EUROPEAN
COMMISSION

Brussels, 6.2.2019
SWD(2019) 13 final

COMMISSION STAFF WORKING DOCUMENT
Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

Sixth report on monitoring development of the rail market

{COM(2019) 51 final}

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List of abbreviations

CAGR	Compound average growth rate
CEF	Connecting Europe Facility
CF	Cohesion Fund
CMS	Consumer Markets Scoreboard
CNC	Core Network Corridor
dB	Decibel
DG JUST	European Commission Directorate-General for Justice and Consumers
DG MOVE	European Commission Directorate-General for Mobility and Transport
DOO	Driver-Only Operation
ECA	European Court of Auditors
EFSI	The European Fund for Strategic investments
EIB	European Investment Bank
ELETA	Electronic exchange of information on Estimated Time of Arrival
ERA	European Union Agency for Railways (formerly European Railway Agency)
ERADIS	European Union Agency for Railways database of interoperability and safety
ERDF	European Regional Development Fund
ERTMS	European Railway Traffic Management System
ESIFs	European Structural and Investment Funds, include Cohesion Fund, European Regional Development Fund, European Social Fund, European Maritime and Fisheries Fund and the European Agricultural Fund for Rural Development
ETA	Estimated Time of Arrival
GFC	Global Financial Crisis
GVA	Gross Value Added
HICP	Harmonised Index of Consumer Prices
IM	Rail infrastructure manager
INEA	EU Innovation and Networks Executive Agency
IRG-Rail	Independent Regulators' Group – Rail
ITU	Intermodal Transport Unit
km	kilometre
KPI	Key Performance Indicator
NIP	National Implementation Plan
NPV	Net Present Value
NSA	National Safety Authority
PAYG	Pay As You Go
p-km	passenger-kilometre
PPP	Purchasing Power Parity
PRIME	Platform of Rail Infrastructure Managers in Europe
PSC	Public Service Contract
PSO	Public Service Obligation
Recast Directive	Directive 2012/34/EU establishing a Single European Railway Area
REGIO	European Commission Directorate-General for Regional and Urban Policy
RFC	Rail Freight Corridor
RMMS	Rail Market Monitoring Survey
RMMS Regulation	Commission Implementing Regulation (EU) 2015/1100 for rail market monitoring
ROSCO	Rolling stock company
RU	Railway undertaking
RU Dialogue	Dialogue of Railway Undertakings

SERAC	Single European Railway Area Committee
SMS	Safety Management System
SWD	Staff Working Document
TAF	Telematics Applications for Freight
TEN-T	Trans-European Transport Network
TSI	Technical Specifications for Interoperability
tonne-km	tonne-kilometre
The Agency	European Union Agency for Railways, until June 2016 called European Railway Agency (ERA)
train-km	train-kilometre
UIC	Union Internationale des Chemins de Fer
UIRR	Union Internationale pour le transport combiné Rail-Route

List of countries

AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czech Republic/Czechia
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
EU	European Union
EU13	EU Member States having joined EU in or after 2004
EU15	EU Member States having joined EU before 2004
EU28	All Current EU Member States
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	The Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

Introduction

This Commission Staff Working Document accompanies the Sixth Report from the Commission to the Council and the European Parliament on monitoring development of the rail market. The data and graphs used in this document have been made available in Excel format on the DG MOVE website[1].

Coverage of the report

This document presents a non-exhaustive report[2] covering the main developments in the EU rail market reflecting the **topics listed in Article 15 (4) of Directive 2012/34/EU** establishing a single European railway area[3] (hereinafter the 'Recast Directive'), according to which the European Commission must report to the European Parliament and the Council every two years on:

1. the evolution of internal market in rail services (Chapter 2);
2. services to be supplied to railway undertakings as per Annex II to the Recast Directive (Chapter 3);
3. the framework conditions (Chapter 4), including inter alia:
   - infrastructure charging;
   - capacity allocation;
   - investment made in infrastructure;
   - developments with regards to prices[4];
   - quality of rail transport services;
   - rail transport services covered by PSCs;
   - licensing;
   - degree of market opening;
   - harmonisation between Member States;
   - development of employment and related social conditions;
4. the state of the Union railway network (Chapter 1);
5. the utilisation of access rights (Chapter 4);
6. barriers to more effective rail services (Chapter 4 and Chapter 5);
7. infrastructure limitations (Chapter 4); and
8. the need for legislation (Conclusions).

The focus of this document is on developments between 2011 and 2016.

The sources of data include Rail Market Monitoring Survey (hereinafter 'the RMMS') responses, the Statistical pocketbook 'EU Transport in Figures'[5], Eurostat[6], IRG-RAIL, statistics collected by various

1 http://ec.europa.eu/transport/modes/rail/market/market_monitoring_en .

2 In addition to rail *market* report, the EU Agency for Railways publishes bi-annual reports on *safety* and *interoperability* performance.

3 Directive 2012/34/EU of the European Parliament and of the council of 21 November 2012 establishing a single European railway area OJ L 343, 14.12.2012, p. 32.

4 Comprehensive monitoring of rail prices for customers is not possible due to the broad variety of services offered.

5 http://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2016_en .

6 http://ec.europa.eu/eurostat/web/transport/data/database .

sectoral organisations[7] and *ad hoc* presentations and studies. Contributions have also been considered from the Member States, national regulatory bodies and stakeholders participating in the Working Group for Rail Market Monitoring in the framework of the Single European Railway Area Committee (SERAC).

All EU Member States are covered, except Cyprus and Malta which have no railways.

Norway participates in the RMMS, but data for Norway are not included in EU totals and averages.

The implementing act for rail market monitoring

Previous RMMS reports drew on the Member States' voluntary responses to the RMMS questionnaire.

This sixth RMMS draws on the mandatory data collection set out in the Commission Implementing **Regulation (EU) 2015/1100 for rail market monitoring**[8] (hereinafter 'the RMMS Regulation') applicable from July 2015. The questionnaire annexed to the RMMS Regulation was developed in close cooperation with the Member States and stakeholders participating in the SERAC Working Group for Rail Market Monitoring. While building mainly on the previous RMMS, the new questionnaire added some new indicators, particularly related to revenues and traffic outputs, public service obligation (PSO), infrastructure charges and employment.

In addition, under the new regime, Member States' reports have been submitted electronically and validated through exchanges with the Commission. This sixth RMMS therefore benefits from better-defined data requirements, a mandatory collection process, and a validation review, which should gradually lead to more consistent and coherent data after the end of the transitional period in 2018. It is recognised that these refinements of the sixth RMMS may have led some Member States to alter the data and approach they have used to respond, which may result in some issues with comparable time series. However, steps have been proactively taken by both the Commission and Member States to ensure that these comparability issues have been minimised wherever possible.

[7] UIC, UIPP.

[8] Commission Implementing Regulation (EU) 2015/1100 of 7 July 2015 on the reporting obligations of the Member States in the framework of rail market monitoring, OJ L 181, 9.7.2015, page 1.

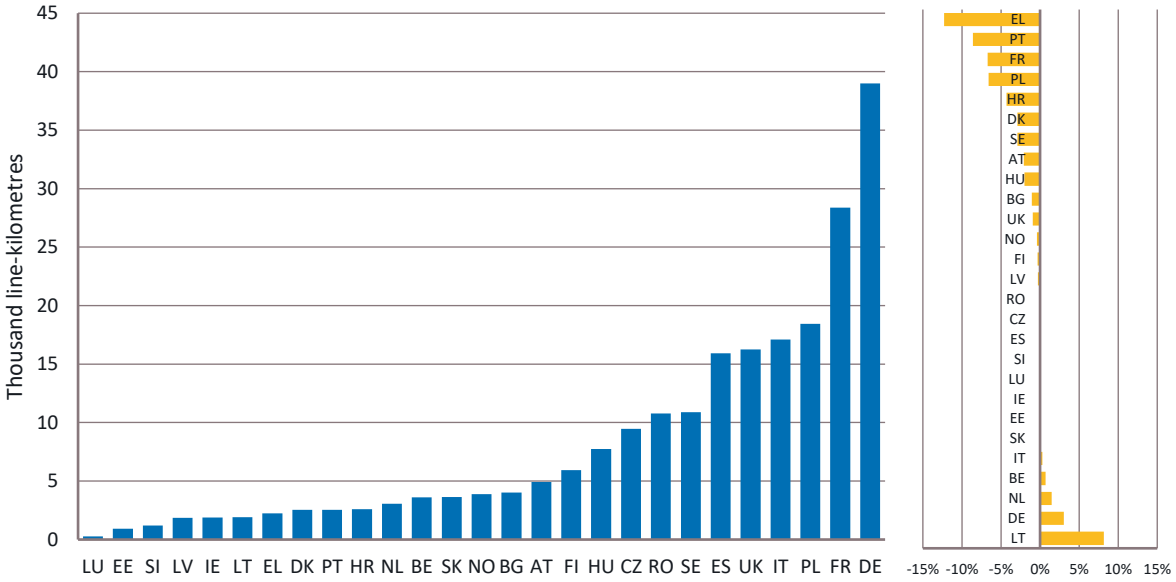
1. The state of the union railway network

1.1 Description

The rail network is the backbone of the EU's transport infrastructure. The importance attached to rail as a sustainable and clean mode of transport is reflected in the TEN-T Guidelines[9], the objectives of the Connecting Europe Facility[10], and the Cohesion Fund[11] priorities. National and European authorities work together to ensure the necessary support for building new and improving existing rail infrastructure as a part of an EU-wide multimodal network.

Figure 1 shows the reported length of the national rail networks of the EU Member States with rail networks, plus Norway (NO).

Figure 1: Length of national networks in 2016 and relative change 2011-2016



Source: Statistical pocketbook, 2018. Infill data from various other sources.

The total length of the EU rail network in use in 2016 was around 221 thousand line-kilometres, 1,6% shorter than in 2011.

Infrastructure density

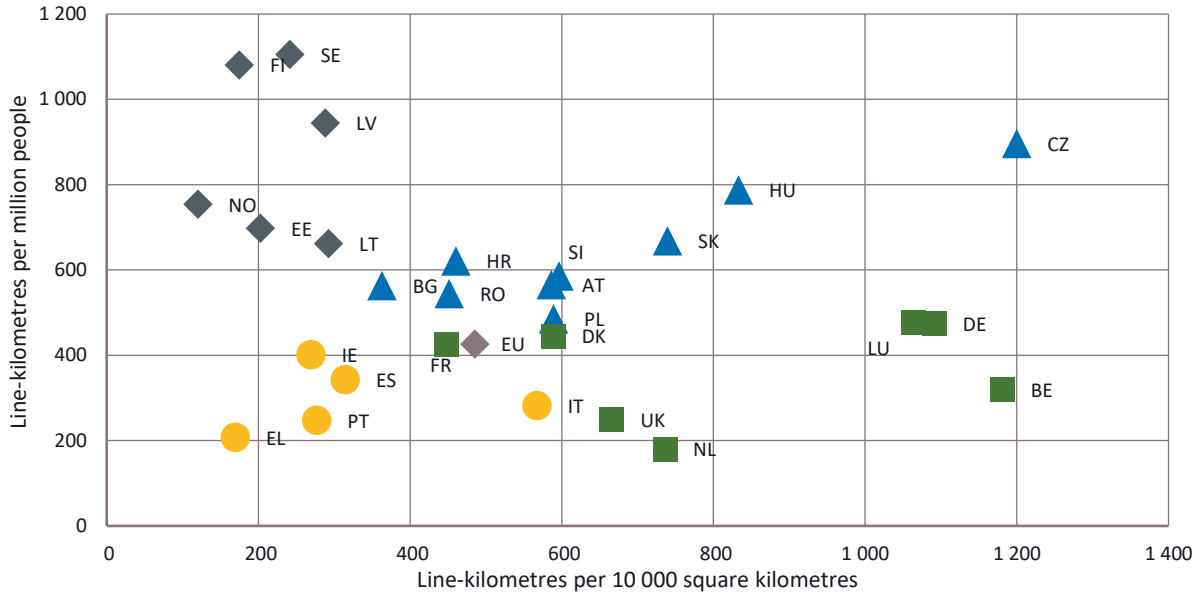
Figure 2 illustrates the diversity of railways in the different States. It compares the number of line-kilometres per ten thousand square kilometres, on the horizontal axis, with the number of line-kilometres per million population, on the vertical axis.

[9] Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network, OJ L 348/1, 20.12.2013.

[10] Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010, OJ L 348, 20.12.2013, page 129.

[11] Regulation (EU) No 1300/2013 of the European Parliament and of the Council of 17 December 2013 on the Cohesion Fund, OJ L 347, 20.12.2013, page 281.

Figure 2: Density of railway network relative to surface area and population in 2016



Source: Statistical pocketbook, 2018.

At the bottom left of the figure (yellow circles) are networks with low track density per 10 000 square kilometres and per million population. These networks are in the peripheral Member States of Ireland, Spain, Portugal, Italy and Greece.

At the top left of the figure (grey diamonds) are networks with a low track density per 10 000 square kilometres but a high track density per million population. These include the Nordic and Baltic States of Norway, Finland, Sweden, Estonia, Latvia and Lithuania.

At the top right of the figure (blue triangles) are networks with medium and high track densities per 10 000 square kilometres and per million population. These include primarily Central and Eastern European Member States of Bulgaria, Romania, Croatia, Slovenia, Poland, Austria, Slovakia and Hungary.

Finally, at the bottom right of the figure (green squares) are networks with high track densities, mainly in Northern Europe: France, Denmark, the United Kingdom, the Netherlands, Luxembourg, Germany and Belgium.

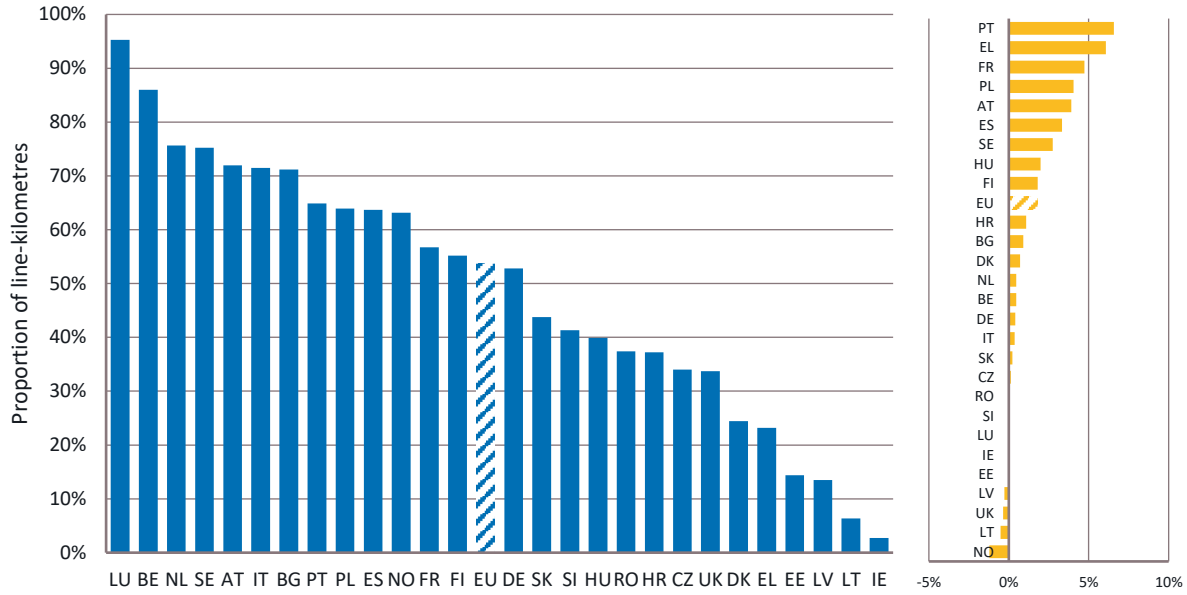
The groupings are particularly striking for:

- the Iberian networks of Spain and Portugal, which also share a track gauge;
- the Nordic States and the Baltic States;
- neighbours Romania and Bulgaria, and Poland, Slovenia, Austria, Slovakia and Hungary; and
- the relatively densely populated Benelux countries, Germany, Denmark and the United Kingdom.

Electrified lines

Figure 3 shows the proportion of each network, measured in line-kilometres, that is electrified, and the EU average.

Figure 3: The proportion of networks electrified, 2016 and change in percentage electrified 2011-2016



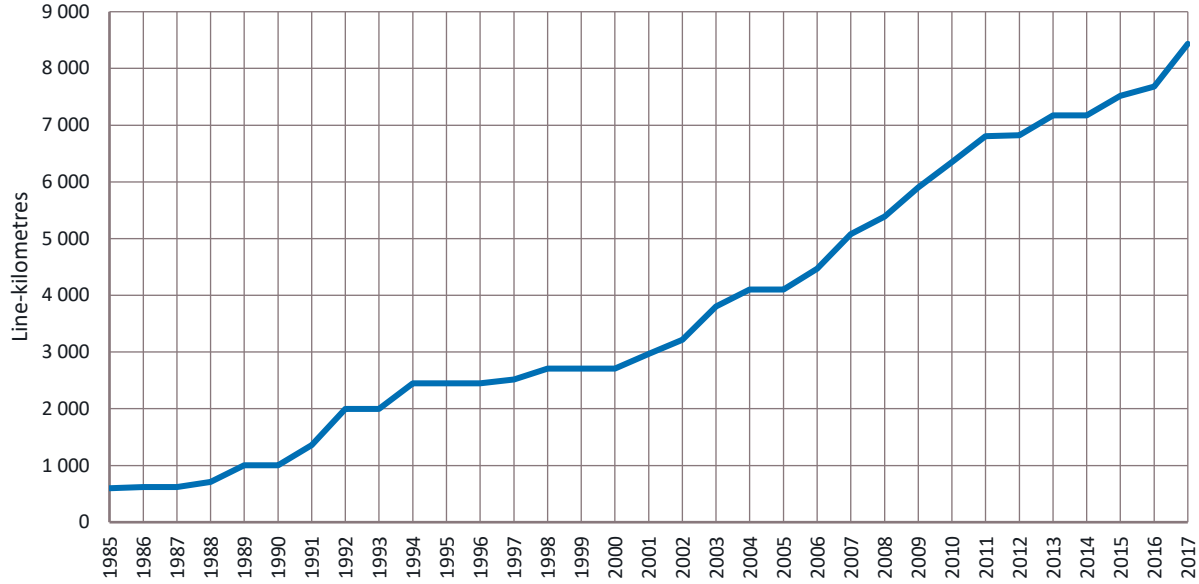
Source: Statistical pocketbook, 2018.

While around 54% of the total EU network is electrified, this proportion ranges from under 3% in Ireland to over 95% in Luxembourg. In Greece and Portugal, over the last 5 years, overall network size has reduced, while additional lines have been electrified, resulting in a sudden increase in the proportion of electrified lines.

High-speed lines

The Commission regularly reports statistics on high-speed lines defined as the lines or of sections of lines on which trains can go faster than 250 km/h at some point during the journey. Figure 4 shows the development of the EU's high-speed network, which by the end of 2017 extended to over 8400 line-kilometres.

Figure 4: Development of high-speed lines in Europe



Source: Statistical pocketbook, 2018, lines or sections of lines on which trains can exceed 250 km/h at some point.

It was 1989 before the network reached 1 000 line-kilometres, but since then it has grown by an average of more than 250 line-kilometres per year, and has more than doubled in length in the 13 years since 2003.

Box 1: Measuring the high-speed network length

Reported length of high-speed network in Europe may vary depending on the reference source.

In the annual DG MOVE publication 'EU transport in figures - Statistical Pocketbook', the Commission reports as high-speed lines the lines or of sections of lines on which trains can go faster than 250 km/h at some point during the journey. Due to the narrow scope, only **8 434** kilometres are reported as completed high-speed lines in Europe in 2017. The RMMS reporting on high-speed lines is based on this statistical publication.

However, high-speed lines could be interpreted more inclusively by counting also lines allowing speeds of at least 200 km/h (and not necessarily exclusively dedicated to high-speed).

For example, the TEN-T Guidelines, on which official measurements of the TEN–T network are based, follow this more extended definition of high-speed lines (Article 11(2 a)), including three categories:

- specially built lines for speeds higher than 250 km/h;
- specially upgraded lines for speeds in the order of 200 km/h; and
- specially upgraded high-speed lines with special features, resulting from topographical constraints etc.

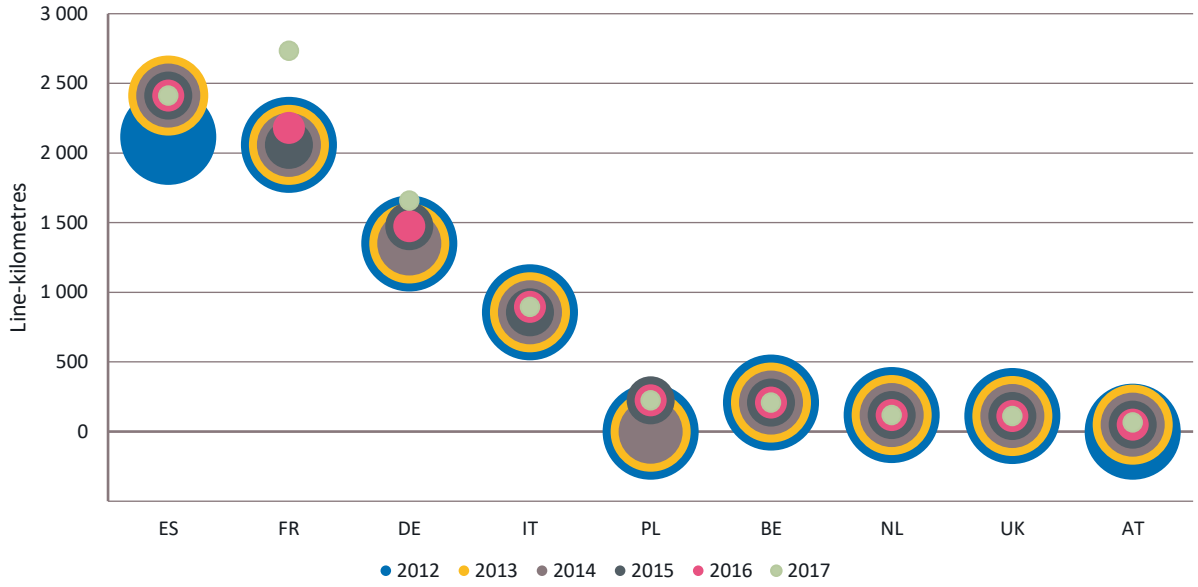
This means that **10 600** kilometres are completed on the core network and **805** kilometres on the comprehensive network, or **11 400** kilometres in total.

This definition is in line with the Directive 2008/57/EC ('the Interoperability Directive'), which defines high-speed lines as those that comprise:

- specially built high-speed lines equipped for speeds generally equal to or greater than 250 km/h (kilometres per hour);
- specially upgraded high-speed lines equipped for speeds of the order of 200 km/h (kilometres per hour); or
- specially upgraded high-speed lines which have special features as a result of topographical, relief or town planning constraints, on which the speed must be adapted to each case. This category also includes interconnecting lines between the high-speed and conventional networks, lines through stations, access to terminals, depots, and other facilities travelled at conventional speed by 'high-speed' rolling stock.

Figure 5 shows how the length of high-speed line has evolved over the four years 2012 to 2017. The first high-speed lines in the EU were in France, which in 2017 overtook Spain as the largest high-speed network.

Figure 5: Length of dedicated high-speed line, 2012-2017



Source: Statistical pocketbook, 2018.

No new lines have been added to the relatively small networks in the United Kingdom and Belgium, which have now been overtaken by Poland, where since December 2014 high-speed services are operated on the 224 line-kilometres. There has been slight growth in the high-speed networks of Italy. The greatest increases occurred in France, Germany and Spain, which have since 2012 put into service 676, 306 and 296 additional line-kilometres respectively.

In France, more than 500 kilometres of new high-speed lines were put into service in 2017, including the new 302-kilometre Tours-Bordeaux line. The newest lines in France allow speeds of 320 km/h.

Table 1: Use of high-speed lines for high-speed services, 2016

	Proportion of total network consisting of high-speed lines (proportion of line-kilometres)	Passengers carried in high-speed rolling stock (billion passenger-kilometres)	Length of high-speed lines (line-kilometres)
Spain	15.2%	15.06	2 413
France	7.7%	50.54	2 180
Belgium	5.8%	1.50	209
Italy	5.2%	12.79	896
Netherlands	3.9%	0.37	120
Germany	3.8%	27.21	1 475
United Kingdom	0.7%	2.80	113

Source: Statistical pocketbook 2017, UIC data.

Many services operated using high-speed rolling stock extend beyond the network of high-speed lines, so passengers carried in high-speed rolling stock are not necessarily travelling on a high-speed line.

Spain's new high-speed network forms nearly one line-kilometre in six (15%) of the national network. In contrast, the United Kingdom has a single short high-speed line from the Channel Tunnel to

London (0.7% of total network), although it is used relatively intensively by Eurostar international and Javelin domestic high-speed services.

Box 2: European Court of Auditors report on the EU high-speed rail network

In a recent special report[12] the European Court of Auditors (ECA) recognises the benefits of the high-speed rail to support EU's sustainable mobility policy.

Able to produce a carbon footprint lower than other forms of transport, high-speed rail contributes to relieve pressure on congested road networks, exhibits increased safety levels, provides its passengers with quick and comfortable travel and can provide socio-economic support to regions.

The Commission recognised the importance of high-speed rail for a sustainable transport enabling economic growth and job creation. Completing a European high-speed rail network by 2050 and tripling the length of the existing high-speed rail network up to 30 000 kilometres by 2030 was one of the ten goals set in the White Paper on Transport 2011 for a competitive and resource-efficient transport system[13].

According to ECA it is unlikely that these objectives will be achieved. The report concludes that the current high-speed network is a patchwork of national high-speed lines rather than a true European high-speed network. They consider that a seamless and competitive cross-border high-speed rail is still some way off and make recommendations to the Commission on the planning of the EU high-speed rail network, on how to better target the EU co-funding for high-speed rail infrastructure investments, on simplifying cross-border constructions and on possible actions to improve high-speed rail operations for passengers.

The 28 Member States have more than 215 000 kilometres of rail lines, so prioritising high-speed rail will not happen overnight. In this context the Commission welcomes the report and recommendations from the Court and is fully supportive of the Court's objective of ensuring public money is well-spent.

Several recommendations of the Court are timely, as they clearly support the Commission's ongoing efforts to better coordinate works and investments for the realisation of the Trans-European Transport Network, and to create a genuine level playing field between transport modes. The Commission has now put in place a clear long-term planning and governance, supported by strong rules, sound monitoring and adequate financing as recommended by the ECA. In addition, proposals recently made by this Commission as part of the next long-term budget ('Connecting Europe Facility') and Europe on the Move ('Smart TEN-T') will accelerate the completion of the high-speed network, while ensuring that public money is well-managed and well-spent.

Source: ECA.

1.2 Missing links and cross border vision

The TEN-T railway network, with total length of 163 180 kilometres (both comprehensive and core networks), has in the first instance to be implemented by Member States. In particular, the European Commission facilitates the implementation of the core network as the strategically most important part (43 % of the total length of the TEN-T railway network). The core network should be completed by 2030.

The Commission supports the implementation of TEN-T projects in two ways: funding under the Connecting Europe Facility (CEF)[14] and through coordination in the framework of the Core Network

[12] Special Report n. 19 'A European high-speed rail network: not a reality but an ineffective patchwork', ECA, June 2018.

[13] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN.

[14] Information about all railway projects, which have so far been funded under the CEF 2014 – 2020, can be found at https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/projects-by-transport-mode/rail.

Corridors (CNC), including EU level horizontal priorities such as deployment of the European Rail Traffic Management System (ERTMS).

Rail projects are addressed in a comprehensive way in the TEN-T Corridor work plans[15] established by the European Coordinators, with the aim of stimulating a shift to rail as a sustainable transport mode. This includes the completion of missing links and the removal of bottlenecks as well as ensuring coherent standards along the corridors (requirements for axle load, train lengths, line speed). Some key cross-border projects (which at the same time overcome geographical barriers, such as the Brenner and Lyon-Torino Alpine tunnels or the Fehmarnbelt Fixed Link) are of special European added value.

Besides the rail projects on the core network, smaller railway projects on the comprehensive network and beyond can also be important. In many cases, abandoned, missing or unused rail connections across the borders between Member States limit opportunities for cross-border cooperation between regions. A study on Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU border[16], completed in March 2018, assesses the situation of such connections.

The Commission's proposal for the Connecting Europe Facility 2021-2028 proposes to give increasing importance to such smaller scale rail infrastructure projects located on the comprehensive network of the TEN-T. Other projects, which may also be important as access routes to the TEN-T infrastructure, might be considered for support under other EU instruments, such as Cohesion Fund (CF) and European Regional Development Fund (ERDF).

1.3 Infrastructure management

1.3.1 Infrastructure governance

Member States often have a single national infrastructure manager, or a dominant infrastructure manager responsible for the main network and smaller ones responsible for specific lines, regional infrastructure or service facilities.

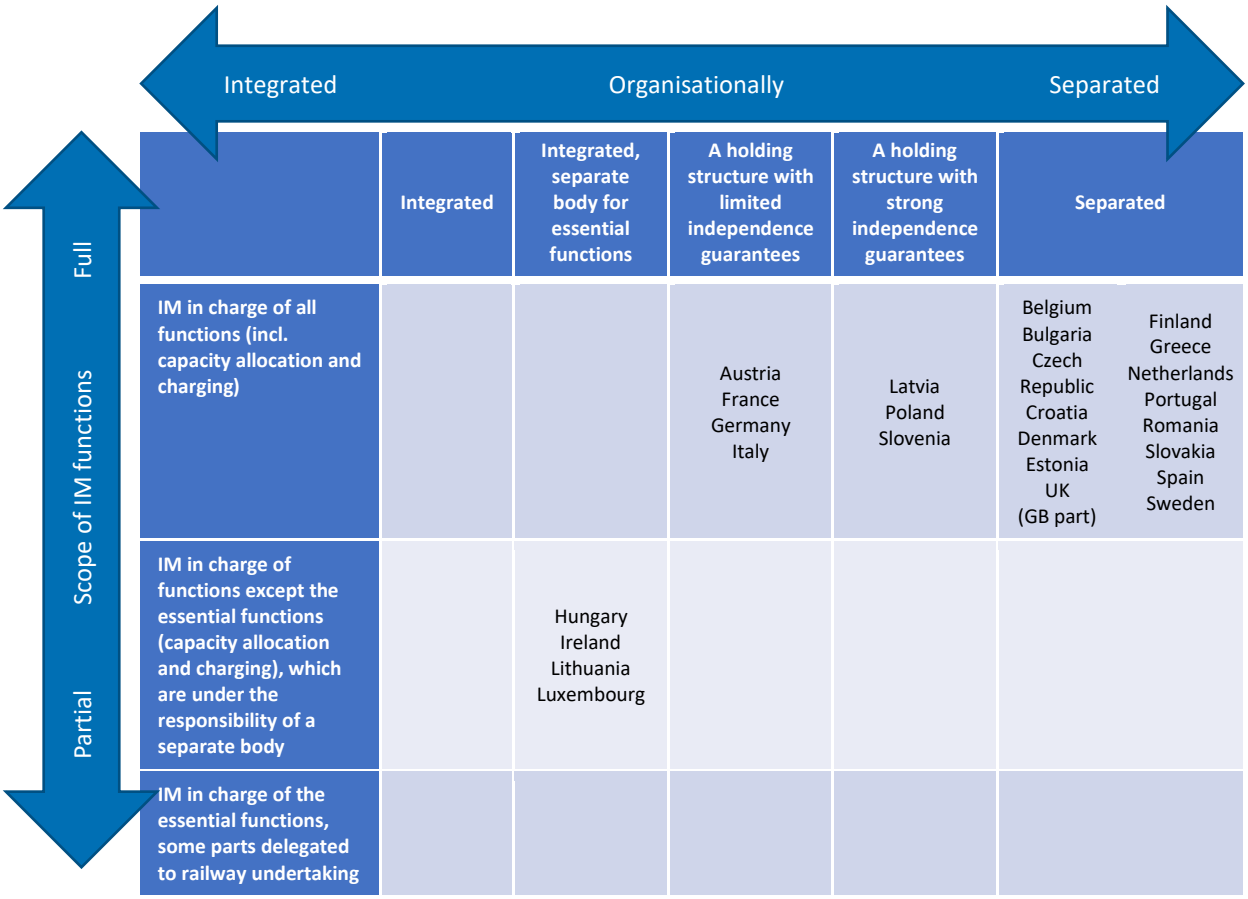
The Fourth Railway Package, whose market pillar was adopted by the co-legislators in December 2016, proposes additional measures to ensure that infrastructure managers manage their networks in an optimised, efficient and non-discriminatory manner.

Figure 6, reproduced from the Commission Staff Working Document accompanying the fifth RMMS, shows the national governance structures of the main infrastructure managers updated to 2016.

[15] The work plans of the European Coordinators can be found at https://ec.europa.eu/transport/themes/infrastructure_en.

[16] http://ec.europa.eu/regional_policy/en/information/publications/reports/2018/comprehensive-analysis-of-the-existing-cross-border-rail-transport-connections-and-missing-links-on-the-internal-eu-border.

Figure 6: Institutional settings in the Member States, 2016



	Integrated	Integrated, separate body for essential functions	A holding structure with limited independence guarantees	A holding structure with strong independence guarantees	Separated	
IM in charge of all functions (incl. capacity allocation and charging)			Austria France Germany Italy	Latvia Poland Slovenia	Belgium Bulgaria Czech Republic Croatia Denmark Estonia UK (GB part)	Finland Greece Netherlands Portugal Romania Slovakia Spain Sweden
IM in charge of functions except the essential functions (capacity allocation and charging), which are under the responsibility of a separate body		Hungary Ireland Lithuania Luxembourg				
IM in charge of the essential functions, some parts delegated to railway undertaking						

Source: EC.

No material changes in national governance structures have been reported since 2016.

Box 3: European Network of Infrastructure Managers PRIME

PRIME brings together rail infrastructure managers at European level with a view to facilitating and improving rail services for transporting people and goods across Europe.

PRIME was created on a voluntary basis in 2013 as a cooperation platform between the European Commission and European rail infrastructure managers. In 2017 it become a formal European Network of Infrastructure Managers as foreseen in the Fourth Railway Package. The tasks of the European Network of Infrastructure Managers include:

- developing EU rail infrastructure and tackling cross-border bottlenecks;
- supporting implementation of the single European railway area;
- exchanging best practices;
- monitoring and benchmarking performance, exchanging best practices and contributing to the market monitoring; and
- cooperating on charging systems and the allocation of cross-border infrastructure capacity.

PRIME has more than 35 member organisations and is co-chaired by the European Commission and industry. According to the Fourth Railway Package, the Member States must ensure that their main infrastructure managers participate in the work of the PRIME by the end of 2018.

Work on specific topics is done in PRIME's six subgroups (KPIs and Benchmarking, Financing, Digitalisation, Safety Culture, Charges and EC Expert Group on Implementing Acts) and in two cooperation platforms - one with Railway Undertakings and another one with Regulatory Bodies[17]. The PRIME KPI and Benchmarking Subgroup published its first Benchmarking report in July 2018[18].

1.3.2 Infrastructure expenditure

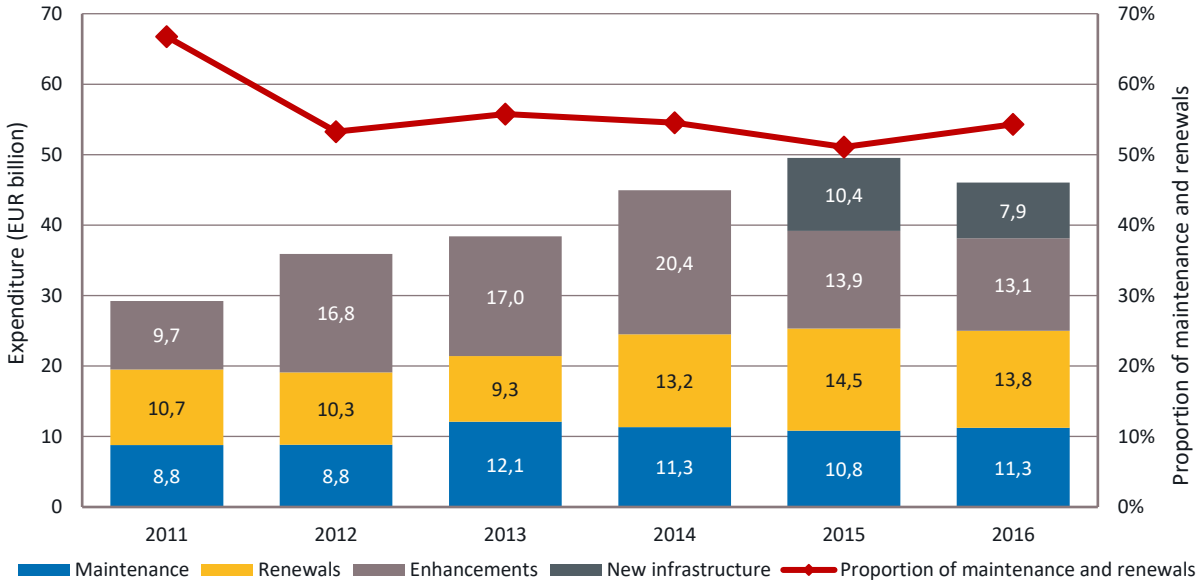
One of the main objectives of European and national transport policies is to enhance rail infrastructure investments. Over the period 2014 to 2020, the investment required for the implementation of projects necessary to contribute to the TEN-T networks is expected to be EUR 500 billion. By 2030, an additional investment of EUR 750 billion will be required to complete the TEN-T networks.[19] This will be financed primarily from the national budgets of Member States, but with a significant contribution from EU grants. In addition, however, Member States and rail infrastructure managers will need to invest and maintain parts of their national networks which are not included in the TEN-T networks.

[17] To learn more about PRIME, its activities and deliverables, visit its website https://webgate.ec.europa.eu/multisite/primeinfrastructure/prime-news_en .

[18] https://webgate.ec.europa.eu/multisite/primeinfrastructure/content/subgroups_en .

[19] https://ec.europa.eu/transport/themes/infrastructure/ten-t-guidelines/project-funding_en .

Figure 7: Expenditure on infrastructure and proportion on maintenance and renewals, 2011-2016

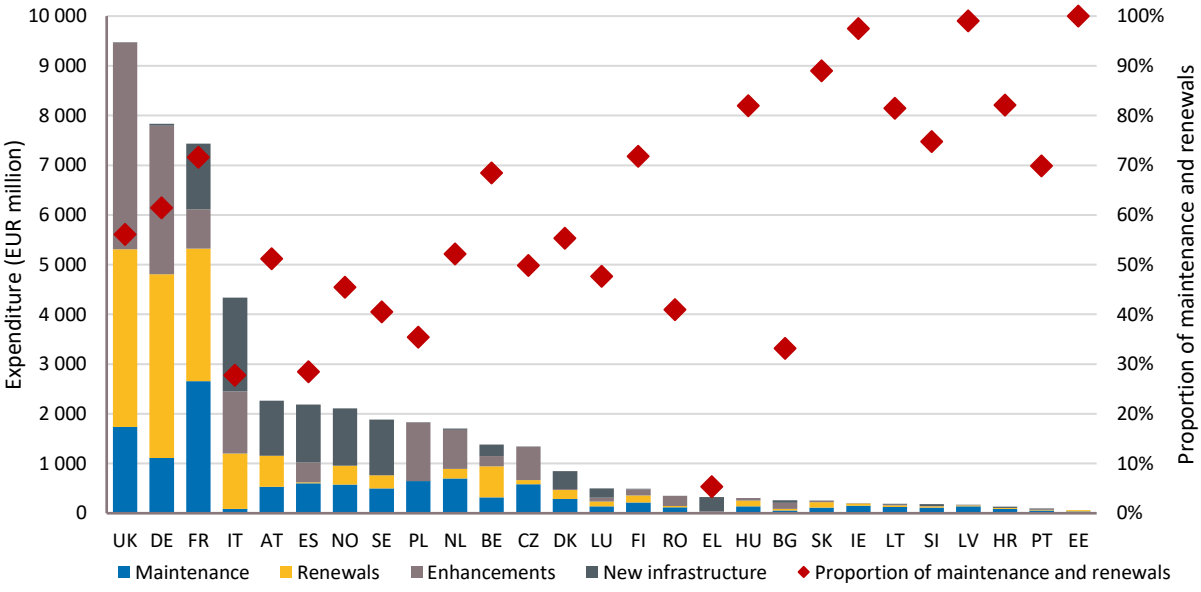


Source: RMMS, 2018.

Figure 7 shows that total EU infrastructure expenditure rose continuously from EUR 29.2 billion in 2011 to EUR 49.5 billion in 2015 and then fell by EUR 3.5 billion in 2016, primarily due to lower expenditure on new infrastructure. Of 2016 expenditure, 25% was on maintenance, 29% on renewals, 27% on enhancements, and 19% on new infrastructure. Compared with 2011, total maintenance expenditure in 2016 had increased by 28%, renewals by 30% and enhancements by 28%.

Figure 8 shows total infrastructure expenditure by State.

Figure 8: Expenditure on infrastructure and proportion on maintenance and renewals per country, 2016



Source: RMMS, 2018. NO, SE included enhancements with renewals.

Not all countries[20] were able to distinguish in their reporting the investments in new infrastructure from enhancements, but the information available suggests that France, Italy, Austria, Spain, Norway and Sweden invested most in new infrastructure in 2016.

Total infrastructure expenditure was highest in the United Kingdom, Germany and France. In Germany, federal subsidies in 2016 rose by EUR 800 million[21] to support the expansion of the regional railway system. In 2018, incumbent rail operator Deutsche Bahn began a major railway investment plan and intends to spend EUR 9.3 billion (9.4% more than in 2017) on maintenance, renewal and enhancement of tracks, stations, bridges and tunnels.

Maintaining and renewing the existing network, to enhance its safety and operational performance, and to ensure reliable service, is a major challenge for infrastructure managers, particularly in conditions of increasing traffic and demanding performance targets agreed between national authorities and operators. Maintenance and renewals expenditure has been relatively low in many Member States, not only because of a shortage of funds, but also because priority was given to investment in new lines. Catching up with underinvestment is often more expensive, in the longer term, than continuous routine maintenance of infrastructure.

In 2016, total maintenance and renewal expenditure amounted to EUR 26 billion, i.e. 54% of the total expenditure[22]. The proportion of maintenance and renewal expenditure in the total varied between countries, with Central and Eastern European economies spending a substantial proportion on maintenance and renewal of lines. The highest proportion was for Estonia (100%), and the lowest was for Greece (5%). France, Germany and United Kingdom spent an average of 63% of total expenditure on maintenance and renewal. Between 2014 and 2016, maintenance and renewal expenditure grew by an average of 23%, most significantly in Slovenia, Bulgaria, and Germany, while Hungary and Croatia showed the largest reductions.

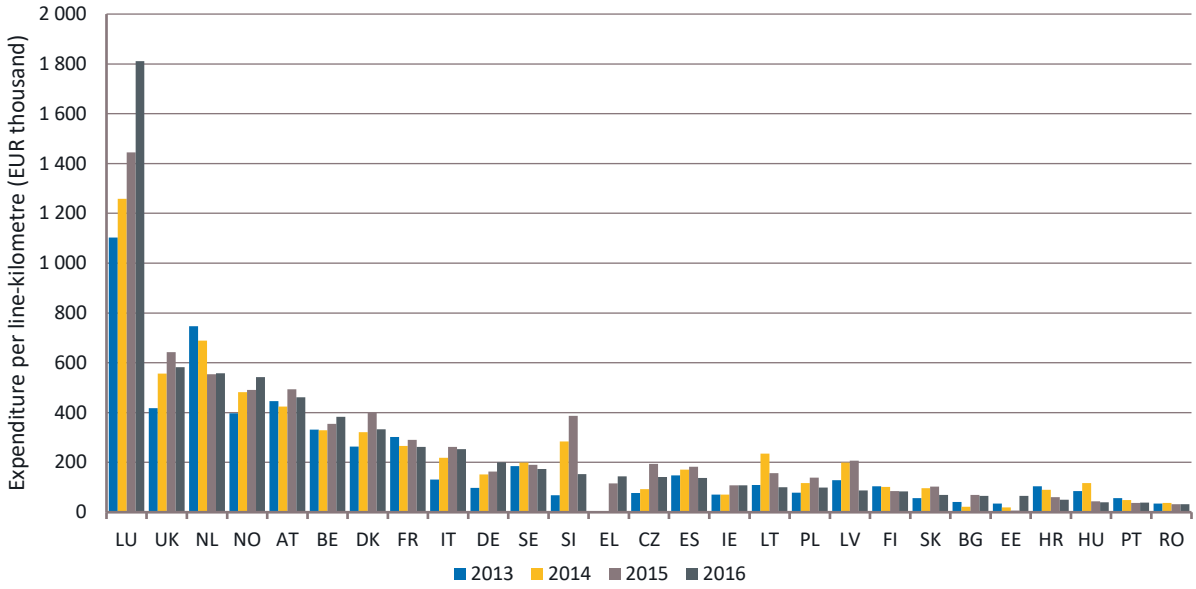
Figure 9 shows total maintenance, renewal and enhancement expenditure per line-kilometre in each Member State over the period 2013 to 2016.

[20] Norway and Sweden have explicitly stated that they combined renewals and enhancements, but it seems that Austria, Croatia and Estonia had the same reporting problem (zero value in enhancements).

[21] https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Public-Finances/Articles/2017-06-19-german-public-investment.html .

[22] Norway included.

Figure 9: Expenditure on maintenance, renewal and enhancement per line-kilometre, 2013-2016



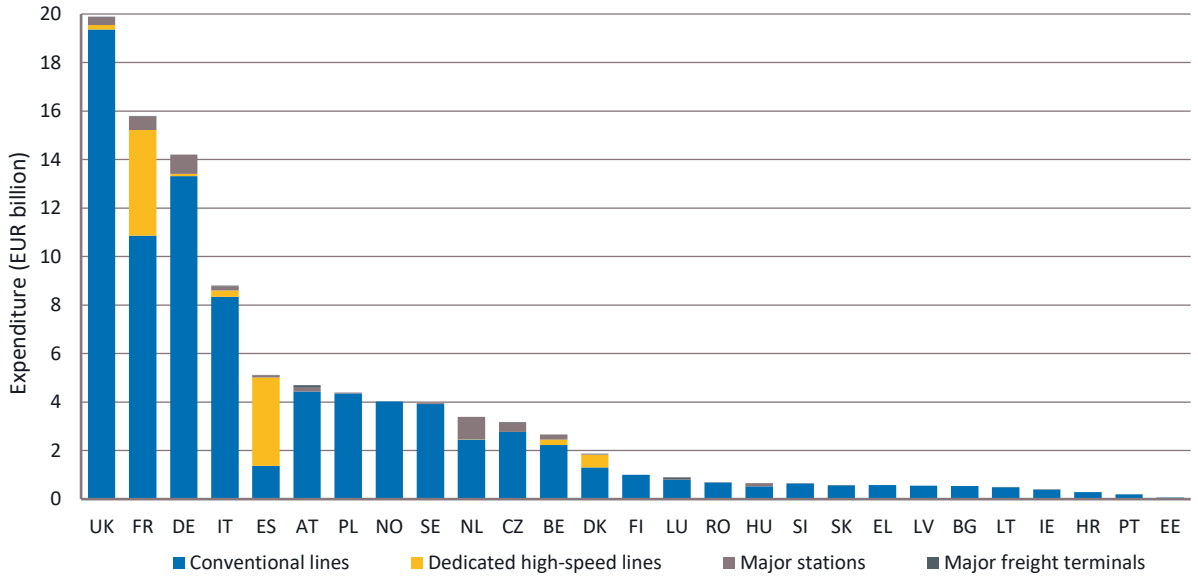
Source: RMMS and Statistical pocketbook, 2018. No 2013 data for EL.

Before 2015, expenditure on new infrastructure was reported as part of enhancement expenditure, so separate data for enhancement infrastructure and new infrastructure are only available for 2015 and 2016. This also means that it is not possible to compare enhancement expenditure in 2011 and 2016. However:

- Total EU expenditure on enhancements in 2016 was EUR 13.1 billion, of which 79% was in five Member States: France, Germany, Italy, Poland and the United Kingdom.
- Total (EU plus Norway) expenditure on new infrastructure fell from EUR 11.5 billion in 2015 to EUR 9.1 billion in 2016, of which 86% was in six States: Austria, France, Italy, Norway, Spain and Sweden.

Figure 10 shows the average annual expenditure in 2015-2016 by the category of infrastructure to which it related.

Figure 10: Expenditure by category by country, average of 2015-2016



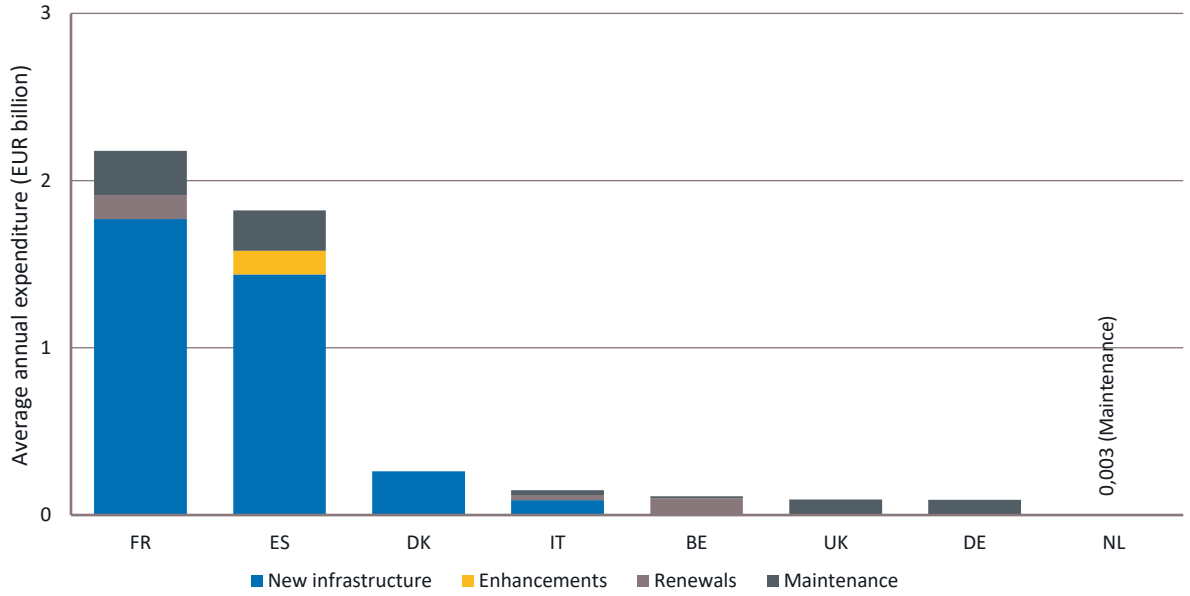
Source: RMMS, 2018. Estonia reported expenditure of EUR 0.1 billion.

Most maintenance, renewal, enhancements and new construction expenditure during 2015-2016 were reported under the category of conventional lines[23]. France and Spain both reported having spent large portions of their overall budgets (EUR 4.36 billion and EUR 3.64 billion respectively) on high-speed rail.

Figure 11 shows the data available on the role of expenditure on high-speed lines. In the top four Member States by spend, most expenditure were allocated to the construction of new infrastructure.

[23] Some Member States are still making use of the transitional period following the entry into force of Regulation 2015/1100 to adjust existing data collection mechanisms to the format requested and they may have reported under conventional lines also the expenditure for dedicated high-speed lines, major stations and major freight terminals.

Figure 11: Expenditure on high-speed rail by activity, by Member State, average of 2015-2016



Source: RMMS, 2018.

Expenditure on new infrastructure occurs only on networks which are being started or extended. Of total 2015-2016 expenditure on high-speed infrastructure, new infrastructure accounted for 100% in Denmark, 81% in France and 79% in Spain, but nothing in Germany and the UK, where expenditure was dominated by maintenance of the existing networks.

1.3.3 Infrastructure funding and financing

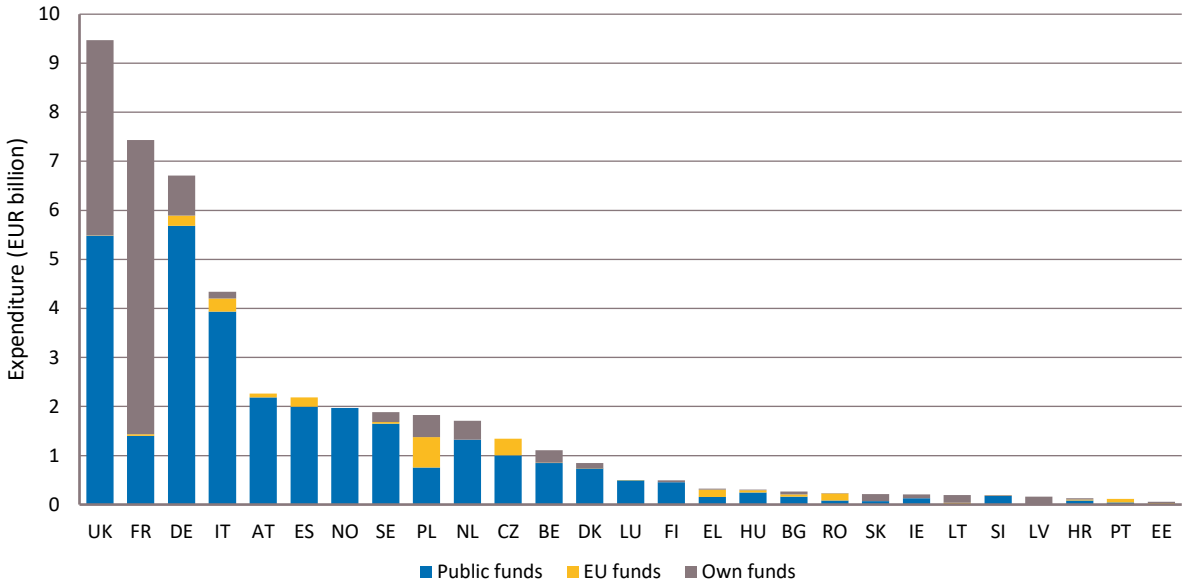
Infrastructure managers obtain resources to maintain and improve their rail infrastructure from a variety of sources, including national public funding, project support from the EU and railway-generated funds such as revenue earned from track access charges.

The principal source is national government budgets: in 2016 national budgets contributed about 70% to total expenditure and investment.

Figure 12 shows the States' infrastructure funding by source[24].

[24] Amounts in this Figure do not always match those related to total expenditure by category due to data quality issues in RMMS.

Figure 12: State rail infrastructure funding by source and country, 2016



Source: RMMS, 2018.

Infrastructure managers' own resources include infrastructure access charges that can contribute to operations, maintenance and renewals. The proportion of total funding generated internally was highest in Latvia (100%), Lithuania and France (both 81%), followed by Slovakia (69%) and the United Kingdom (42%).

In many States, however, funding generated by rail services was less than 10% of the total. In most Member States, infrastructure access charges cover between 5% and 10%[25] of operations and maintenance costs, although this proportion varies widely:

- In the Baltic States, high freight track access charges have in the past been sufficient to fund a large proportion of maintenance expenditure.
- In Germany, a fund based on a Performance and Funding Agreement between the federal government and Deutsche Bahn AG has been established to cover the maintenance cost of infrastructure.

European Union funding is also important for railway infrastructure investments. European Union funding through Cohesion Fund (CF), the European Regional Development Fund (ERDF), the Connecting Europe Facility (CEF), and the European Investment Bank (EIB) contribute an average of 12% of the total funding for investment in rail infrastructure in Europe. Funding is also supported by private financing such as bank loans and by equity capital for large projects.

Depending on national policy on the level and structure of access charges, most infrastructure managers also require subsidies to fund their activities. To ensure that they have mid-term assurance on the availability of sufficient funds, Directive 2012/34/EU obliges Member States to conclude contractual agreements between the competent authority and the infrastructure manager covering a period of at least five years, with funding in many States conditional on the achievement of performance targets.

[25] "The results and efficiency of railway infrastructure financing within the EU", European Parliament, 2015.

As yet, however, there is no comprehensive overview of the level of subsidies provided by national governments to rail infrastructure managers[26].

The RMMS survey asked States to provide information on total compensation from the State pursuant to Article 30(2) of Directive 2012/34/EU. Only 17 Member States provided complete responses, describing compensation arrangements for periods ranging from one year to nearly 30 years. Only 11 Member States reported that the compensation was for a period of five years or more, and only ten reported that performance indicators had been agreed. Many Member States reported a single national total compensation, but Italy listed 17 different compensation packages for various infrastructure managers for periods varying from one to ten years. The reported average annual compensation per network kilometre varied from EUR 37 in Lithuania to more than EUR 3 million in Portugal.

EU funding (Connecting Europe Facility and European Structural and Investment Funds)

Around EUR 33 billion has been allocated to European railway investments under the current framework. Table 2 shows that 74% of CEF funding and 37% of total EU transport funding has been allocated to the railway sector. Table 3 and Table 4 show the types of projects on which these funds were spent.

Table 2: Allocation of EU funds to transport and rail projects for the EU funding cycle 2014-2020

EUR billion	All transport projects	Railway projects	Proportion of total invested in rail
ERDF and Cohesion Fund	70.1	18.7	27%
CEF	19.7	14.6	74%
Total	**89.8**	**33.3**	**37%**

Source: Innovation and Networks Executive Agency (INEA), DG REGIO.

Table 3: Allocation of CEF to railways, 2014-2016

	2014 CEF call		2016 CEF call	
	Number of projects	Granted funding, EUR million	Number of projects	Recommended funding, EUR million
ERTMS	18	251.5	19	477.8
Rail Interoperability	8	28.1	4	12.0
Rail freight noise	2	6.2		
Multimodal logistics platforms	10	30.1	15	63.1
Railways	81	9 339.1	33	4 406.3
Total	**119**	**9 655.0**	**71**	**4 959.2**

Source: Innovation and Networks Executive Agency (INEA).

[26] Some Member States, such as the United Kingdom, provide comprehensive data about the financing of their rail system (see, for example http://orr.gov.uk/statistics/published-stats/gb-rail-industry-financial-information/gb-rail-industry-financial-information-2014-15), but this practice is not common to all States.

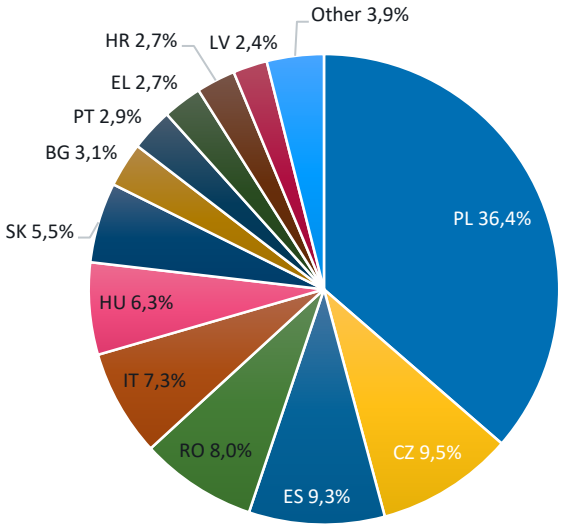
Table 4: Allocation of ESIF to railways, 2014-2020

EUR million	Cohesion Fund	European Regional Development Fund	Total
Railways (TEN-T core)	5 334.9	2 511.0	7 854.9
Railways (TEN-T comprehensive)	4 089.4	424.8	4 614.2
Other railways	194.5	2 64.8	4 159.3
Mobile rail assets	158.9	668.8	2 027.7
Total	**12 477.6**	**6 169.6**	**18 647.1**

Source: DG REGIO.

Figure 13 shows the distribution of Cohesion Fund and ERDF funding among the Member States.

Figure 13: Distribution of Cohesion Fund and ERDF funding by Member State, 2014-2020

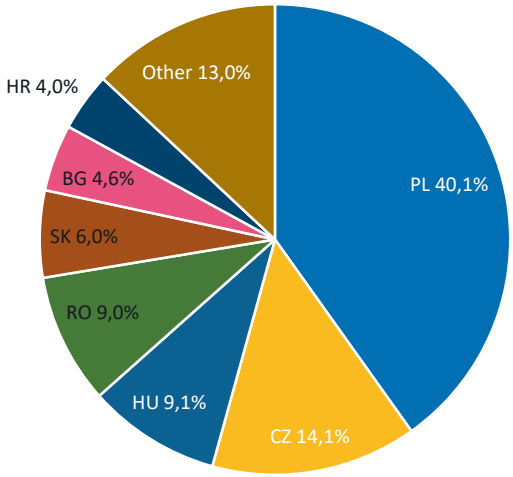


Source: INEA and DG REGIO.

Poland is the largest beneficiary of CF and ERDF funding, receiving 36.4% of total EU funding. No other Member State received more than 10%.

Figure 14 shows that Poland is also largest beneficiary of CEF funding, with 40.1%, followed by the Czech Republic with 14.1%. No other Member State received more than 10%.

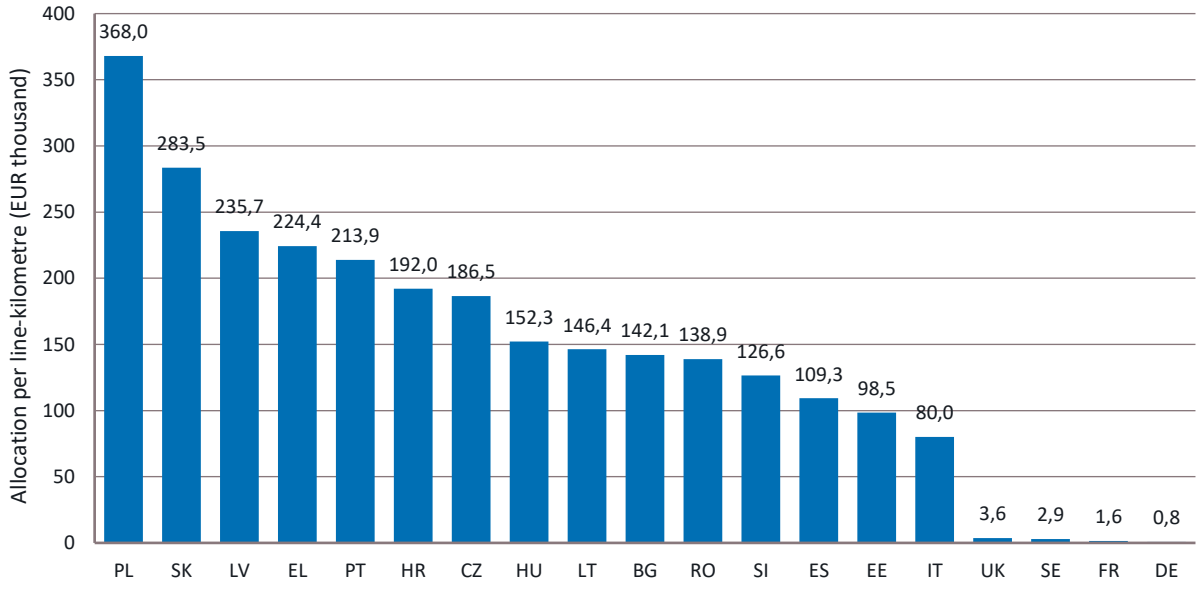
Figure 14: Distribution of CEF funding by Member State, 2014-2016



Source: INEA and DG REGIO.

Figure 15 shows the rate of Cohesion Fund (CF) and ERDF funding per line-kilometre allocated to each Member State. This data indicates that Poland was allocated more funding per line-kilometre than any other Member State.

Figure 15: Allocation of CF and ERDF funding per line-kilometre in the 2014-2020 funding cycle



Source: INEA, DG REGIO and Statistical pocketbook, 2017, operational programmes adopted at 23 June 2016 .

Box 4: EFSI for rail

The European Fund for Strategic Investment (EFSI) was established in July 2015 as one of the three pillars of the Investment Plan for Europe, to help overcome the current investment gap in the EU. Jointly launched by the European Commission and the European Investment Bank (EIB) Group, the EFSI aims to mobilise private investment in projects which are strategically important for the EU.

Backed by a budget guarantee from the European Union and own resources from the EIB Group,

operations approved until July 2018 are expected to trigger EUR 335 billion in investment across the 28 EU Member States. This is more than the original goal of EUR 315 billion set in 2015.

In December 2017, the EFSI 2.0 extended the lifetime of the EFSI until end-2020, covering the period of the current Multiannual Financial Framework. It also increases its target to mobilise at least EUR 500 billion of investments by end-2020 versus the original goal of EUR 315 billion by July 2018.

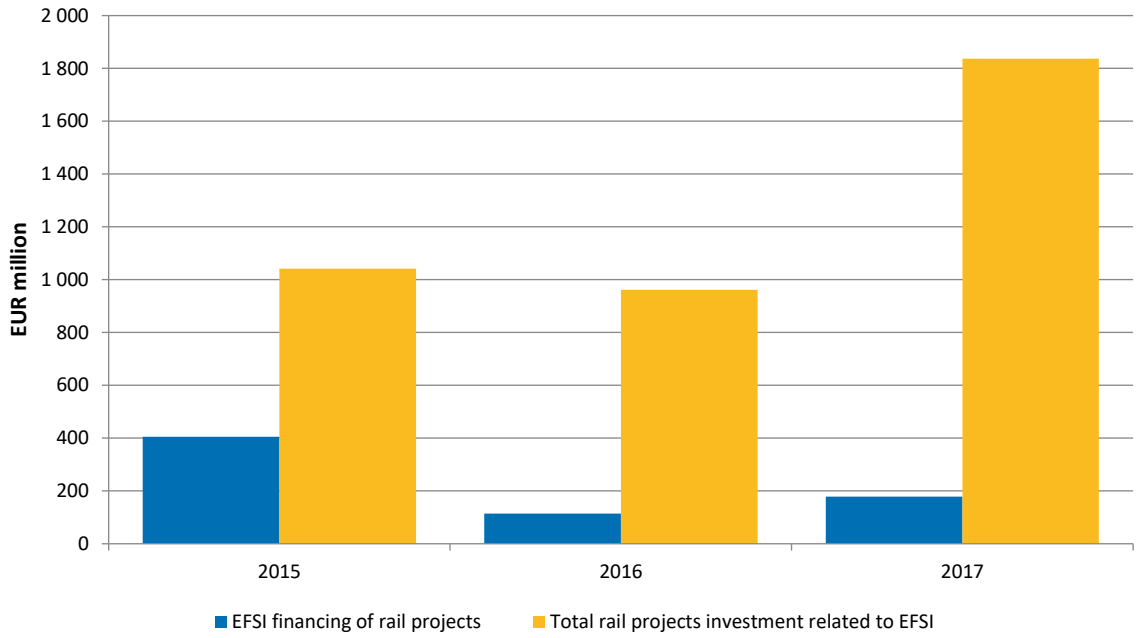
EIB finance makes an important contribution to rail investment in Europe with an average of over EUR 4 billion per year (from 2015-17 inclusive) in loans:

EIB annual lending (signed projects) for the rail transport sector

EUR million	2015	2016	2017	2018 to date
EU28	5 547.5	3 816.0	3 063.9	1 649.5
non-EU	177	204.8	40	134
Total	**5 724.5**	**4 020.8**	**3 103.9**	**1 783.5**

Source: EIB; 2018 data to 5 July 2018.

The support given to rail projects under the EFSI has helped to mobilise significant additional public or private funds. The figure below shows for all rail projects approved and signed under the EFSI between 2015 and 2017 both the specific EFSI financing and the total investment they are expected to attract.



Source: EIB – projects mainly related to rolling stock.

The EFSI financing is the tranche of an operation that benefits from the support of the European Fund for Strategic Investments. This amount will sometimes differ from the total EIB financing amount of the same operation.

The total investment related to EFSI refers to the total financing amount expected to be attracted for any particular EFSI project. This amount might come from public or private sources, and it includes EFSI financing provided by the EIB.

Source: EIB, 2018.

2. The evolution of rail services

The traffic volume indicators in this section are mainly based on RMMS data, available as from 2007. RMMS data provide breakdowns of volumes in terms of market segments (passenger/freight, domestic/international, PSO/non-PSO). Eurostat data are used to assess the modal split, which require combining the data of different modes. Passenger-kilometres and tonne-kilometres as reported in Eurostat could however show slight differences with those reported in the RMMS due to variations in the scope of reporting, potential double counting of transit volumes and adjustments performed in the RMMS (estimates and integration from other sources). Finally, for train-kilometres the data of Eurostat, UIC and IRG-Rail have been combined to acquire a dataset as complete as possible.

The European rail transports some 1.6 billion tonnes of freight and 9 billion passengers every year. Rail transport is critical to the EU strategy for a more sustainable transport sector, economic and social cohesion and connecting EU citizens, within and between Member States.

Rail has the potential to play a significant role in accelerating the reduction of transport's emissions. It only accounts for 2% of total EU energy consumption in transport, while in 2016 it carried 11.2% of freight and 6.6% of passengers of all transport modes (land, air and waterways). It is also the only mode having almost continuously reduced Green House Gas (GHG[27]) and in particular carbon dioxide (CO_2) emissions since 1990, representing in 2016 only 0.5% of total emissions from all transport modes[28].

2.1 Traffic volumes

Figure 16 summarises trends in passenger and freight volumes over the period 2005 to 2016 and Figure 17 shows the average annual rates of change over the period 2011 to 2016.

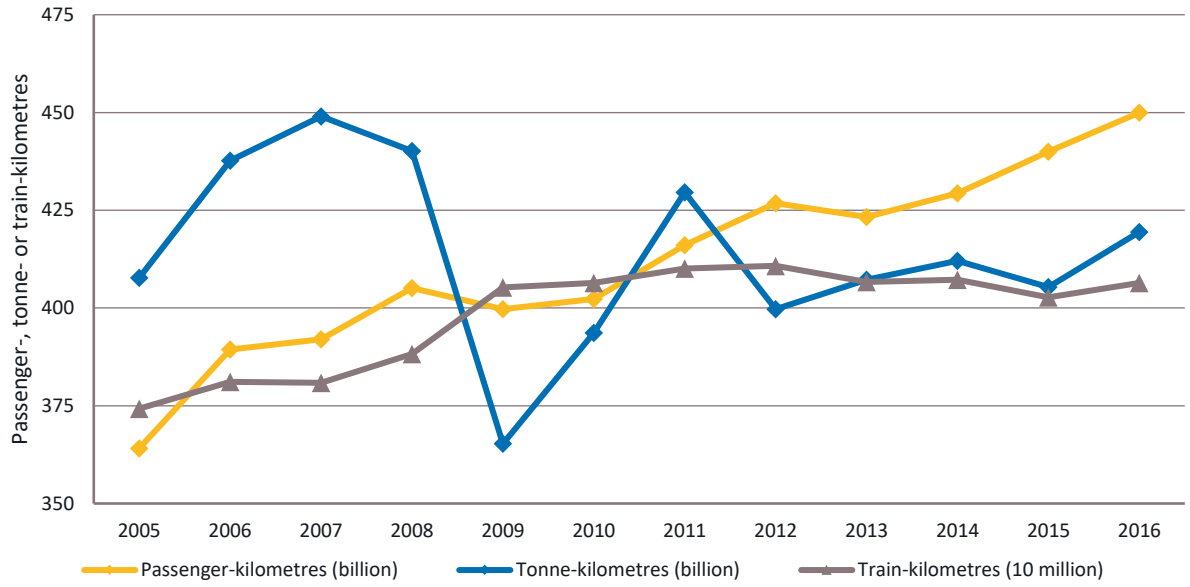
Total train-kilometres, which include both passenger and freight train movements, remained substantially stable between 2009 and 2016, after a significant increase in the pre-crisis period.

Rail transport's focus varies between countries. On average, 82.3% of total EU train-km are used for passenger transport. In Denmark, the United Kingdom and Luxembourg more than 90% of train-km are used for passenger transport, whereas Lithuania, Slovenia and Latvia are more freight oriented (around 50% or more train-km).

[27] The European Environment Agency (EEA, https://www.eea.europa.eu/) is the main provider for EU-wide GHGs emissions data. GHGs comprehends carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), hydrofluorocarbons (HFC), perfluorocarbons (PFC).

[28] Excluding indirect emissions from electricity consumption.

Figure 16: Passenger and freight volumes, 2005-2016



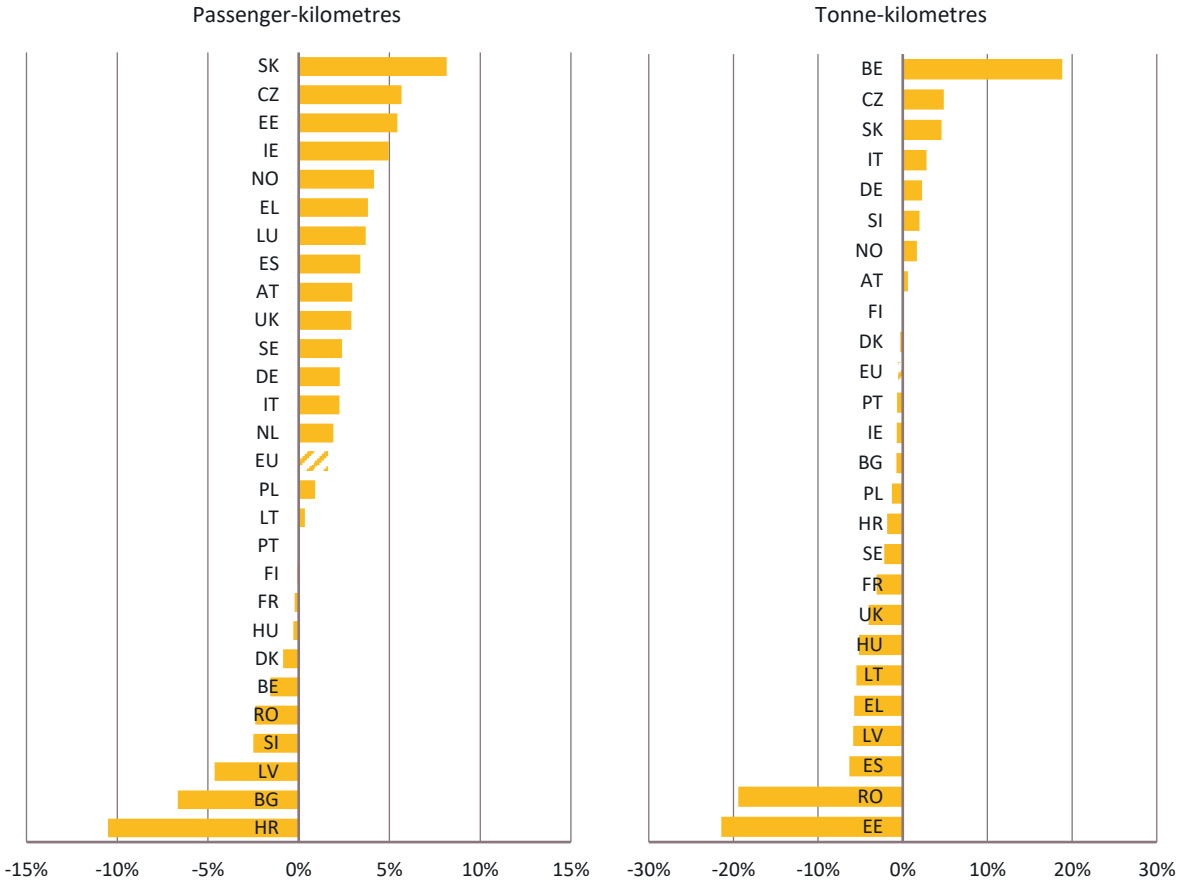
Source: RMMS, 2018. Infill data from various other sources and estimates.

Rail passenger traffic continued to grow between 2011 and 2016 with a compound average growth rate of 1.6%, fully recovering from the slight decline experienced in 2009 due to the unfavourable economic climate across most of the EU.

Rail freight traffic, in contrast, struggled to recover from the significant drop in volumes experienced in 2009, the low point of the economic crisis, with a peak in 2011 followed by a slow recovery from 2012[29].

[29] Data on volumes presented in the 6th RMMS Report and its accompanying Staff Working Document are based on the figures reported in the yearly RMMS questionnaire by Member States and Norway. They may differ from those reported by Eurostat. The difference is due to the different scope of the two surveys and to potential double counting of transit volumes and adjustments applied in the RMMS to complete the time series (estimates and integration from other sources).

Figure 17: Passenger and freight volumes, compound average annual growth 2011-2016



Source: RMMS, 2018. No freight data for LU and NL.

Passenger and freight markets are discussed more in detail below.

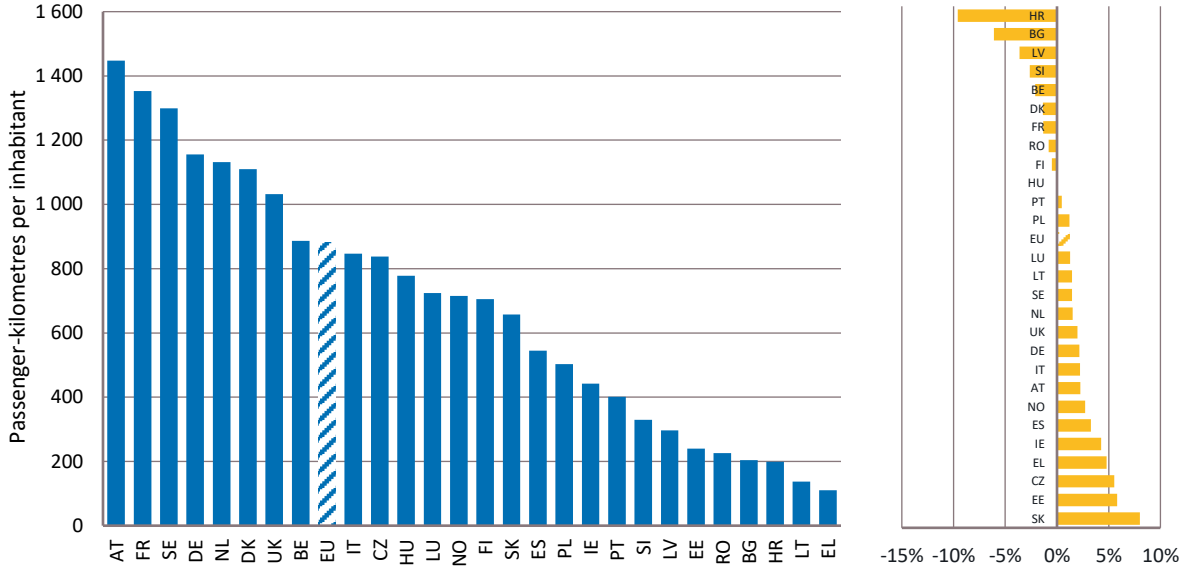
2.2 The passenger market

2.2.1 Evolution of volumes

Evolution of propensity to travel/rail travel per inhabitant

Figure 18 shows how propensity to travel by rail, measured as annual passenger-kilometres per inhabitant, varies significantly between States.

Figure 18: Propensity to travel by rail 2016 and compound average annual growth 2011-2016



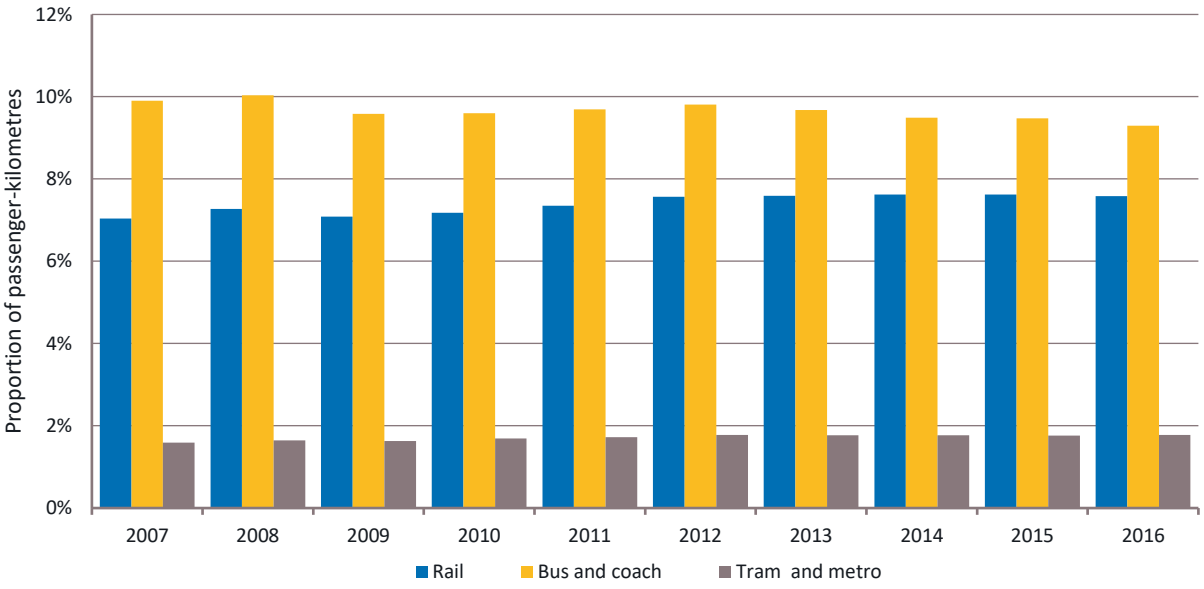
Source: Statistical pocketbook, 2018 and Eurostat.

Since 2011, the average propensity to travel in EU has slightly increased from 830 to 882 passenger-kilometres per inhabitant (+1.2% of cumulative annual growth rate). The most rail travel per inhabitant was in Austria, France and Sweden, with over 1 300 passenger-kilometres per inhabitant. The least rail travel per inhabitant was in Lithuania, Greece, Croatia and Bulgaria, all with at most around 200 passenger-kilometres per inhabitant.

Passenger land transport modal split by Member State

Passenger car dominates total passenger land transport within the EU, with a share of more than 80% throughout the period 2007 to 2016. Figure 19 shows the remaining shares carried by the modes of rail, bus and coach, and tram and metro.

Figure 19: Passenger land transport modal split, 2007-2016

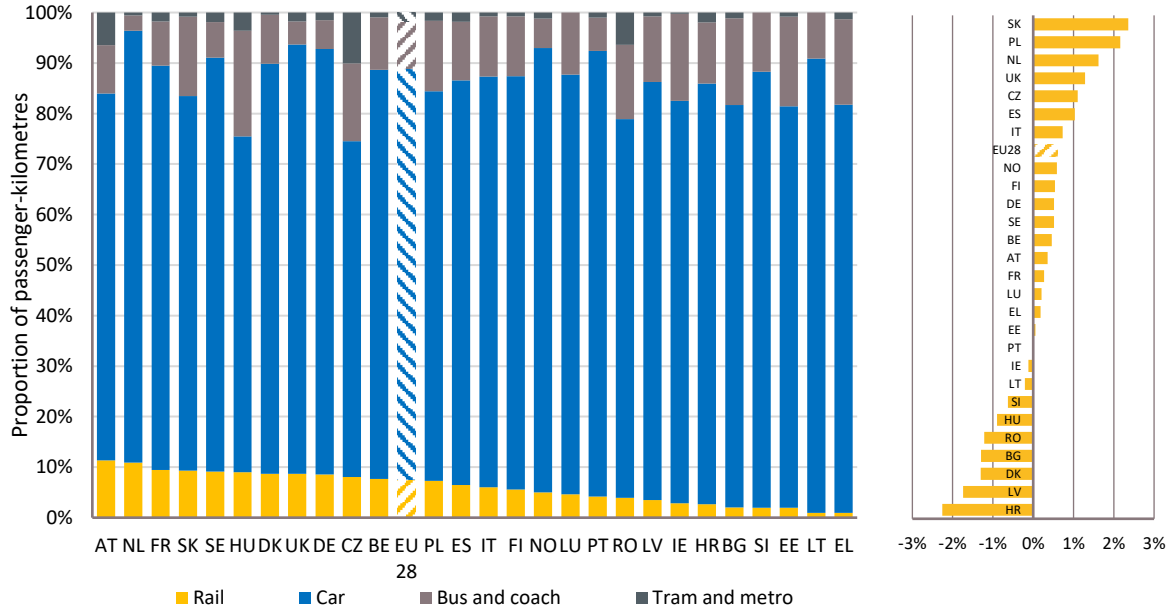


Source: Statistical pocketbook, 2018.

Over the period 2007 to 2016, rail mode share rose from 7.0% to 7.6%. Tram and metro mode share also rose, from 1.6% to 1.8%, possibly reflecting the continued investment in expansion of urban and suburban tram and metro networks.

Bus and coach share fell from 9.9% to 9.3% between 2007 and 2016, whilst car share fell only 0.1% over the same period.

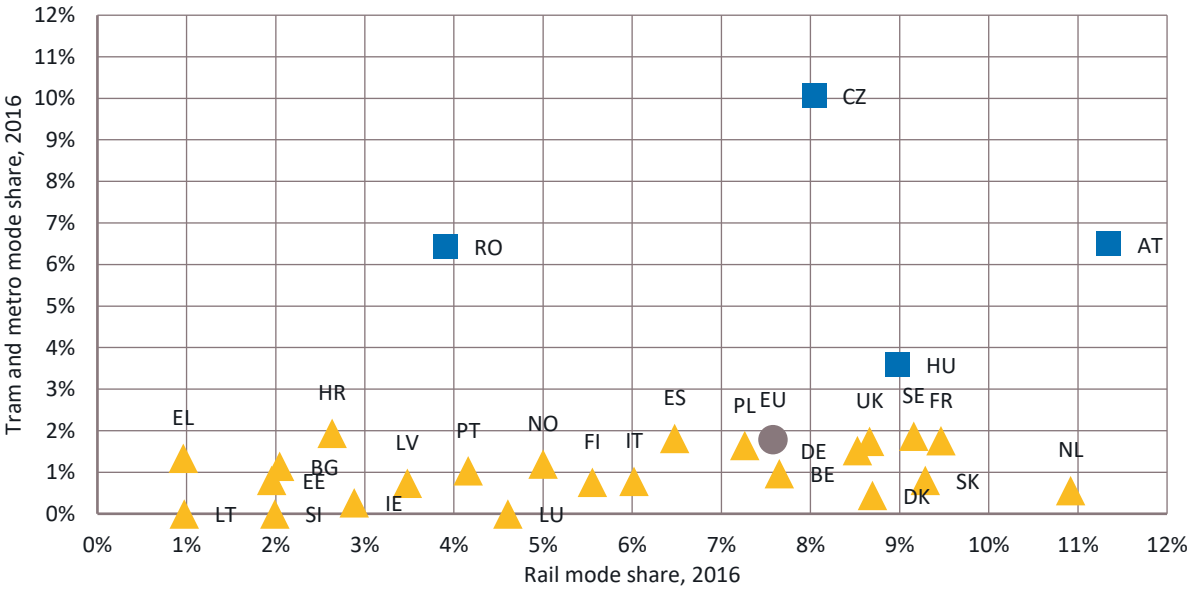
Figure 20: Passenger land transport modal split by country, 2016 and change in percentage rail 2011-2016



Source: Eurostat and statistical pocketbook, 2018. 2011 data for EU27.

Figure 21 compares the 2016 rail mode share and tram and metro mode share in each State.

Figure 21: Passenger rail, tram and metro mode shares by country, 2016

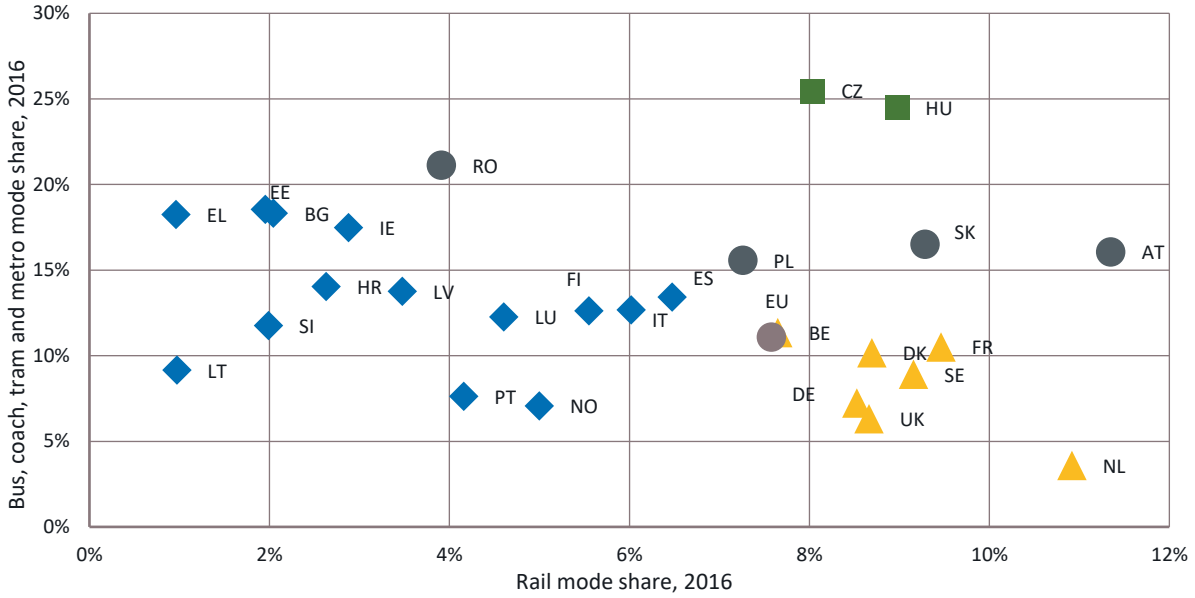


Source: Eurostat and statistical pocketbook, 2018.

In most States, total tram and metro mode share was less than 2%, but in Hungary, Romania and Austria was over 3% and for the Czech Republic over 10%.

Figure 22 shows the effect of including the mode share of bus and coach, which tends to be larger in smaller States with limited rail, tram or metro networks.

Figure 22: Passenger rail, bus, coach, tram and metro modal split by country, 2016



Source: Eurostat and statistical pocketbook, 2018.

On the left (blue) are smaller States with rail mode share near or below 6%, including the Baltic States, Greece, Slovenia, Bulgaria, Ireland and Croatia.

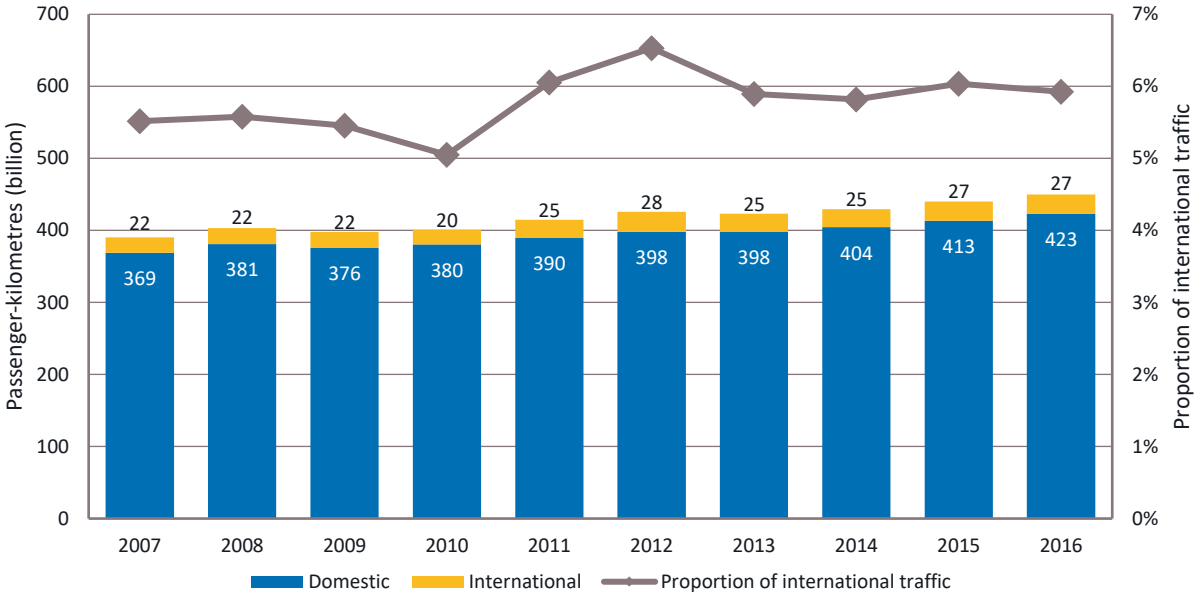
On the upper right (dark grey), with relatively high non-rail public transport shares, are Member States in central Europe including Austria, Slovakia and, with lower rail mode share, Poland and Romania. Hungary and the Czech Republic (green) have both relatively high non-rail and rail public transport modal share.

On the lower right (yellow), with relatively low non-rail public transport share, are larger Member States in western Europe including Germany, France and the United Kingdom, but also the Netherlands, Sweden, Denmark and Belgium.

Evolution of rail passenger volumes

Figure 23 shows the evolution of rail passenger volumes from 2007 to 2016.

Figure 23: Evolution of rail passenger traffic volumes, 2007-2016



Source: RMMS, 2018. Infill data from various other sources and estimates.

EU railways transported in 2016 some 9 billion passengers[30]. Rail passenger traffic has been resilient to the financial crisis and has risen from 391 billion passenger kilometres in 2007 to 450 billion passenger kilometres in 2016 on about 6 trillion passenger-kilometres of land transport overall[31].

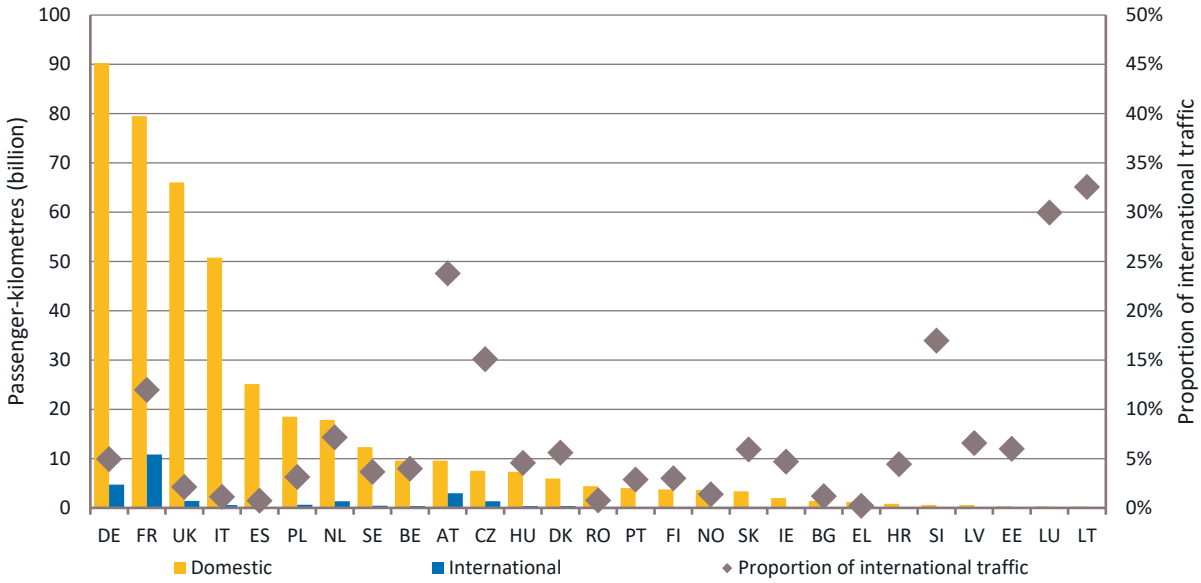
The proportion of passenger-kilometres reported as being on international journeys was more impacted by the unfavourable economic climate, falling to 5% of the total passenger traffic, but rose thereafter and has since remained around 6%.

Figure 24 shows the volumes of domestic and international passenger rail travel, measured in passenger-kilometres, and the proportion of international traffic by State in 2016.

30 DG MOVE estimates based on Eurostat.

31 Statistical pocketbook 2018, includes cars, powered-two-wheels, buses and coaches, railway and tram and metro.

Figure 24: Passenger traffic volumes by country, passenger-kilometres, 2016



Source: RMMS, 2018.

The figure shows that the largest rail markets are in Germany, France, the United Kingdom and Italy. In three of these Member States, well below 5% of passenger-kilometres are on international journeys. However, the proportion of international travel is 12% in France, which has high-speed rail links into the United Kingdom (Eurostar), Belgium, the Netherlands and Germany (Thalys), and Switzerland, Italy and Spain (TGV).

The proportion of international traffic is also high in several smaller States, including Lithuania and Luxembourg (both over 30%), Slovenia, the Czech Republic and Austria (where national operator ÖBB operates both day and night trains to several other States).

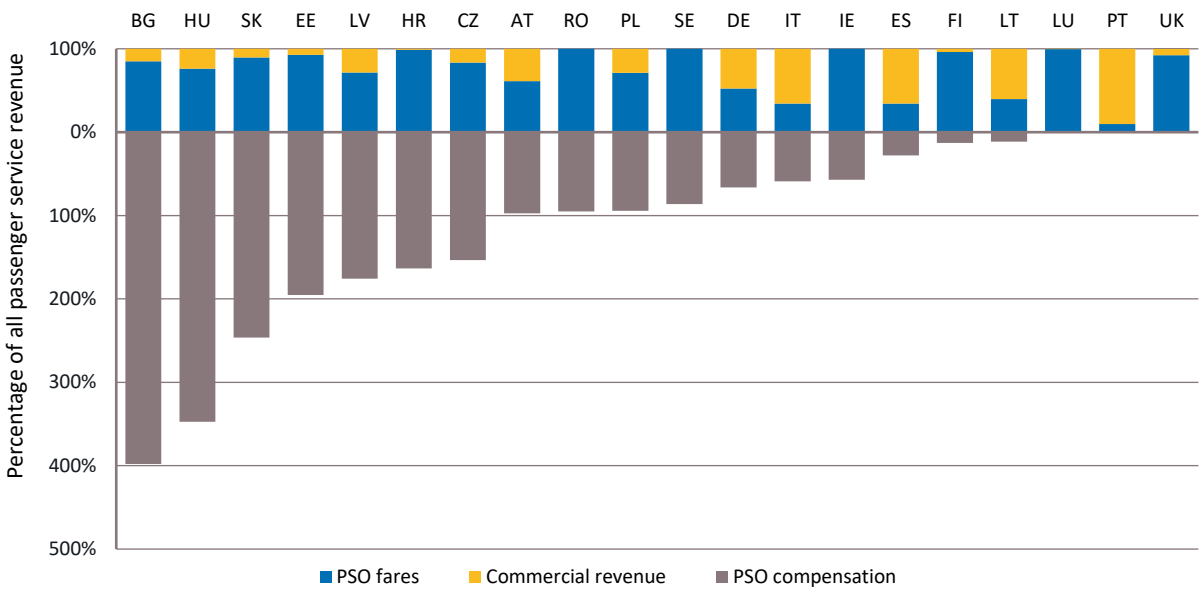
2.2.2 Evolution of revenues

Figure 25 shows the sources of passenger railway undertakings' revenue in 2016 which have been reported.

The figure is structured as follows:

- Above the horizontal axis is the revenue contributed by passengers through fares paid on either PSO or (if reported) commercial services.
- Below the horizontal axis is the proportion of revenue contributed by competent authorities in the form of PSO support.

Figure 25: Sources of passenger railway undertakings' revenue, 2016



Source: RMMS, 2018. No data for EL, FR, NL and SI. Information on commercial services confidential for BE, DK and NO.

In Member States such as Bulgaria and Hungary, most of the railway undertakings' revenue is from PSO support. In Bulgaria this amounts to almost four times passenger revenue: passengers only contribute 20% of total railway undertaking revenue while 80% comes from subsidies. In other States, however, the need for support from competent authorities is less.

In the extreme case of the United Kingdom, the net requirement for support from competent authorities is negative, although this cannot readily be shown on the chart. This is because, in the United Kingdom, many services which are subject to a PSO can be operated profitably, at least at current levels of access charges and fare (both of which, while regulated, are subject to change)[32]. Competitive tenders for many PSOs therefore result in a request for negative subsidy, indicating that the tenderer will pay the competent authority for the right to operate the service[33]. The result is that the PSO operators, in aggregate, currently receive a negative subsidy from the competent authorities.

2.3 The freight market

2.3.1 Evolution of volumes

Evolution of rail freight tonnage relative to GDP

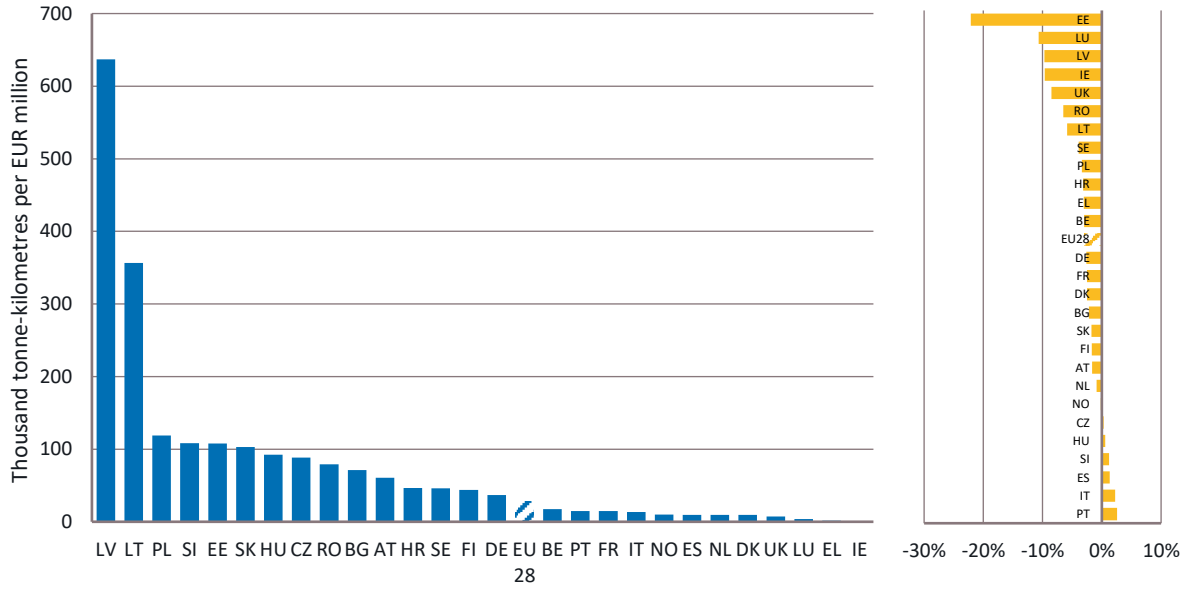
In 2016, there was a strong disparity among European countries regarding the ratio of rail freight use compared to nominal GDP. The high end of the scale was dominated by eastern European nations with Latvia and Lithuania demonstrating the highest rates of rail freight relative to GDP and the others following closely.

[32] In addition, even where capacity exists for commercial services, the United Kingdom's regulatory body restricts open access commercial entry to protect the economic equilibrium of PSO services.

[33] This negative subsidy requirement is normally referred to in the United Kingdom as a 'premium'.

Growth in the use of rail freight services was significantly outpaced by that of the GDP between 2011 and 2016, resulting in a negative average annual growth rate across many of member states, suggesting that rail freight is playing less of a role in economic development than in previous years. Only countries to have registered a positive growth were Czech Republic, Hungary, Slovenia, Spain, Italy and Portugal.

Figure 26: Rail freight activity per unit of GDP, 2016 and compound average growth rate 2011-2016

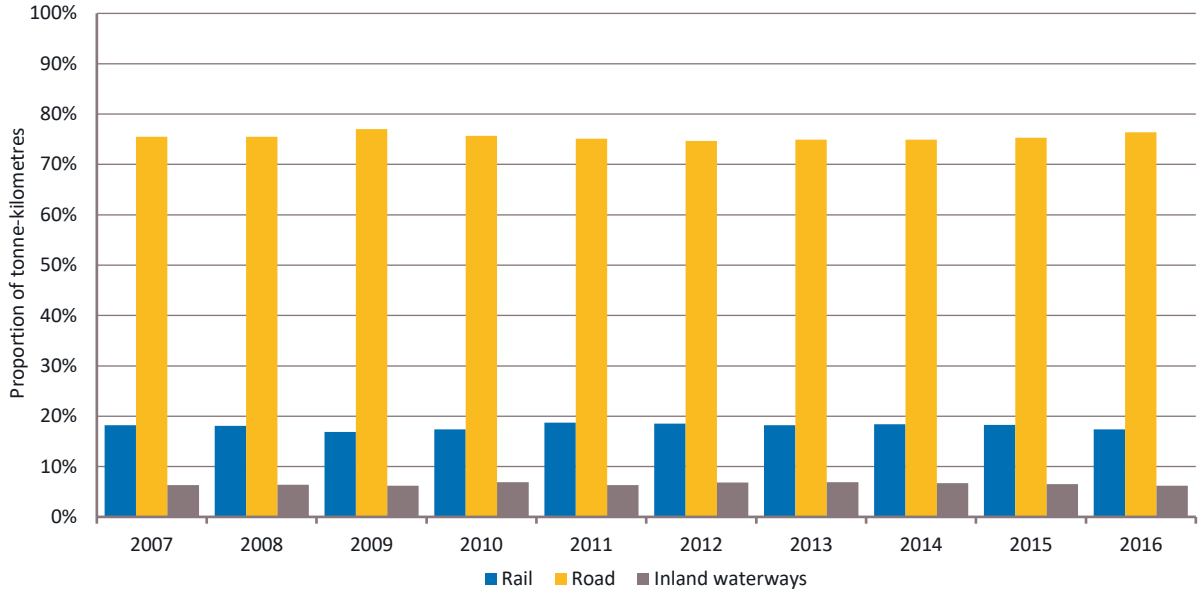


Source: Statistical Pocketbook 2018, Eurostat 2018.

Freight land transport modal split by Member State

Road remains the dominant mode within the EU also in freight transport and continues to handle around three-quarters of net tonne-kilometres. Its weight in the modal mix is however lower than in the passenger transport, remaining around 75%. Figure 27 shows the shares of rail and inland waterways, the principal modes for heavy or bulk goods, compared to road.

Figure 27: Freight land transport modal split, 2007-2016



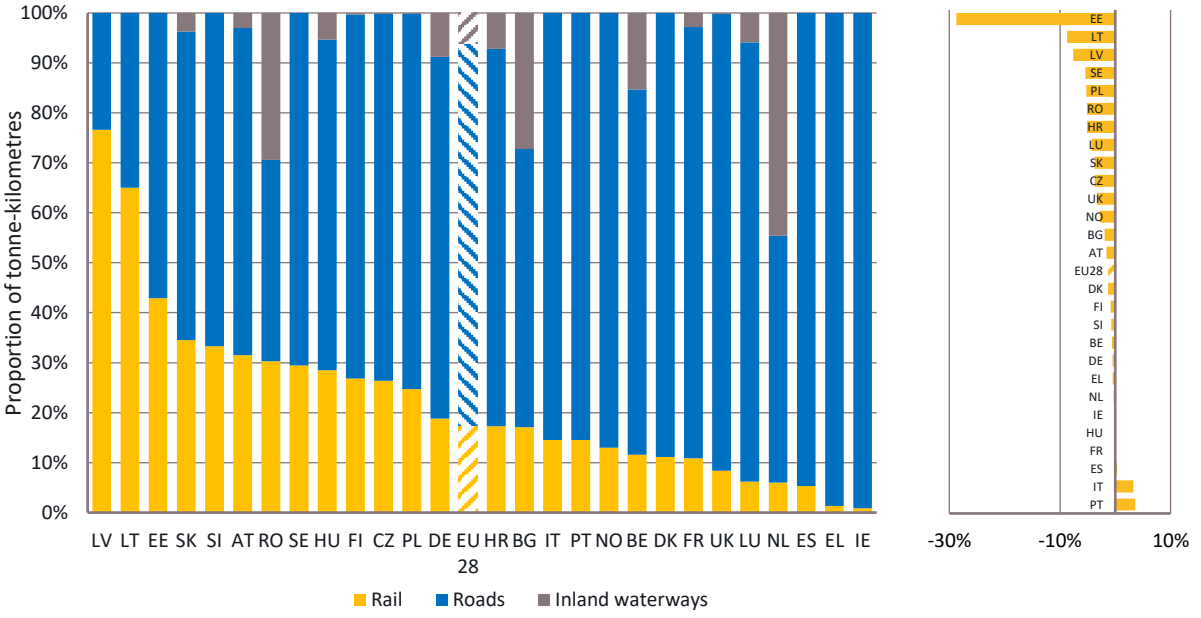
Source: Eurostat.

Rail mode share has been broadly constant between 2007 and 2016. However, since the peak reached in 2011 (almost 19%) the share decreased but managed to remain around 17% in 2016, while road's share increased from 75% to 76%.

The overall share of inland waterways has been broadly constant over the period, with some variation but little overall change, and continues to be just over 6% of tonne-kilometres transported.

Figure 28 shows the rail, road and inland waterway mode shares in each Member State.

Figure 28: Freight land transport modal split by country 2016 and change in percentage rail 2011-2016



Source: Eurostat.

Rail has the highest mode share in Latvia and Lithuania, primarily because their rail networks carry large volumes of transit traffic to and from the Russian Federation. Rail's share is also high for the

States of Slovakia, Slovenia and Austria. In contrast, rail has the lowest mode share in the insular or peninsular Member States of Ireland, Greece and Spain, where there is less scope for international or transit traffic.

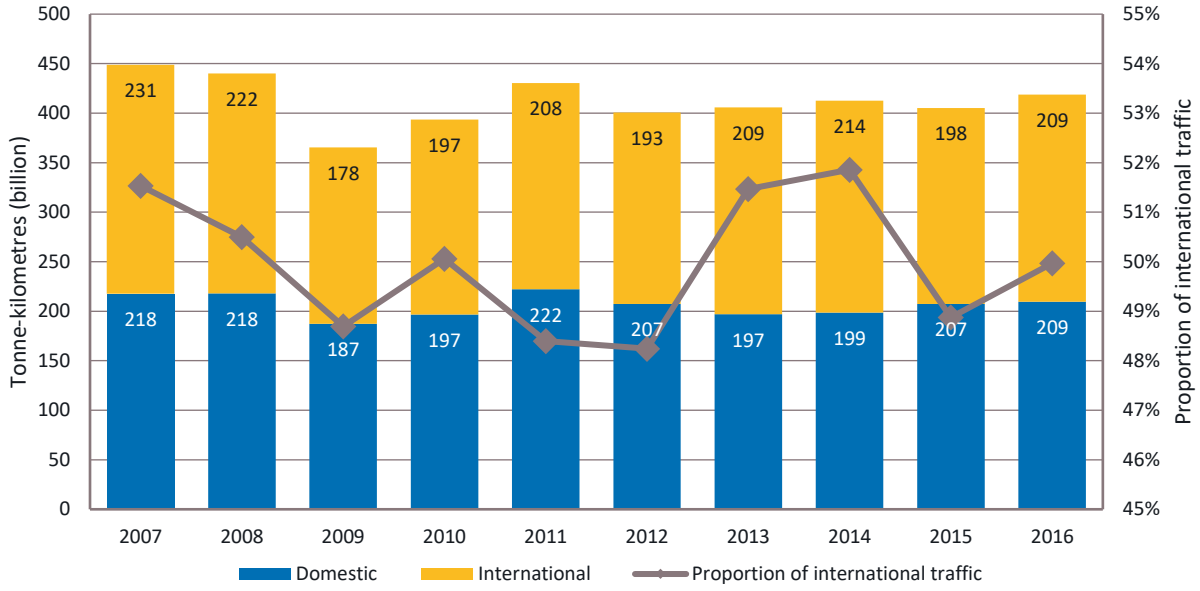
Inland waterways are a major competitor to rail in Member States with access to major rivers including Romania and Bulgaria, which border the Danube, and Belgium, the Netherlands and Germany, with access to the Scheldt, Meuse and Rhine.

The evolution of modal share between 2011 and 2016 has been clearly negative for the majority of the countries. Particularly relevant has been the decrease in the Baltic States. The share increased only in Portugal and Italy (more than 3 percentage points), whereas it remained substantially stable in Spain and France.

Evolution of rail freight volumes

In 2016 around 1.6 billion tonnes of freight was carried on EU railways[34]. Figure 29 shows that output in tonne-kilometres, while still being less than 7% lower than the 2007 peak level, have recovered 15% between 2009 and 2016 reaching according to RMMS data[35] to 419 billion tonne-kilometres out of overall 2.5 trillion in land transport[36].

Figure 29: Evolution of rail freight traffic volumes, 2007-2016



Source: RMMS, 2018. Infill data from various other sources and estimates.

Around half of total rail freight, measured by net tonne-kilometres, is cross-border: rail freight is increasingly competitive to road freight at longer distances. International freight peaked during 2014 at 53% of total rail traffic and then came down to 50% in 2016. This significant cross-border element gives to rail freight a stronger European dimension compared to passenger traffic, where the

[34] Source: DG MOVE estimates based on Eurostat.

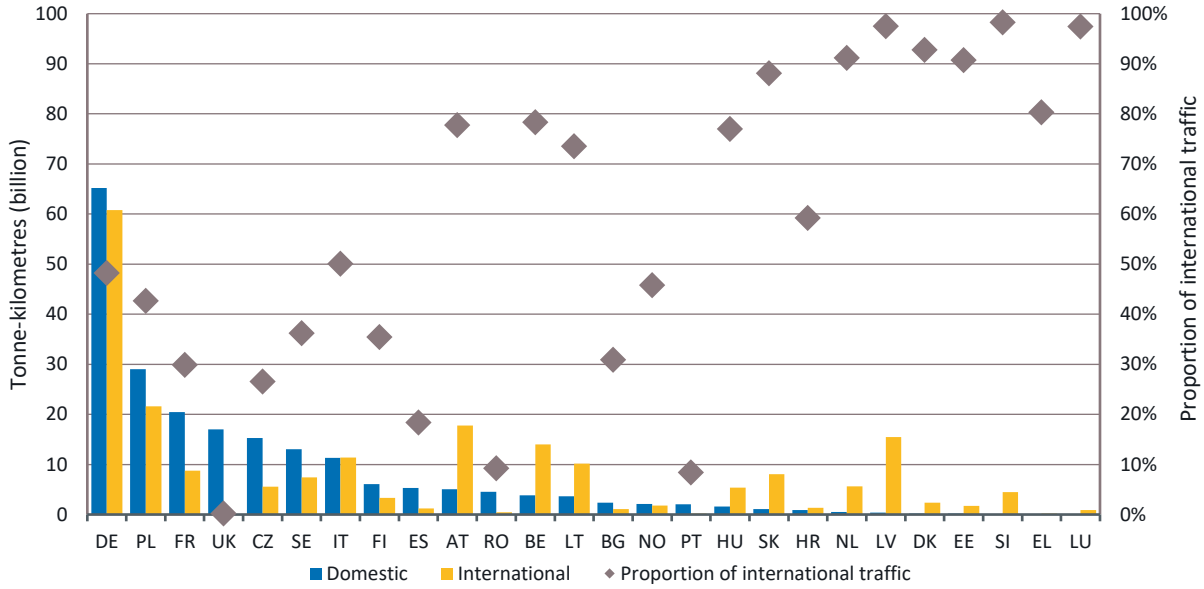
[35] Data on volumes presented in the 6th RMMS Report and its accompanying Staff Working Document are based on the figures reported in the yearly RMMS questionnaire by Member States and Norway. They may differ from those reported by Eurostat. The difference is due to the different scope of the two surveys and to potential double counting of transit volumes and adjustments applied in the RMMS to complete the time series (estimates and integration from other sources).

[36] Statistical pocketbook 2018, includes road, rail, inland waterways and pipelines.

proportion of international journeys remains around 6%. A lack of interoperability and cooperation between national railway networks can hugely affect rail freight transport and its competitiveness with alternative modes.

Figure 30 shows the volumes of domestic and international rail freight by State in 2016.

Figure 30: Rail freight traffic volumes by country, 2016



Source: RMMS, 2018. IE volumes too small to appear in the graphic (0.1 bn tonne-km).

The largest volumes of rail freight are in Germany, followed by Poland and France.

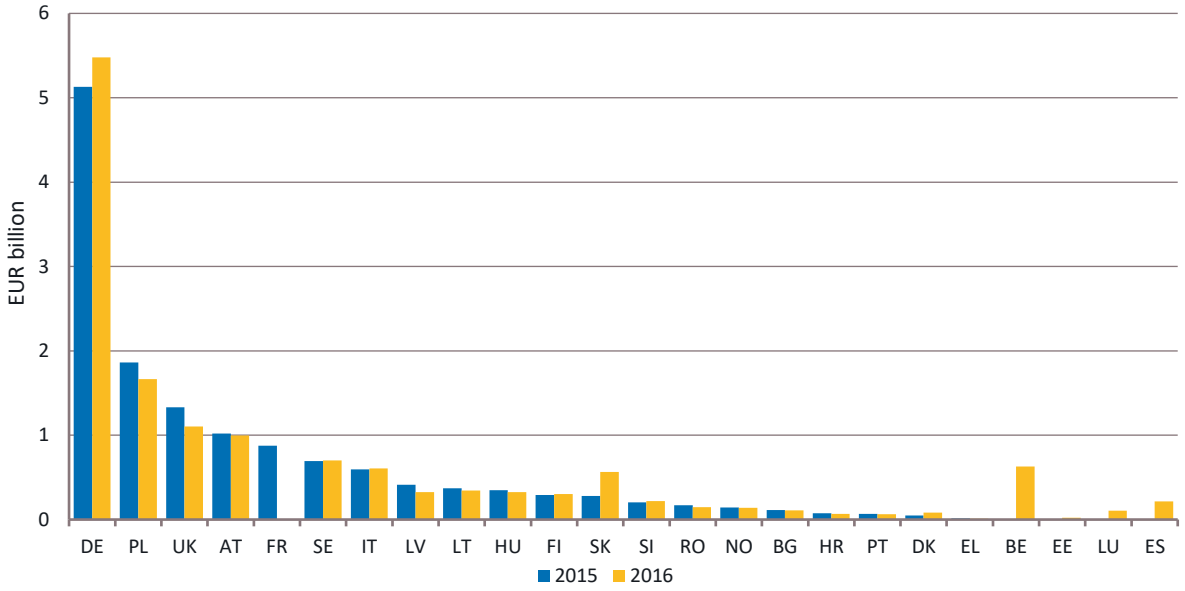
The chart shows that international rail freight represents only a small proportion of the total in the island economies of Ireland and the United Kingdom, and less than half of the total in the large economies of Spain, France, Germany and Italy. In contrast, international rail freight represents a large proportion of the total in smaller States. This illustrates the importance of giving small, and particularly landlocked Member States, efficient links and access to ports.

2.3.2 Evolution of revenues

Evolution of rail freight revenues

Figure 31 shows reported revenues from rail freight by State in 2015 and 2016. As with rail freight volumes in Figure 30, Germany is by far the largest contributor, followed by Poland.

Figure 31: Freight revenue of railway undertakings by country, 2015 and 2016



Source: RMMS, 2018. No data for CZ and NL, IE too small figure to be represented. No 2015 data for BE, EE, ES, LU. No 2016 data for FR.

Between 2015 and 2016, rail freight revenues rose in Germany (from EUR 5.1 billion to EUR 5.4 billion), but fell in Poland (from EUR 1.8 billion to EUR 1.6 billion) and the United Kingdom (from EUR 1.3 billion to EUR 1.0 billion).

2.4 The future of rail freight

Transport currently accounts for a quarter of all EU greenhouse gas emissions, 72% of which come from the road sector. A part of the EU's ambitious policy to fight climate change is therefore to promote rail freight. To deliver it, the Commission has a coherent Strategy for Low-Emission Mobility[37] and has set modal shift objectives in its 2011 White Paper: 30% of road freight over 300 kilometres should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors. In this context, rail freight has a central role to play in the transport model of the future and is considered as a priority by the Commission.

However, the overall situation of rail freight remains critical: its modal share is stagnating around 17%. Figure 28 shows that the modal share has increased slightly in Italy and Portugal, but has declined in almost all Member States. To reach the modal shift objectives, far larger volumes of freight need to be carried by rail.

Although exogenous factors such as the evolution of the industrial structure and the state of the wider economy and productive situation affect modal choice, the main lever to achieve growth of rail freight is to secure the shippers' trust vis-à-vis rail as a reliable and cost-effective mode to move goods across Europe. In other words, rail freight needs to become more competitive. In particular, the quality, reliability and flexibility of the rail freight services offered need to be increased sharply, which will in turn contribute to address the cost challenge rail freight is facing.

[37] 2016 Strategy for Low-Emission Mobility: https://ec.europa.eu/transport/sites/transport/files/themes/strategies/news/doc/2016-07-20-decarbonisation/com%282016%29501_en.pdf.

In 2016 almost 50% of European rail freight was cross-border, down from 52% in 2014. To achieve EU climate objectives the share of international rail freight traffic should continue to grow. On the one hand, this is driven by further European economic integration, on the other hand, because the competitive advantage of rail freight increases with distance. This strong European dimension means that rail freight is particularly suffering from the lack of a truly Single European Rail Area, in particular from the lack of interoperability between the different networks and of coordination of operations, such as at the borders or in terms of rail capacity and traffic management.

To tackle the situation, the Commission is pursuing an agenda of complementary initiatives and actions. The Fourth Railway Package is setting the general regulatory framework: its market pillar will reinforce the framework conditions for an efficient market organisation and its technical pillar will simplify the processes and reduce costs, particularly through an extended role for the European Union Agency for Railways. This will complement, on the one hand, the Commission's long-standing policy to achieve interoperability (including the efficient and coordinated deployment of ERTMS), with a current focus on solving practical cross-border operational issues (see Box 5) and, on the other hand, the Commission's infrastructure development policy through the TEN-T policy, with significant financial support provided under the CEF. A well-developed infrastructure, free of bottlenecks and missing links and with infrastructure parameters targeted to freight is a precondition for rail freight development.

These key policies are accompanied by efforts to tackle the issue of rail noise, to better embed rail in the multimodal transport system by deploying digital technologies and to foster innovation, particularly through the activities of the Shift2Rail Joint undertaking.

In parallel, the Rail Freight Corridors remain the key element of the Commission's policy to boost rail freight. They are intended to trigger rail freight development in terms of volume, market share, quality and reliability along the main freight axes, through fostering cooperation, coordination and harmonisation at different levels and in different areas (such as rail capacity, traffic management, conditions of use of the infrastructure, processes). As illustrated in the report from the Commission to Council and European Parliament on the application of the Rail Freight Corridor Regulation (Regulation 913/2010) published in April 2018[38], the Rail Freight Corridors have achieved positive results, but the pace of change needs to be accelerated. The progress accomplished by the Rail Freight Corridors is mainly in the hands of the Member State authorities and infrastructure managers, but the Commission continues to promote their ambitious development. In the coming years the Commission services will launch an evaluation of Regulation 913/2010 to assess whether there is a need to revise it.

Finally, rail freight cannot be considered in isolation from other modes: its competitiveness also depends on the framework for intermodal competition. This is why the Commission is striving for equal conditions for intermodal competition, such as through the Mobility Package and the Eurovignette initiative (see https://ec.europa.eu/transport/modes/road/news/2017-05-31-europe-on-the-move_en).

With the legislative framework largely in place and other support actions on track, ambition set out in the White Paper in respect of rail freight can be achieved only if rail freight is high on the agenda of all relevant parties.

This includes high-level commitment at national level, as the societal and political acceptance of rail freight should be ensured. This is the reason why the Commission intends to strengthen the

[38] Report on the application of Regulation (EU) 913/2010, in accordance to its Article 23: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0189&from=EN.

coordination of its rail freight policy with those of the Member States and engaged, in this context, in accompanying the Austrian Presidency of the Council in its activities to follow up on the Rotterdam Ministerial Declaration on rail freight[39] in the second half of 2018.

Active progress is also required from the rail sector, as most of the structural changes can only happen within the concerned organisations and processes. The Commission places high expectations on the sector and provides strong political support to the implementation of the Rotterdam Sector Statement[40]. Instrumental actions to be undertaken and delivered by the sector for the rail freight services to gain in reliability and flexibility include:

- making the timetabling process more efficient and flexible (such as through the TTR project[41]);
- improving information exchange, such as through the sharing of a reliable Estimated Time of Arrival between the parties involved in a train run (see ETA);
- developing KPIs to adequately measure rail freight performance;
- accelerating the pace towards solving cross-border interoperability issues, where progress is urgently needed;
- ensuring a better coordination of temporary capacity restrictions; and
- developing and implementing processes for contingency situations, as discussed next.

Interoperability of rail networks

Following an incident near the city of Rastatt in Germany in autumn 2017, a stretch of line on the rail freight corridor Rhine Alpine was closed for rail traffic for seven weeks. This important north-south corridor is a core connection for rail freight and links the ports of Rotterdam, Hamburg and Antwerp with Switzerland and Italy. A major hurdle was that diversionary routes were limited in capacity and interoperability. The incident led to big financial losses, a drop-in market share and reputational damage for the rail freight industry.

DG MOVE reacted to this incident with the organisation of meetings open to European stakeholders. It was important to establish a platform for exchange for finding European solutions and establishing measures that help to remedy the consequences of such incidents much more effectively in future.

The output of the meetings is the Handbook for International Contingency Management[42], put together in cooperation between rail stakeholders. It describes standards that will, in the event of international disruption, allow for the continuation of rail traffic, in addition to assuring transparency of the status of the disruption and its impact on traffic flows for the relevant stakeholders. All measures of the Handbook will be applied from the start of the 2019 timetable in December 2018.

39 Ministerial Declaration 'Rail Freight Corridors to boost international rail freight': https://ec.europa.eu/transport/sites/transport/files/themes/infrastructure/news/doc/2016-06-20-ten-t-days-2016/rfc-declaration.pdf.

40 Sector Statement 'Boosting international rail freight': http://www.cer.be/sites/default/files/publication/160520_Sector_Statement_RFC.pdf.

41 Redesign of the International Timetabling Process (TTR).

42 http://www.rne.eu/rneinhalt/uploads/International_Contingency_Management_Handbook_final_v1.5.pdf.

Box 5: Cross-border harmonisation of technical and operational rules and issues log

Cross-border operational and interoperability issues are one of the biggest and urgent obstacles hindering cross-border traffic, particularly rail freight. The Rastatt incident showed once more how much impact such obstacles have. This is why DG MOVE has sought to use the post-accident momentum to strengthen its joint initiative with the European Union Agency for Railways (ERA), involving the Rail Freight Corridors, the sector associations and the relevant authorities, and aiming at initiating efficient processes to tackle these issues through a so-called Rail Technical Operational Issues Logbook[43]. The logbook will serve as a repository of all the main technical operational issues hampering international rail freight traffic. With this initiative the Commission and ERA intend to prioritise issues with great impact and focus the work, so that quick resolutions are achieved.

2.5 Rail noise

Noise is one of the most widespread public health problems in the European Union, with serious costs to society. Railways, and especially rail freight traffic, are the second most important source of noise in Europe with at least 19 million people estimated to be exposed to levels above 55 dB.

A number of initiatives have been already adopted at the EU level in order to reduce noise exposure, including the Environmental Noise Directive 2002/49/EC, Technical Specification for Interoperability (TSI) on noise, financial assistance under the CEF, and modalities for noise-differentiated track access charges. However, despite the efforts of the Commission and Member States, progress in tackling rail noise is rather slow. There is also a risk that excessive levels of railway noise can lead to uncoordinated unilateral actions by Member States, such as applying speed limits and restrictions on operating at night.

Box 6: Policy framework for tackling rail noise

Given that more than 50 % of rail freight wagons run across borders, any attempt to combat rail noise at source needs a European response. At present the most effective way to mitigate rail noise is by retrofitting the existing freight wagons with composite brake blocks. This technical solution reduces rail noise by up to 10 dB which equals a 50% reduction in audible noise for humans. The Commission now envisages a revision of the TSI Noise following the 'quieter routes' approach so that the noise limit values become applicable not only to new wagons but also to the existing fleet. A 'quieter route' is a part of a network identified on the basis of traffic intensity where only wagons complying with TSI Noise pass-by limit values will be permitted to circulate as of December 2024. It is paramount to provide stakeholders with a stable timeframe, which will allow them to anticipate the necessary investment and to adopt suitable market strategy. The Agency has finalised preparations for the revision of the TSI Noise with a planned adoption by the end of 2018.

In 2018 it will launch also the evaluation of the existing Commission Regulation on Noise Differentiated Track Access Charges.

[43] https://ec.europa.eu/transport/sites/transport/files/rail-nip/rail-technical-operational-issues-logbook-explanatory-document.pdf.

3. The evolution of services supplied to railway undertakings

Directive 2012/34/EU defines rules for service facilities and rail related services, aiming at increasing the transparency of access conditions and charges applied to ensure non-discriminatory access.

Provisions apply to a broad range of facilities, including passenger stations, freight terminals, marshalling yards and train formation facilities, storage sidings, maintenance facilities, cleaning and washing facilities, maritime and inland port facilities and refuelling facilities.

Services provided in these facilities and additional and ancillary services as traction current supply, pre-heating of trains, arrangements for transport of dangerous goods, access to telecommunication networks and ticketing services in stations are also covered by the Directive.

A new implementing Regulation on service facilities, adopted in 2017, makes provisions for sharing and accessing information and for developing cooperation between service facility operators and infrastructure managers.

Box 7: New implementing Regulation on service facilities

Implementing Regulation (EU) 2017/2177 lays down the details of the procedure and criteria to be followed for access to service facilities and to the services supplied in these facilities listed in points 2, 3 and 4 of Annex II to Directive 2012/34/EU.

The Implementing Regulation repeats the principle of establishment and publication of a service facility description and provides a detailed list of information that service facility operators shall make publicly available. This can be done either by publishing the information on their own website or on a common web portal and providing the infrastructure managers with a link to be included in the network statement. Another option is providing the infrastructure managers with the relevant ready-to-be-published information to be included in the network statement. The Implementing Regulation requires infrastructure managers to provide a common template for service facility descriptions developed by the railway sector in cooperation with regulatory bodies. RailNetEurope (RNE) has developed such a template, discussed it with the market and published it on their website.

In addition, the Implementing Regulation highlights the need for better cooperation between service facility operators and infrastructure managers with the aim of ensuring that the allocation of capacity on infrastructure and in service facilities is consistent where necessary. It also refers to the coordination of conflicting requests and, where the coordination procedure has not enabled the reconciliation of conflicting requests, to the application of predetermined priority criteria. Regarding requests that cannot be accommodated at all following the application of priority criteria, it is mentioned that the concerned service facility operator and the concerned applicant shall jointly assess whether there are viable alternatives allowing operating the relevant freight or passenger service on the same or alternative routes under economically acceptable conditions.

Last but not least, it provides for the possibility to exempt certain service facility operators from the application of all or some of the provisions of the Implementing Regulation with the exception of certain provisions concerning the obligation to publish a service facility description.

Information on service facilities and rail related services is particularly important for freight services. Expected to be launched in mid-2019, the Rail Facility Portal could provide the sector with a unique entry point for gathering and sharing information between interested parties.

Box 8: European Rail Facility Portal

The Rail Facility Portal is being currently developed as a single EU user-friendly and market-oriented GIS-based portal, mapping and providing key information on the rail service facilities and last-mile infrastructure in Europe. The portal aims at remedying the lack of easy access to information on rail facilities and last-mile infrastructure and will therefore contribute to the better planning of rail services. It will also provide an efficient tool for the service facility operators to comply with their obligation to publish information on access conditions pursuant to Directive 2012/34/EU and Commission Implementing Regulation (EU) 2017/2177. The portal will therefore be both a market tool and a compliance tool.

The pilot portal 'Rail Freight Locations' (railfreightlocations.eu) is the basis for the new European Rail Facility Portal, which is expected to become gradually operation as from mid-2019. New functionalities will be introduced, such as the indication of available capacity at the facilities or reporting capabilities, and an initial 'critical mass' of data will be fed. This will be accompanied by a self-sustainable management concept for the permanent operation phase, as DG MOVE intends to hand over the portal to the sector. Although the portal will also be developed for passenger facilities, the focus will first be put on rail freight.

The acceptance of the portal by the wide sector, as the 'tool of choice' both for feeding and consulting information on the EU rail service facilities, will be the key success factor. DG MOVE is expecting the sector to support the use of the portal, which is a unique opportunity to avoid a piecemeal publication of information on services facilities, and thus to make such information usable and useful for the benefit of the rail market.

RMMS information is largely complete for stations. However, despite the introduction of Regulation 2015/1100, information on other service facilities remains fragmented and not always comparable. Data presented in this section must therefore be interpreted with care. The Commission services have started working with Member States and the Consortium developing the portal on common definitions for reporting purposes to improve the quality of reported data.

Charging principles for service facilities, additional and ancillary services

Any public or private entity responsible for managing one of more service facilities or supplying one or more services to railway undertakings referred to in points 2 to 4 of Annex II of Directive 2012/34/EU shall be considered as a service operator under Article 3(12) of the same Directive. Different service facility types and rail-related services are enumerated in Annex II points 2 to 4 of Directive 2012/34/EU.

Service facilities in principle supply services related to the nature of the facility itself. For example, freight terminals are installations where services of loading, unloading and transhipment of goods from and to freight trains or wagons are supplied. These services are defined as basic. Additional and ancillary services are services supplementary to the basic ones. For instance, in the case of freight terminals additional services may comprise tailor-made contracts for control of transport of dangerous goods and ancillary services may comprise technical inspection of rolling stock.

Charging principles for service facilities and rail-related services differ from the ones applied to rail infrastructure. While direct costs and possibly mark-ups (and eventually other charging components) are levied by the infrastructure manager, charges imposed for track access within service facilities and the supply of basic services in such facilities shall not exceed the cost of providing them plus a reasonable profit (direct costs). The charge for additional and ancillary services shall similarly not exceed the cost of providing the single service including a reasonable profit, except when these services are offered by more than one supplier.

Applicants must have easy access to information on any service facility and its rail related services. For that reason, it is obligatory that the network statement, which is available free of charge,

contains a section on information on access to and charging for gaining access to service facilities as well as for the provision of rail-related services. Alternatively, the information can be published on the website of the service facility or on a common web portal (see Box 8: European rail locations portal).

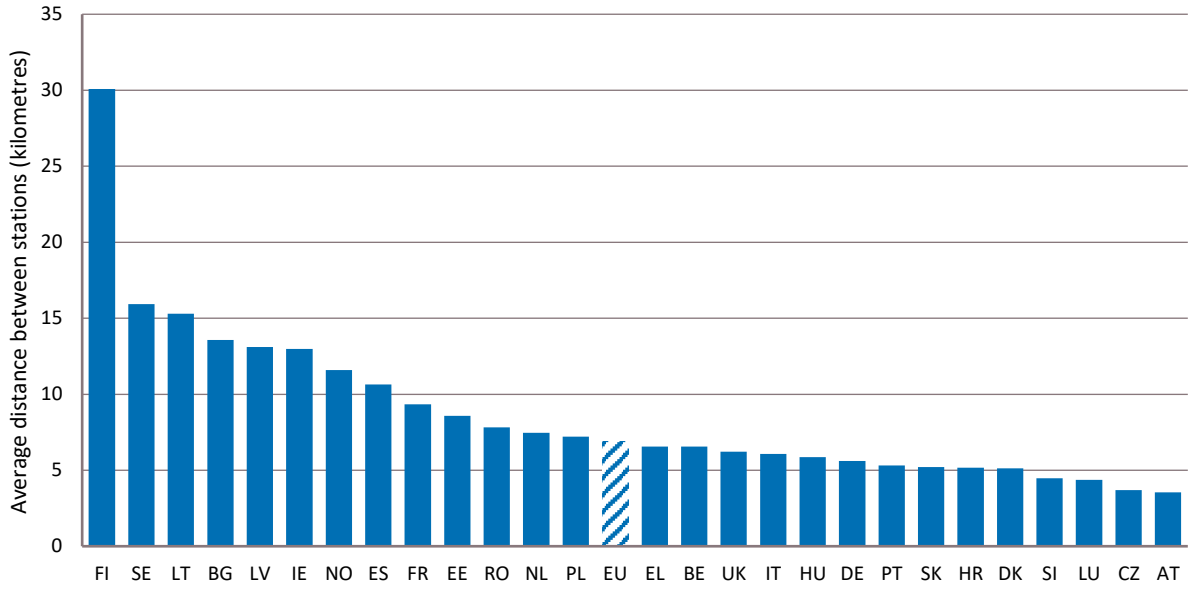
Charging principles ensure transparency and non-discrimination. Any individual negotiation on charges or discounts not based on the above principles would undermine the principle of non-discrimination.

3.1 Passenger stations

There were more than 31 000 stations in the EU in 2016[44], of which about 330 were **large stations** serving more than 25 000 travellers per day.

Figure 32 shows the average distance between stations on each national network for which information is available.

Figure 32: Average distance between stations by country, 2016



Source: RMMS, 2018 and Statistical Pocketbook, 2018. 2015 data for HU.

Slovakia reported 927 stations on the network of which only 695 are active, and the analysis has therefore been based on 695 stations on a network of 3 626 line-kilometres.

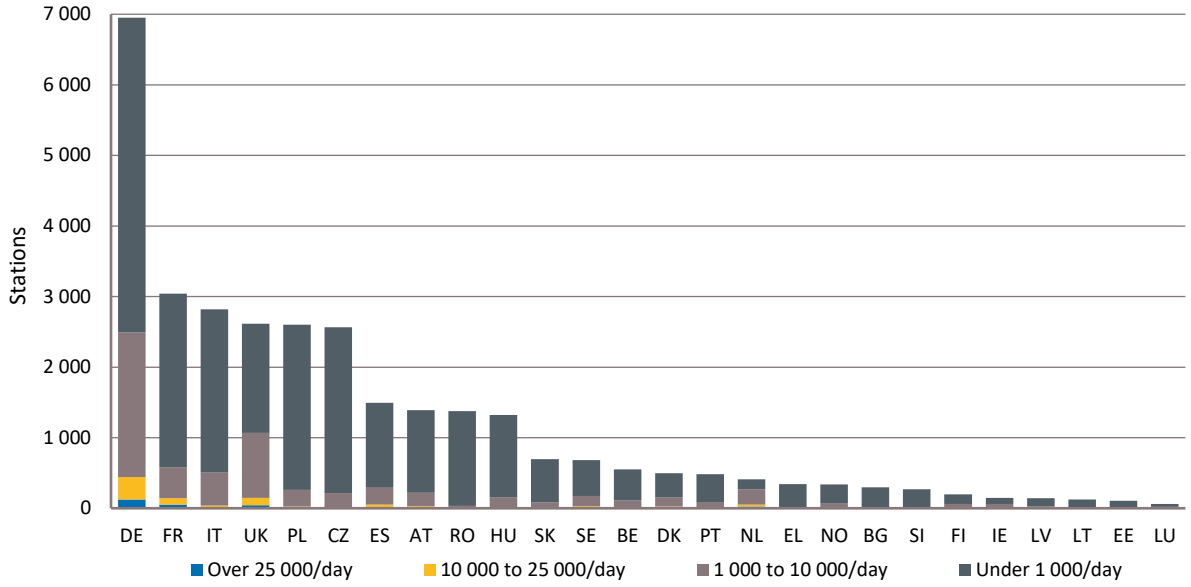
In 2016 the average distance between stations in EU was about 7 kilometres.

The Austrian network has the shortest average distance between stations at 3.5 kilometres (283 stations per 1 000 line-kilometres), followed by the network of the Czech Republic at 3.7 kilometres (271 stations per 1 000 line-kilometres). The largest average distances between stations are in the Scandinavian and Baltic networks of Finland (over 30 kilometres, or 33 stations per 1 000 line-kilometres), Sweden, Lithuania and Latvia, and also Bulgaria.

[44] Includes estimates for countries were data were not available, as reported under the graphics of this paragraph.

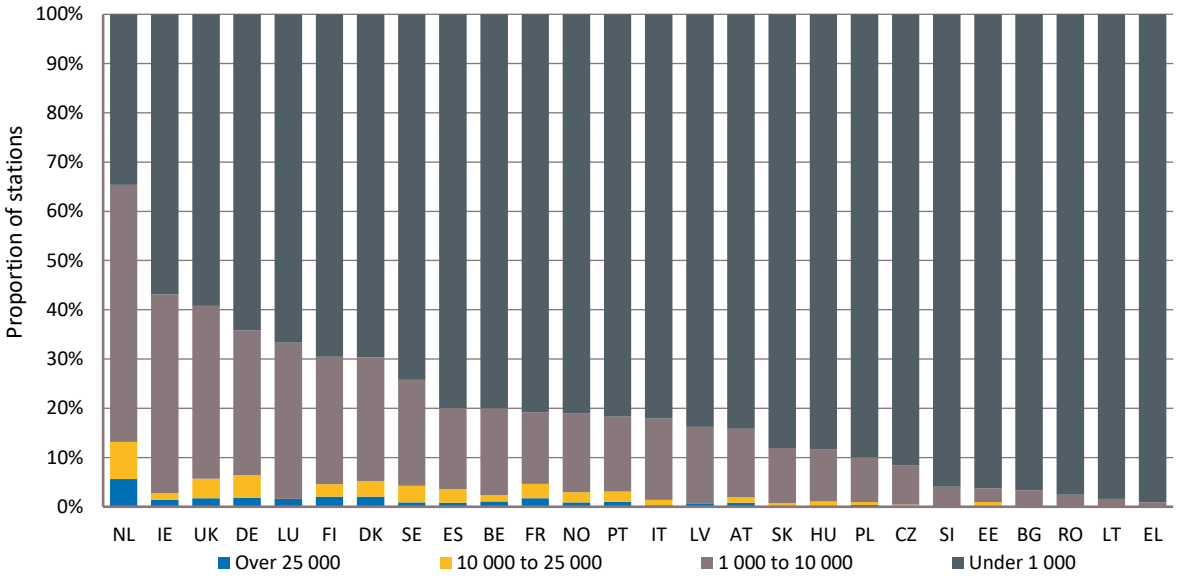
Figure 33 shows the relative numbers of stations with different passenger volumes per day. Figure 34 shows the relative mix of stations with different passenger volumes per day.

Figure 33: Number of stations by passengers per day by country, 2016



Source: RMMS, 2018. No data for HR. 2015 data for HU, RO.

Figure 34: Stations by passengers per day by country, mix, 2016



Source: RMMS, 2018. No data for HR. 2015 data for HU, RO.

Figure 33 shows that Germany has almost 7 000 stations on its network, over one quarter of the EU total. In contrast Luxembourg has only 42 stations, reflecting the size of the country and the largely suburban and regional nature of its network.

Figure 34 shows the proportion of stations in each network serving different numbers of passengers per day. Except in the case of the Netherlands, at least half the stations on all networks serve fewer than 1 000 passengers per day, equivalent to 500 round trips. Four networks, in Bulgaria, Greece,

Lithuania and Slovenia, have no stations serving more than 10 000 passengers per day, and Romania has only one.

3.2 Other service facilities

The RMMS collected data from Member States on the numbers of other service facilities, whether for the use of freight operators or for the storage and fuelling of trains, as referred to in Annex II of Directive 2012/34/EU.

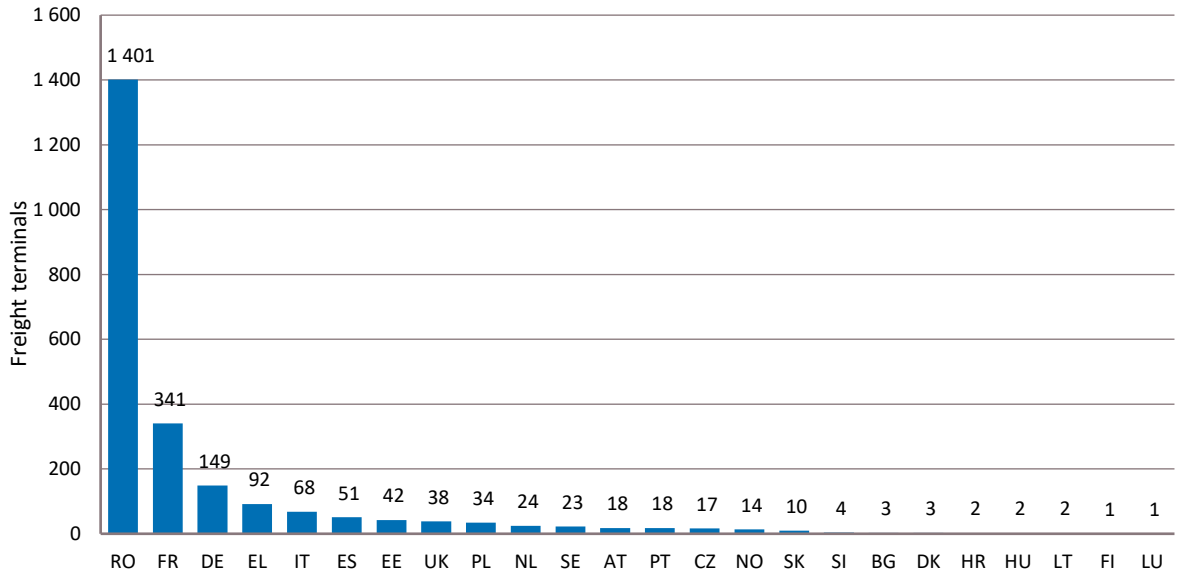
In many cases, however, the current discrepancies in the definition of each type of service facility at national level limit the comparability of figures across Member States and suggest caution in drawing conclusions from the inputs received[45].

Moreover, the RMMS does not collect data on the use of such facilities, whether there was a realistic need for them in the foreseeable future, or whether they were sufficiently well-maintained to be used at short notice. The mere existence of a facility in fact does not necessary imply that this facility is regularly used (or could be used in future).

Freight terminals

Based on data reported for the RMMS, there were around 2 358 freight terminals in the EU in 2016. Figure 35 shows the reported number of freight terminals in 2016 by State.

Figure 35: Facilities: freight terminals by country, 2016



Source: RMMS, 2018. No 2016 data or suitable proxy for IE (last reported in 2012), BE or LV. 2015 data for ES.

The RMMS Regulation defines freight terminals as a facility equipped for the transhipment and storage of intermodal transport units, where at least one of the modes of transport is rail. Romania reported high numbers of such freight terminals, with 1 401 in 2016. Major freight terminals are also defined, as those with a capacity of over 100 000 containers or over 1 million tonnes per year.

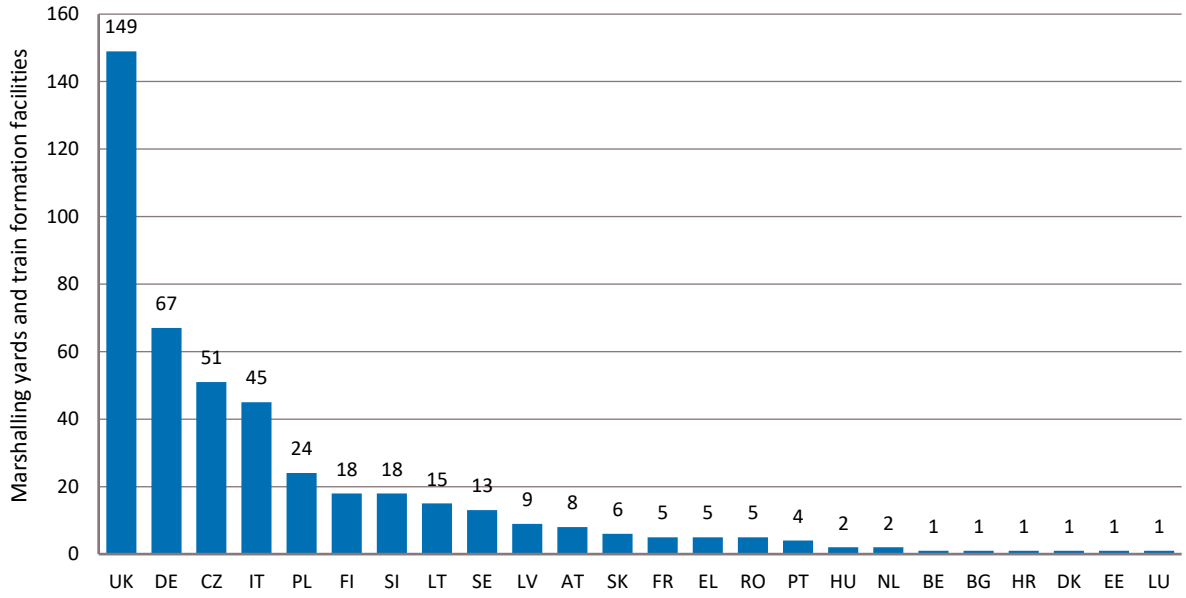
[45] Data are also often incomplete, with gaps and different definitions applied.

Marshalling yards and train formation facilities

Based on data reported for the RMMS, there were around 452 marshalling yards and train formation facilities in the EU in 2016.

Figure 36 shows the reported number of marshalling yards and train formation facilities in 2016 by State.

Figure 36: Facilities: marshalling yards by country, 2016



Source: RMMS, 2018. No data or suitable proxy for ES, IE or NO.

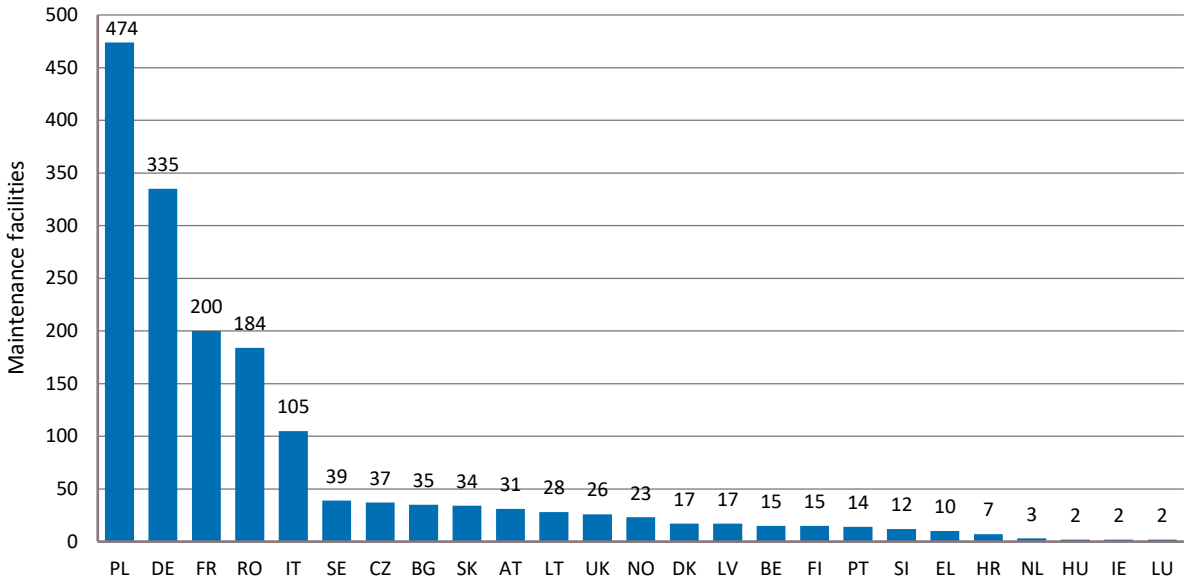
The RMMS Regulation defines a marshalling yard as a site or a part of a site equipped with several tracks or other equipment used for railway vehicle marshalling operations, including switching, and which use gravity as a means of formation or rearrangement of trains.

Maintenance facilities

Based on data reported for the RMMS, there were around 1 667 maintenance facilities in the EU in 2016.

Figure 37 shows the reported number of maintenance facilities in 2016 by State.

Figure 37: Facilities: maintenance facilities by country, 2016



Source: RMMS, 2018. No data or suitable proxy for EE or ES. 2015 data for FR. 2014 data for EE.

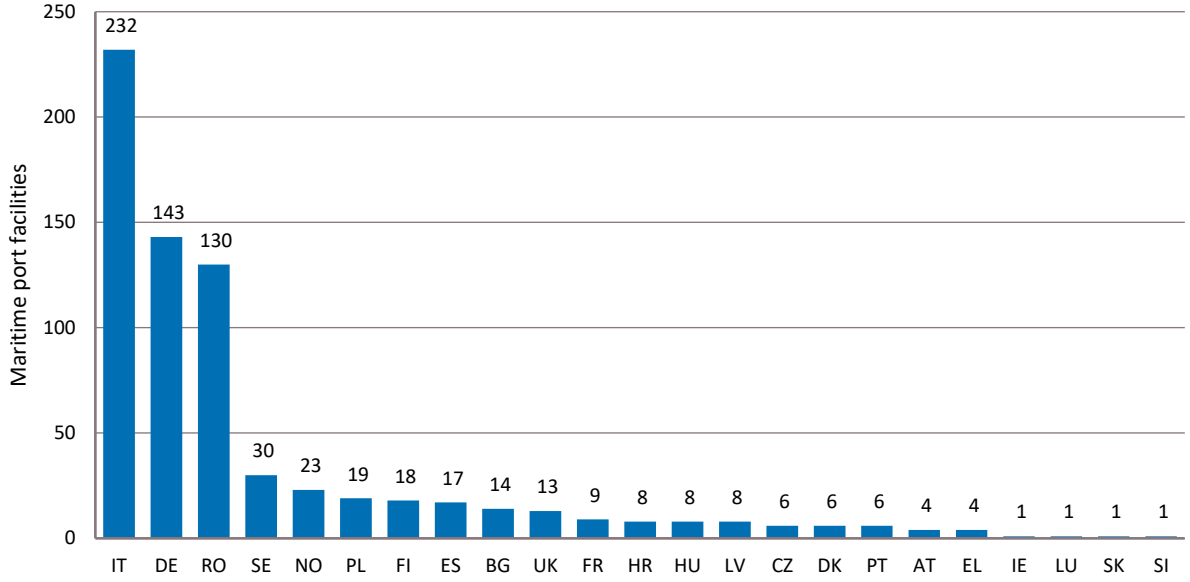
Maintenance facilities are facilities where rolling stock is maintained, including both heavy and light maintenance, to keep it in operation.

Maritime and port facilities

Based on data reported for the RMMS, there were around 702 maritime and port facilities in the EU in 2016.

Figure 38 shows the reported number of maritime and port facilities in 2016 by State.

Figure 38: Facilities: maritime and port facilities linked to rail activities by country, 2016



Source: RMMS, 2018. 2015 data for FR and HU. 2014 data for ES and LV. No data or suitable proxy for BE, EE, LT, NL.

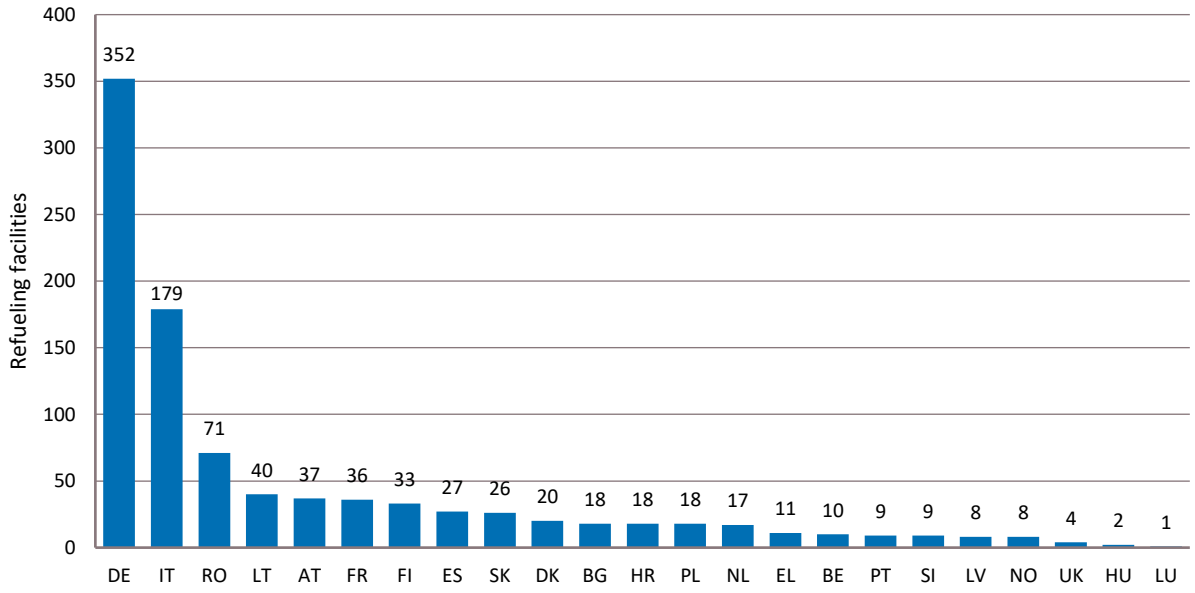
Italy reported the largest number of links to port and maritime facilities, 232, but commented that only 24 of them are directly connected to the network of RFI, the main infrastructure manager.

Refuelling facilities

Based on data reported for the RMMS, there were around 954 refuelling facilities in the EU in 2016.

Figure 39 shows the reported count of facilities refuelling locomotives and multiple units.

Figure 39: Facilities: refuelling facilities by country, 2016



Source: RMMS, 2018. No data or suitable proxy for CZ, EE, IE, SE.

Germany reported the highest number, 352 such facilities, followed by Italy with 179 and Romania with 71.

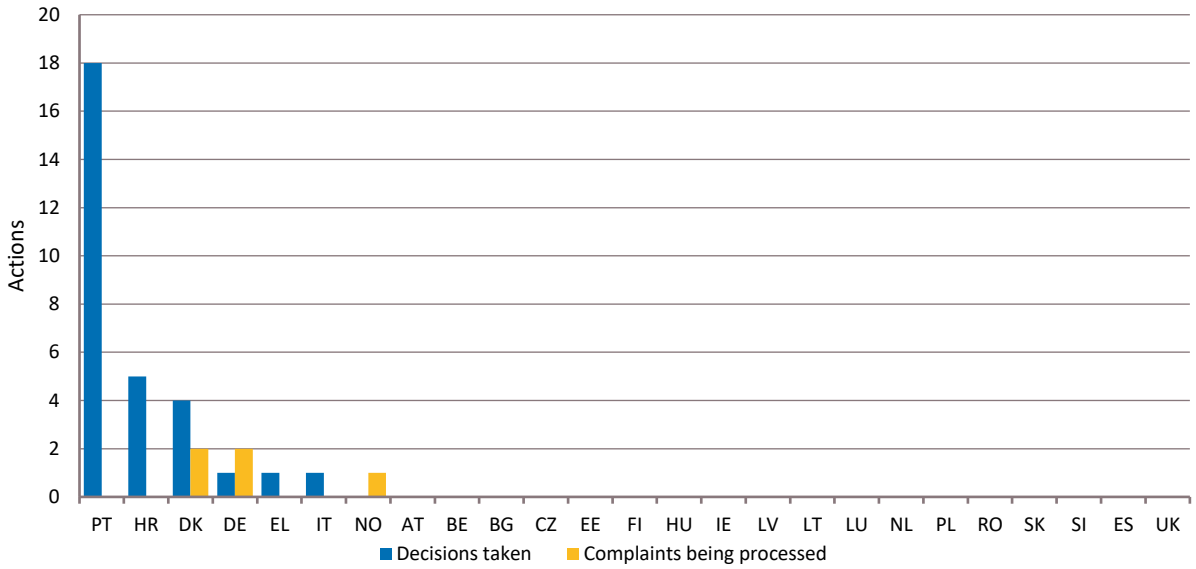
3.3 Complaints related to access to service to facilities

Complaints currently being processed and decisions taken

Figure 40 shows data in relation to complaints and decisions made in 2016, provided by 23 of the States. Complaints reported relate primarily to:

- access to facilities;
- infrastructure charging; and
- quality of services provided.

Figure 40: Complaints being processed and decisions made by country, 2016



Source: RMMS, 2018. No data for ES, FR, RO and UK. No data on complaints being processed for EL.

Portugal made the most decisions, with other States reporting limited or no complaints activity.

Some complaints also relate to processes for bidding for track access. The RMMS survey also asked States to report whether any complaints relate to the interpretation of the European railway acquis.

Decisions are not necessarily in response to complaints raised in the same year, as there can be a considerable time lag between a party making a complaint and the resolution of the complaint. The feedback received from Member States through RMMS suggests that each uses different approaches to complaints management and regulation more broadly, meaning that there is likely to be considerable variation in the categorisation and recording of complaints for the purposes of reporting.

3.4 The traction market

Many passenger services are operated by multiple units, which carry their own source of power (typically electric or diesel, although a small number of hybrid and battery-powered vehicles have been used) and interface with signalling systems. Other passenger services, and almost all freight

services, require traction provided by locomotives carrying this equipment. Locomotives may be designed for use with passenger services, freight services, or both.

Locomotives must be compatible with the infrastructure over which they are to be operated, with compatibility defined by track gauge, structure gauge, coupling and signalling equipment and, if electrified, electrification system (which may use trackside rails or overhead catenary supplying power at several different voltages). Suitable maintenance facilities and, for diesel locomotives, fuelling points, must also be available on or near the infrastructure over which they are to be operated. For international passenger and freight services, this often means that the locomotive (and crew) must be changed at each border. Technical Specifications for Interoperability (TSIs) are intended to reduce the variety of systems in use, particularly in signalling and control, through the European Railway Traffic Management System (ERTMS).

An operator wishing to enter the market or to expand its services may buy new or used traction equipment or lease it from another party such as a rolling stock company. New entry and expansion are easiest when one or more of these options is available and, ideally, there is a competitive supply market. Lack of suitable traction, or an unwillingness of an existing owner to sell or lease it on reasonable terms, can be a major barrier to market entry. Equally, lack of an alternative use, or of an attractive resale value, for existing traction can be a major barrier to market exit.

In some Member States there are relatively developed markets for the leasing of traction equipment. In the United Kingdom, three privately-owned rolling stock companies (ROSCOs) were created in 1995. ROSCOs have also been established in other Member States including Germany, the Netherlands and Sweden. On 4 June 2018, Finland's incumbent railway undertaking, VR Group, agreed with the Ministry of Transport and Communications that a new rolling stock company would be established, although it is not yet clear whether this will supply traction.

Useful data on the availability of traction equipment in the Member States are limited. Locomotives may be listed as available but may no longer comply with safety and technical standards, be maintained in operable condition, or meet the technical requirements (track gauge, structure gauge, coupling, signalling system, electrification type) needed to operate any service. The key issue is whether existing and potential operators can obtain suitable equipment on reasonable terms.

4. The evolution of framework conditions in the rail sector

4.1 Infrastructure charging

Infrastructure charges enable infrastructure managers to recover the cost related to provision of infrastructure for train operations. The core principle is that the charges should cover at least the 'direct' costs of the train run referring to those costs incurred to the infrastructure manager due to the interaction of train and infrastructure.

In addition to direct costs there are other components of charging systems that infrastructure managers can apply to enhance the optimal use of their infrastructure or to set incentives:

- the effective use of infrastructure capacity can be incentivised through mechanisms such as a scarcity charge, a reservation charge or discounts to specific traffic flows;
- to improve the environmental performance, charges can reflect noise emissions or the usage of diesel/electric locomotives;
- the costs of specific investment projects can be recovered by charges based on long-term costs); and
- the operational performance can be addressed by a performance scheme involving penalties/rewards linked to occurrence/avoidance of service disruption both by railway undertakings and infrastructure managers.

In addition, mark-ups can be applied on top of the direct cost charges in market segments being able to pay such higher charges. At the same time, market segments that can at least pay the direct costs shall not be excluded from the use of the rail infrastructure. The overall level of cost recovery through infrastructure charges is interdependent with the level of government contribution and Member States may require different levels of cost recovery.

Box 9: Direct cost-based charging

The EU rail legislation provides the basis for the calculation of direct costs which are core for setting track access charges. According to Directive 2012/34/EU, the charges for the minimum access package (the essential components of the infrastructure service, such as use of tracks, traction current, train control services) and for access to infrastructure connecting service facilities, shall be set at the cost that is directly incurred as a result of operating the train service. Commission Implementing Regulation 909/2015[46] specifies the rules on the modalities calculating the underlying direct costs.

Direct cost based infrastructure charges intend to ensure optimum effective use of the available infrastructure capacity by ensuring that every market segment that can at least pay the direct costs shall not be excluded from the use of the rail infrastructure, while the infrastructure manager has always the right to charge at least for the cost of each train run. The infrastructure managers shall integrate in their calculation of direct costs those costs that they can objectively and robustly prove to be incurred by the operation of the train service. The rules for calculating direct costs include the prohibition to recoup the wear and tear of infrastructure for which the infrastructure manager had received grants.

Effective implementation of the principle of direct costs charging requires that infrastructure managers have a good overview of their assets and understanding of cost causation, so that they can allocate costs to different services or even to different types of vehicles. By doing so, it also allows the infrastructure managers to incentivise the use of less damaging rolling stock.

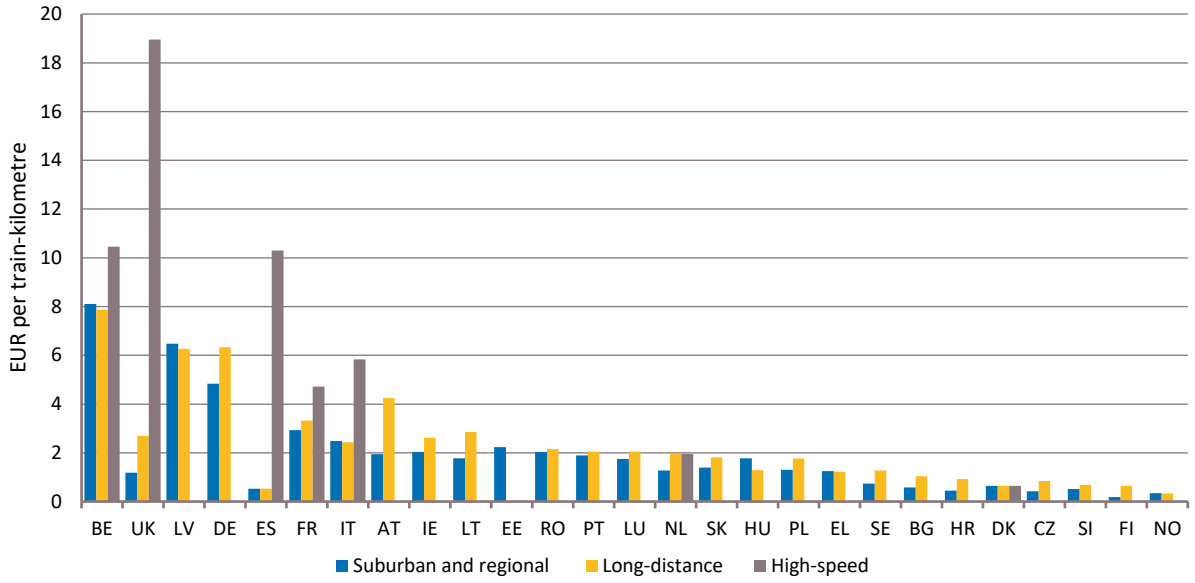
Access charges for different categories of passenger trains

As explained above, level and approach to charging may vary both within the charging scheme of one infrastructure manager as well as between Member States. The current RMMS does not allow distinguishing between the various charging elements used by each Member State. Therefore, while comparing the level of charges as reported in the RMMS, the results need to be interpreted with caution.

Figure 41 compares estimates of typical access charges (excluding mark-ups), in EUR per train-kilometre, for three different types of passenger train.

[46] Commission Implementing Regulation (EU) 2015/909 of 12 June 2015 on the modalities for the calculation of the cost that is directly incurred as a result of operating the train service (Text with EEA relevance) OJ L 148, 13.6.2015, p. 17.

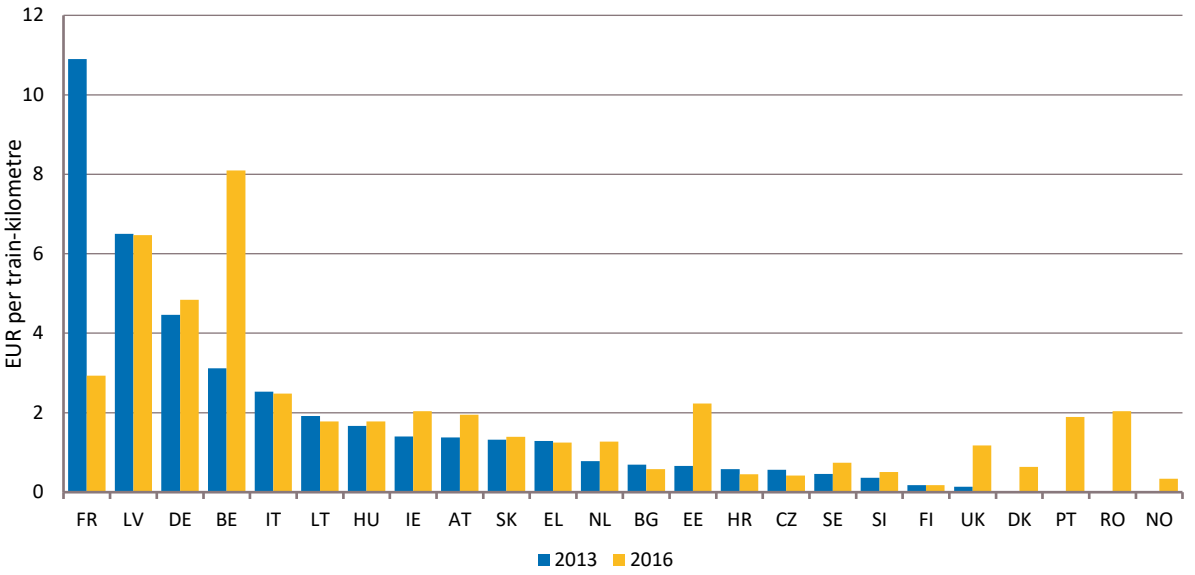
Figure 41: Access charges (excluding mark-ups): passenger trains by type by country, 2016



Source: RMMS, 2018. DE data including mark-ups.

Figure 42 compares track access charges for typical suburban and regional passenger trains in 2013, where available, and 2016.

Figure 42: Access charges (excluding mark-ups): suburban and regional passenger trains by country, 2013 and 2016

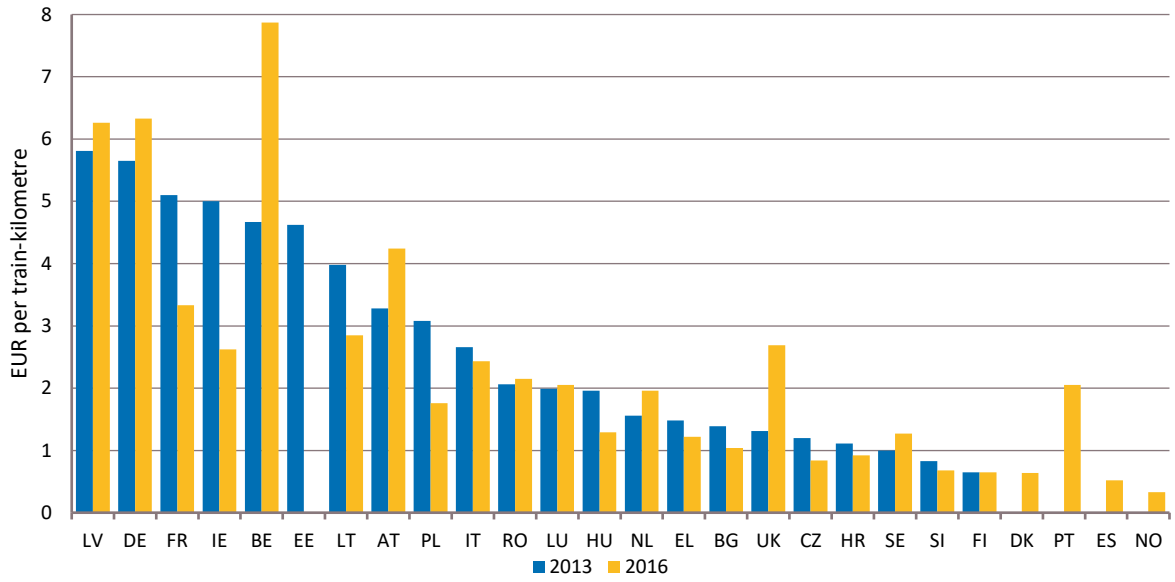


Source: RMMS, 2018. No 2013 data for DK, PT, RO. NO.DE data including mark-ups.

The figure shows how charges have changed in several Member States, most notably France, Belgium, Estonia and the United Kingdom. In practice, while changes in charges affect infrastructure managers, they may have little or no effect on operator behaviour if suburban and regional services are specified by a PSO, where changes in charges are compensated through different levels of public subsidies.

Figure 43 compares track access charges for conventional long-distance trains in 2013, where available, and 2016. The results are mixed and overall there are more changes than for the access charges of suburban and regional passenger trains.

Figure 43: Access charges (excluding mark-ups): conventional long-distance passenger trains, 2013 and 2016

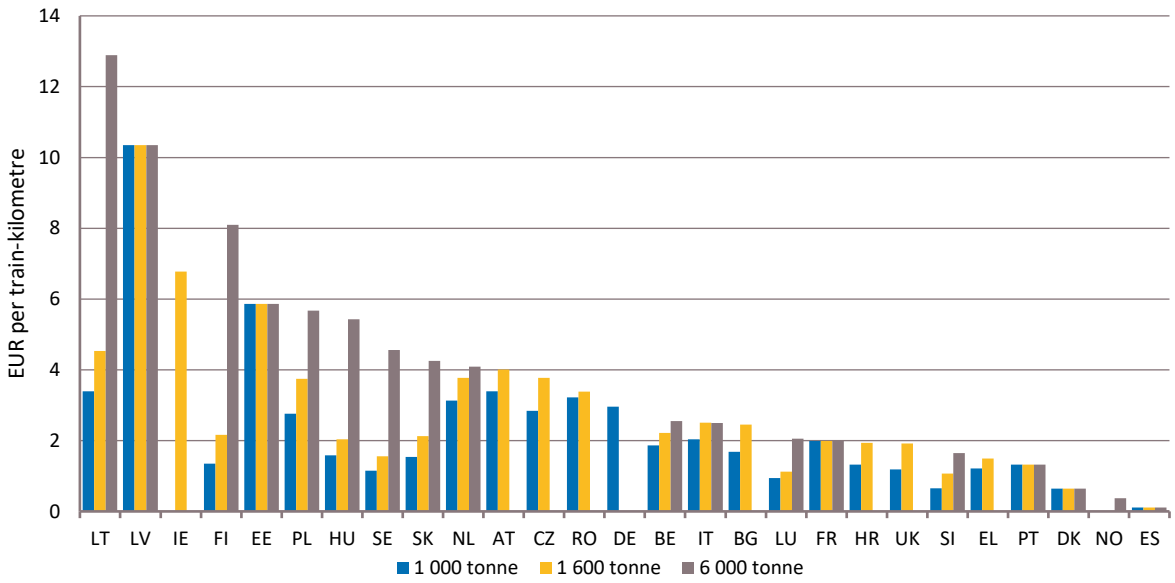


Source: RMMS, 2018. No 2013 data or suitable proxy for PT, DK, ES, NO. No 2016 data or suitable proxy for EE.DE data 2016 including mark-ups.

Access charges for different categories of freight trains

Figure 44 shows track access charge rates (excluding mark ups) for freight trains of different maximum gross tonnage.

Figure 44: Access charges (excluding mark-ups): freight train by type by country, 2016



Source: RMMS, 2018. For DE: split by train type not available, figure here includes mark-ups.

Latvia, Estonia, France, Portugal and Denmark apply a fixed charge per train-kilometre. This can incentivise railway undertakings to assemble long trains which make efficient use of limited infrastructure capacity, provided they operate at sufficient speed. However, they may not reflect the direct cost of the train run, given that in general heavier train runs cause higher wear and tear than the lighter trains.

In most other States, access charges increase with train size, although not necessarily pro rata with tonnage. Italy stated that its track access charges change at 1 000 and 1 600 tonnes as follows:

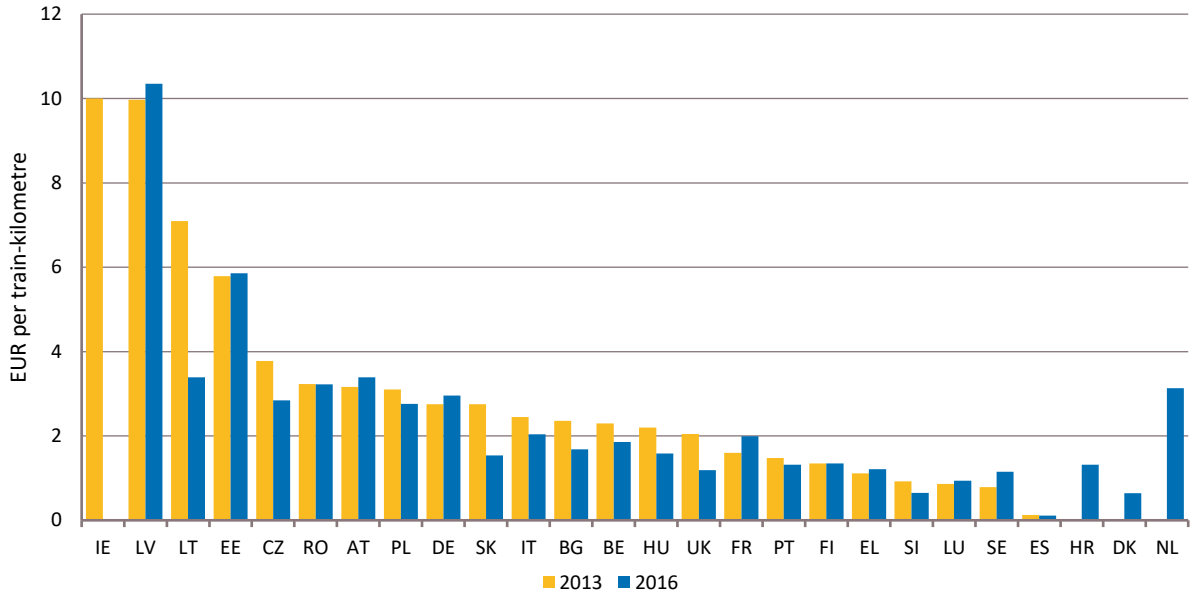
- EUR 2.04 up to 999 tonnes;
- EUR 2.51 from 1 000 to 1 599 tonnes; and
- EUR 2.50 from 1 600 to 5 999 tonnes, with no charge specified at 6 000 tonnes or above.

The figure shows these three charges but in practice the charges at exactly 1 000 and 1 600 tonnes are in the next higher band.

The largest variation in charges reported was in Lithuania, with a difference of EUR 8.40 per tonne-kilometre between the 1 600 tonne and 6 000 tonne categories. The largest difference in charges reported was in Finland, with a factor of 3.8 between the 1 600 tonne and 6 000 tonne categories.

Figure 45 shows how reported average freight charges have changed between 2013 and 2016.

Figure 45: Access charges (excluding mark-ups): freight train average by country, 2013 and 2016



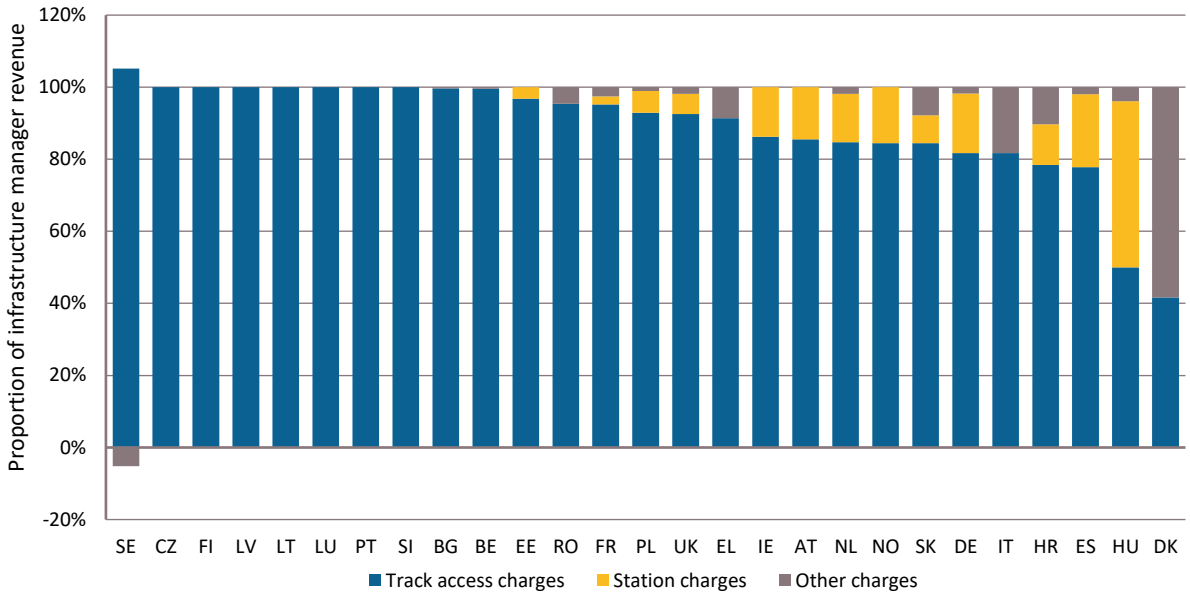
Source: RMMS, 2018. No data 2013 for HR, DK and NL. Split by tonne not available for DE 2016. 2014 1 000 tonne data for 2016 for IE.

The largest reported increases in access charges for freight trains were in Sweden (46%) and France (24%) and the largest reported reductions were in Lithuania (-52%), Slovakia (44%)and the United Kingdom (42%).

Figure 46 shows infrastructure managers' reported revenues from passenger trains through track access charges, station charges and other charges.

Infrastructure managers' revenue collected for passenger and freight trains

Figure 46: Access charges: infrastructure managers' revenue from passenger trains, 2016

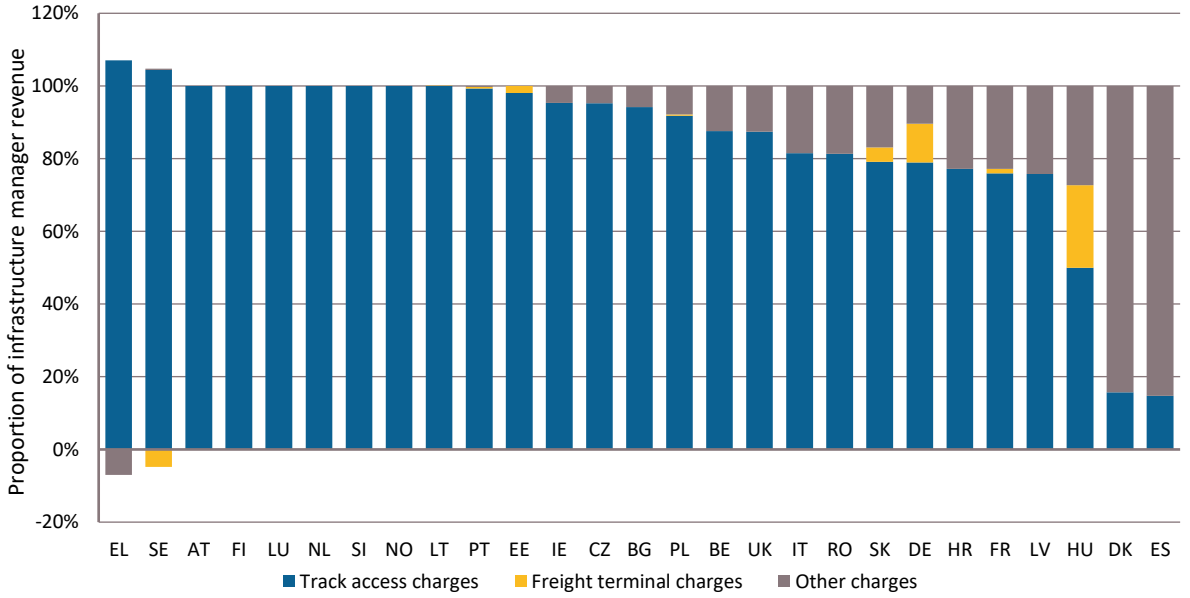


Source: RMMS, 2018.

Sweden reported negative revenue from other charges, resulting from net penalties paid the infrastructure manager under the performance scheme. Not all infrastructure managers own or manage stations and therefore all their revenue comes from track access charges. In Hungary, however station charges provide 46% of the total revenues. 'Other charges' in Italy relate to traction energy and in Denmark to the use of the bridges across the Storebælt and Øresund.

Figure 47 shows the main infrastructure managers' reported revenues from freight trains through track access charges, freight terminal charges and other charges.

Figure 47: Access charges: infrastructure managers' revenue from freight trains, 2016



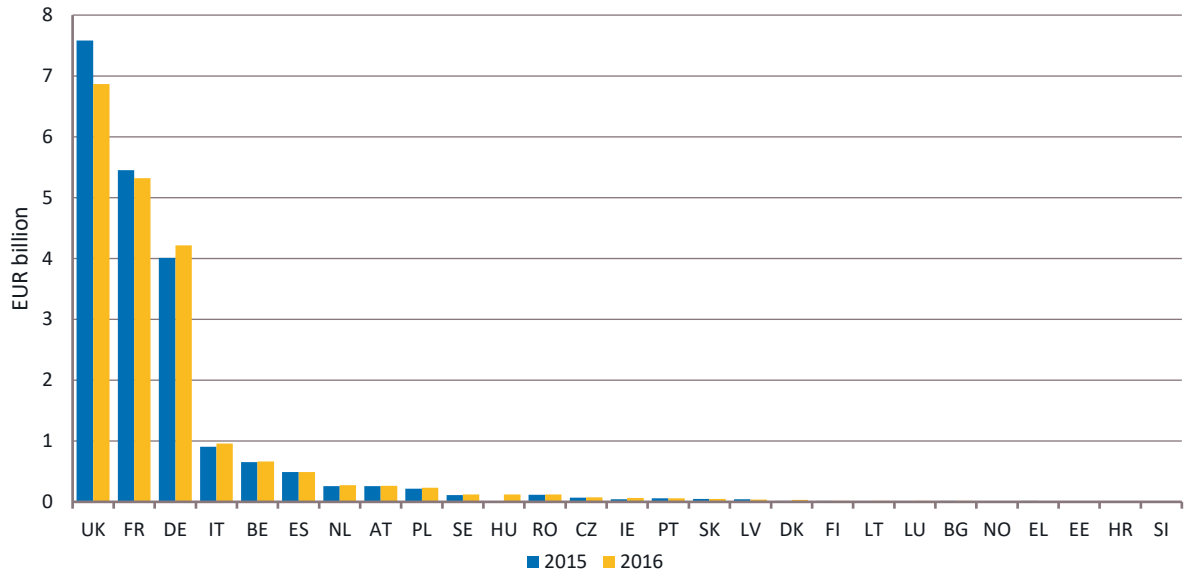
Source: RMMS, 2018.

Greece reported negative revenue from other charges, and Sweden reported negative revenue from freight terminal charges, resulting from net penalties paid for under-performance.

In Germany, DB Netz earned EUR 101 million from freight terminal charges. Revenues from freight terminal charges in Hungary, France, Slovakia and Poland did not exceed EUR 2 million and several Member States reported no revenues from freight terminal charges. We assume that in these countries terminals are (mostly) not owned by the main infrastructure manager. Other charges in Denmark are due to bridge charges, there is no information about the nature of other charges in Spain.

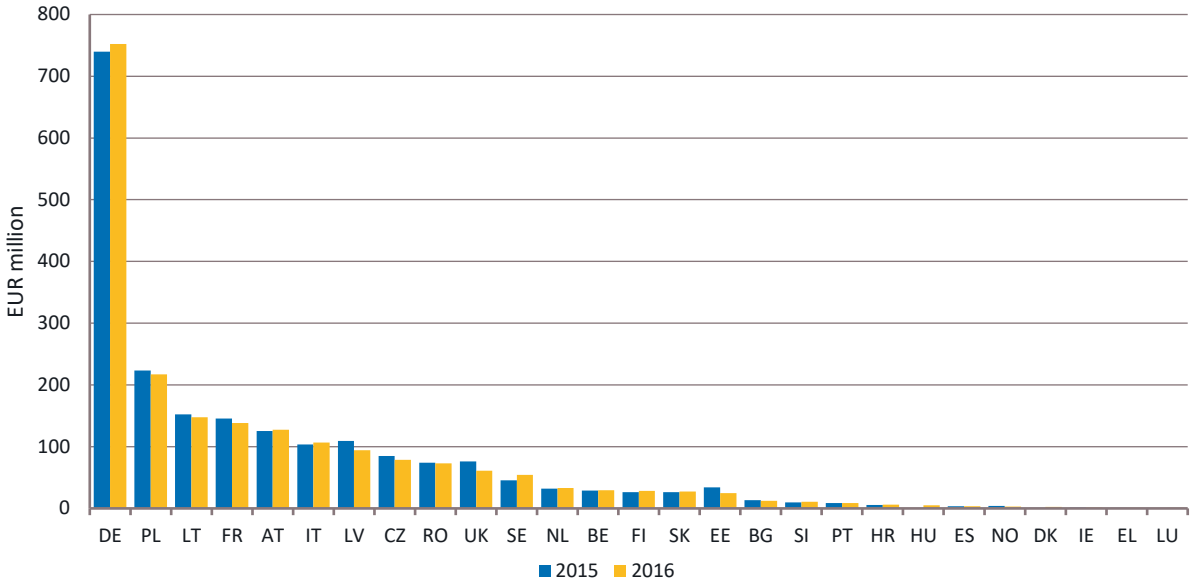
Figure 48 and Figure 49 compare revenues from passenger and freight track access charges, including mark-ups, where applicable, in 2015 and 2016.

Figure 48: Access charges (including mark-ups): revenues from passenger trains, 2015 and 2016



Source: RMMS, 2018. 2015 no data for LU, HU.

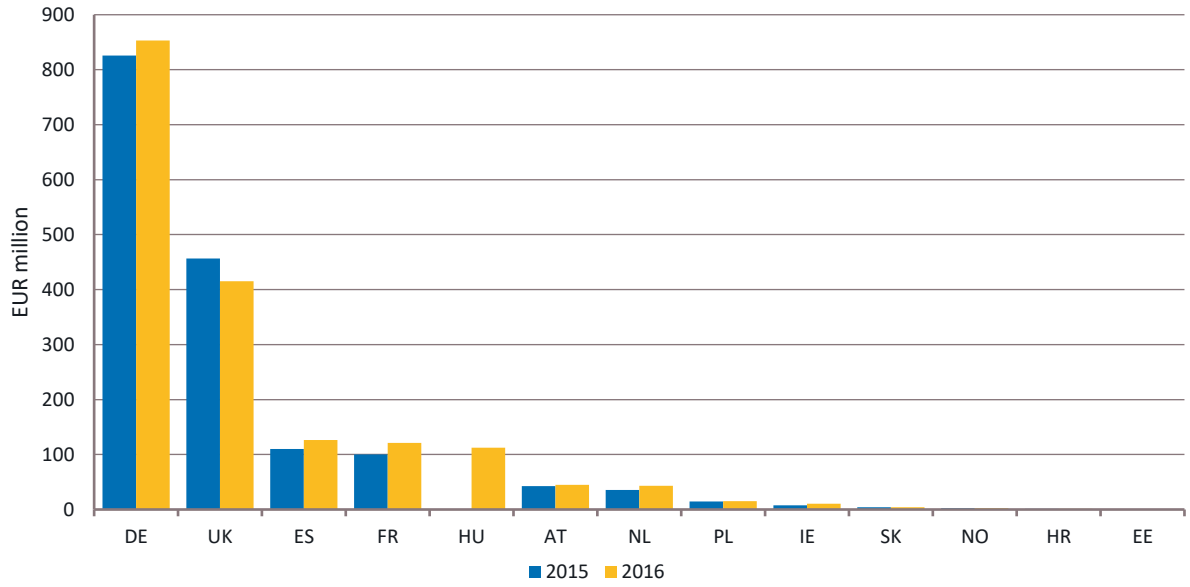
Figure 49: Access charges (including mark-ups): revenues from freight trains, 2015 and 2016



Source: RMMS, 2018. No 2015 data for HU or LU.

Figure 50 compares revenue from station charges, where available, in 2015 and 2016.

Figure 50: Access charges: revenues from station charges, 2015 and 2016

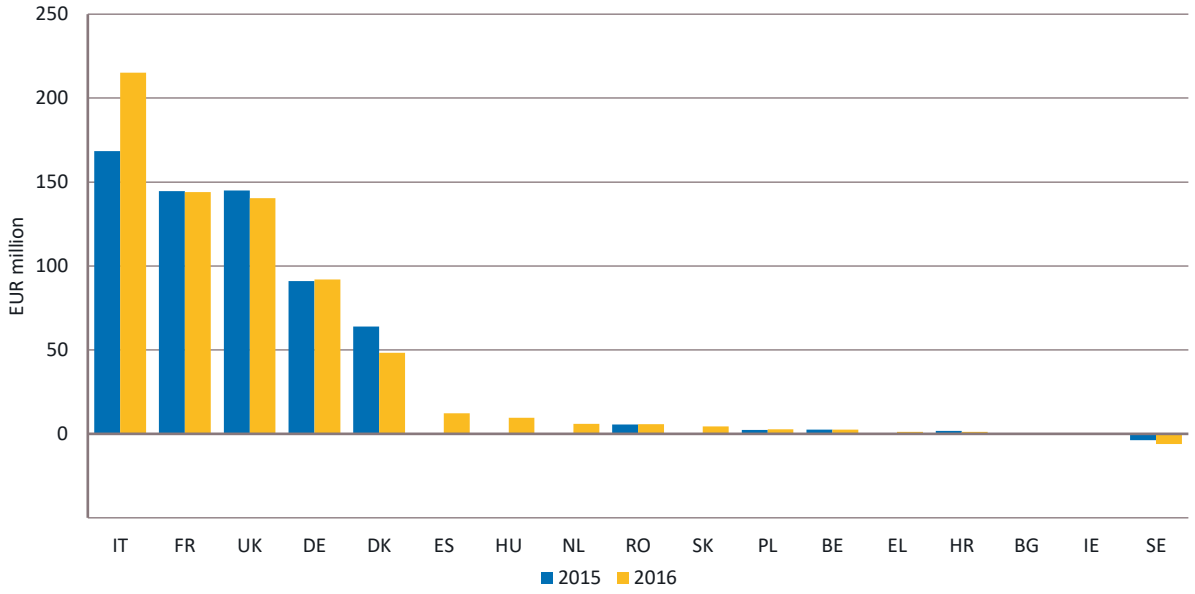


Source: RMMS, 2018. BE, BG, CZ, DK, FI, EL, IT, LV, LT, LU, PT, RO, SI and SE did not report revenues from station charges in the RMMS questionnaire.

Figure 50 only reports revenue from charges at stations owned by the main infrastructure manager. Revenues from station charges rose in Germany, from EUR 826 million in 2015 to EUR 853 million in 2016, while in the United Kingdom they fell from EUR 457 million to EUR 415 million over the same period. In contrast, they generally remained at 2015 levels in Austria, the Netherlands, Poland and, to a limited extent, Spain and France.

Figure 51 and Figure 52 show the variation in revenues from other charges collected from passenger and freight train operators, where available, among the States.

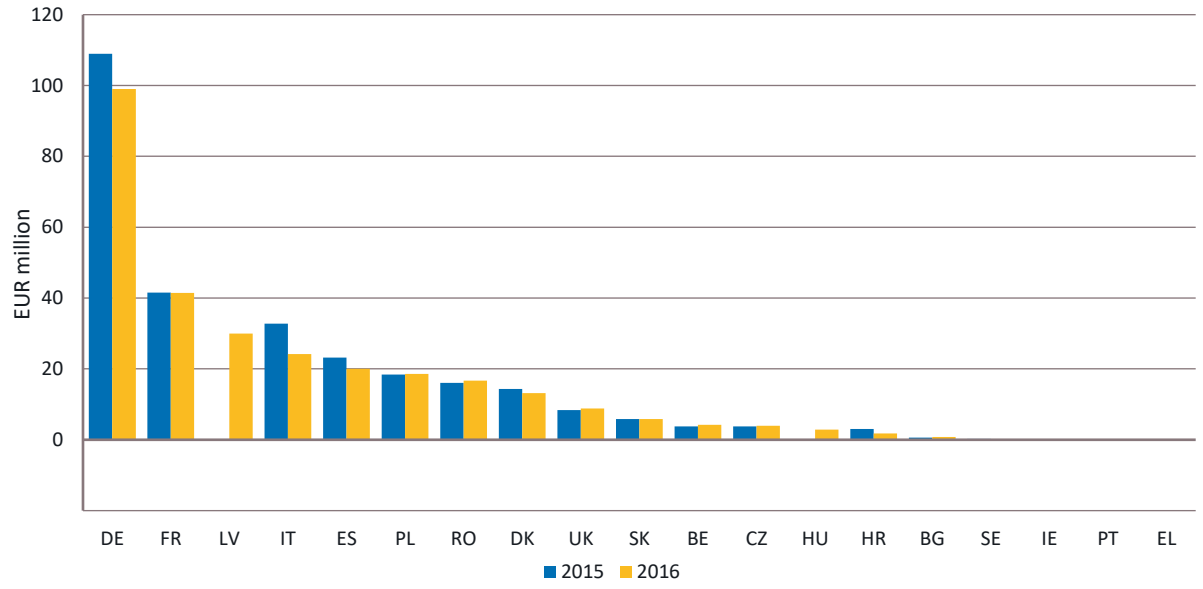
Figure 51: Access charges: revenues from other charges from passenger operators, 2015 and 2016



Source: RMMS, 2018. AT, CZ, EE, FI, LT, LU, LV, NO, PT and SI did not report revenues from other charges from passenger operators in the RMMS questionnaire in both years; same for ES, HU, NL, SK and EL for 2015. 2016 no data for IE.

As noted above, Sweden reported negative revenue from other charges resulting from net penalties paid for under-performance.

Figure 52: Access charges: revenues from other charges from freight operators

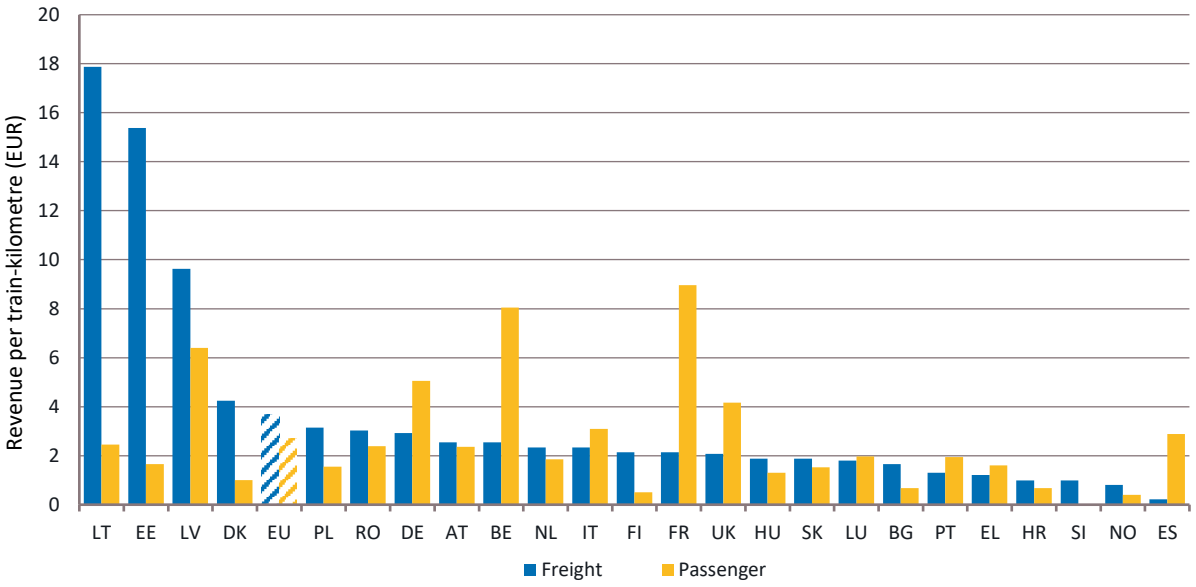


Source: RMMS, 2018. AT, EE, FI, LT, LU, NL, SI and NO did not report revenues from other charges from freight operators in the RMMS questionnaire for both years; same for LV and HU for 2015.

Greece reported a small negative revenue from other charges.

Figure 53 shows the average revenue from the charges for the minimum access package in 2016 in each State reported by IRG-Rail.

Figure 53: Access charges: average revenue from charges for the minimum access package, 2016



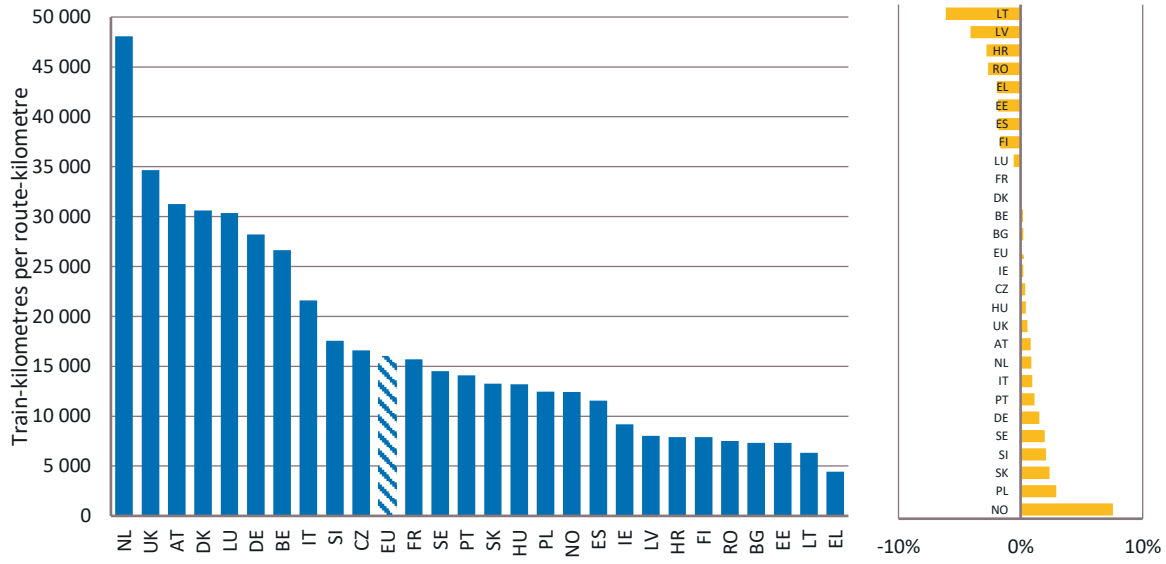
Source: IRG-Rail, 2018. No data for CZ, IE, SE.

4.2 Capacity allocation and congestion

4.2.1 Network utilisation

Figure 54 shows the reported average intensity of use of the infrastructure in train-kilometres per year per route-kilometre[47].

Figure 54: Network utilisation 2016, compound average growth rate 2011-2016



Source: RMMS, 2018 and Statistical pocketbook, 2018

[47] In practice trains may carry many more passengers, or tonnes, in some networks, or parts of networks, than others. These broad national averages say nothing about the emptiest parts of the network, but provide some indication about which networks are on average busier than others.

The most intensively-used networks, on average, are those of north west Europe including the Netherlands (operating almost 50 000 train-kilometres per route-kilometre in 2016), the United Kingdom, Austria, Denmark, Luxembourg, Germany and Belgium. The least intensively-used networks are those of the Baltic States, Greece, Finland, Romania and Bulgaria. Low network utilisation means that the fixed costs of operations, maintenance and renewals of the infrastructure need to be recovered from, or justified by, a smaller volume of trains and passenger or freight traffic.

4.2.2 Managing capacity shortages

Sections and nodes declared congested

Congestion underlines the existence of infrastructure limitations not allowing all potential traffic to transit on the network. Article 47 of Directive 2012/34/EU requires that infrastructure managers declare as 'congested' any infrastructure for which it has not been possible to satisfy requests for infrastructure capacity. The Directive also makes provision for a capacity analysis and a capacity enhancement plan.

Table 5 summarises the lengths of track, and numbers of nodes, declared to be congested in 2015 and 2016 by eight Member States plus Norway. No States declared any dedicated high-speed line to be congested.

Table 5: Track and nodes declared to be congested, 2015 and 2016

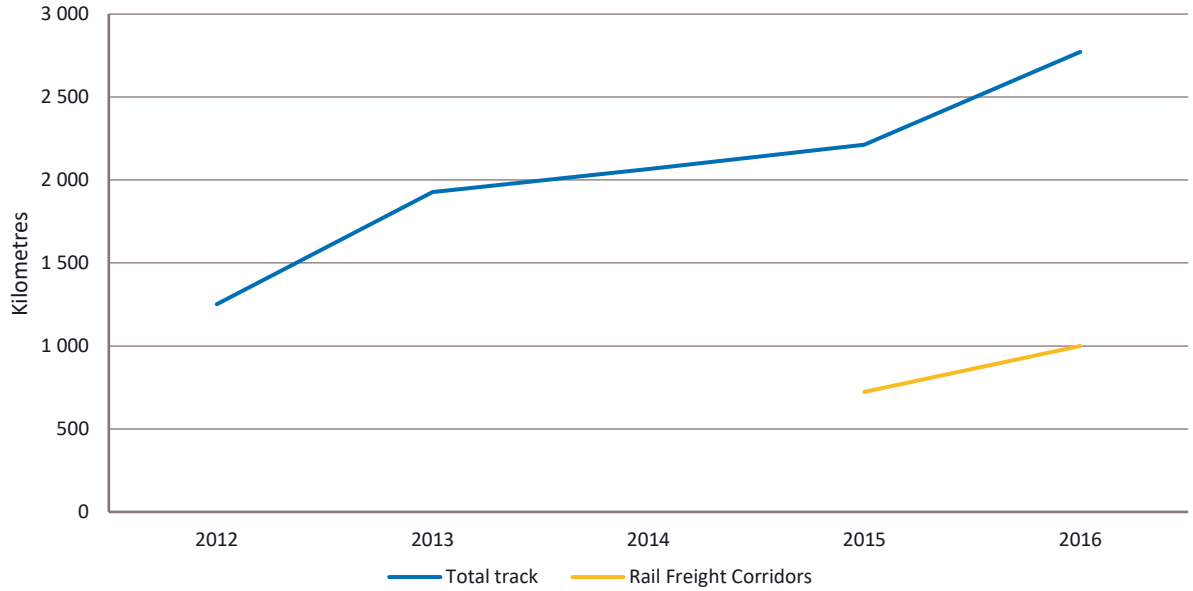
State	Total track (kilometres)		Rail freight corridors (kilometres)		Nodes	
	2015	2016	2015	2016	2015	2016
United Kingdom	1 171	1 171			1	1
Germany	507	681	396	570	2	2
Italy	163	387	67	67	1	1
Romania	260	363	260	363	9	
Denmark	84	84	67	67	1	1
Norway	71	71	24	24	2	2
Ireland	12	12			2	2
Austria	12	12				
Poland	4	4			1	1
EU total (this excludes Norway)	**2 213**	**2 714**	**790**	**1 067**	**16**	**8**

Source: RMMS.

The network with the greatest length of declared congested track is that of the United Kingdom, which accounted for over 40% of total congested track in 2016. There is extensive congestion in Germany, Italy and Romania, each of which has declared more than 100 kilometres of track to be congested.

Figure 55 combines the information in Table 5 with available historic data to show the trends in the total length of track declared congested over the period 2012 to 2016.

Figure 55: Total length of track declared congested, 2012-2016



Source: RMMS, 2018.

The total length of track declared congested (including in Norway) is rising and has now reached nearly 3 000 kilometres, including 1 000 kilometres of rail freight corridors. This suggests that further growth of traffic in some passenger and freight markets will be constrained, at least until alternative routes or additional capacity are available.

Principles for dealing with congestion

Infrastructure managers need to survey the usage of infrastructure capacity to meet all capacity requests adequately. If capacity is constrained, methods to deal with this need to be developed. Reasons for congestion and measures that are to be taken in the short and medium term need to be displayed to ease the congestion. If, after coordination and consultation, train path demand cannot be matched, the relevant section of infrastructure must be declared congested.

After a declaration of congestion, either the infrastructure manager must carry out a capacity analysis within six months and produce a capacity enhancement plan within a further six months, or an existing capacity enhancement plan must be realised. Any capacity enhancement plan shall display the reasons for the congestion, the likely future development of traffic, any constraints on infrastructure development and the options and costs for capacity enhancement, including likely changes to access charges. On this basis, a decision of measures to overcome the congestion needs to be taken. The users of the relevant congested infrastructure are to be consulted on the plan and its measures.

Where congestion exists, Article 31 of Directive 2012/34/EU permits infrastructure managers to levy a charge which reflects the scarcity of capacity of the identifiable section of the infrastructure during periods of congestion. The declaration of congestion on congested infrastructure is therefore a prerequisite for levying such a charge.

IRG-Rail (2017) reported that scarcity charges were in use in Austria, Estonia, France, Italy, Luxembourg, Netherlands, Norway, Slovenia and Sweden[48]. Poland makes provision for scarcity charges but does not impose them.

If scarcity charges are not levied, or have not achieved changing the traffic demand behaviour, the infrastructure manager may also employ priority criteria to allocate infrastructure capacity. Such criteria need to reflect the importance of a service to society relative to any other service, which will consequently be excluded. Member States might take measures to ensure that the importance of transport services under public service requirements and of national or international rail freight are taken into consideration. Compensations to infrastructure managers for losses of revenues due to the capacity allocation to certain services may be granted. This also includes effects of any exclusion of a service in another Member State. All procedures and defined criteria shall be reflected in the network statement.

If no capacity enhancement plan is produced, or no progress with the measures agreed in the plan is made, the infrastructure manager must cease levying any charges for the use of the relevant infrastructure. Otherwise, if the plan cannot be realised due to unforeseen reasons, or if the measures in the plan prove not to be economically of financially viable, the infrastructure manager may continue to levy the charge in agreement with the regulatory body.

Framework agreements

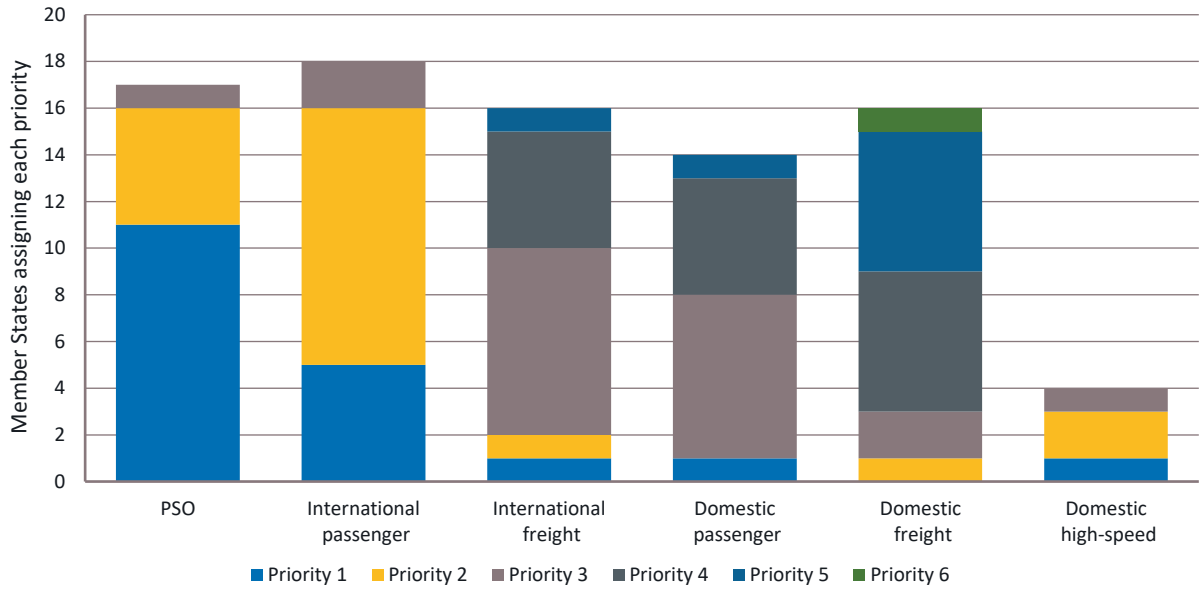
Article 42 of Directive 2013/34/EU makes provision for framework agreements for the use of the infrastructure for longer than one working timetable period. However, the EU rail industry is characterised by dominant operators, some of which may have close ties with infrastructure managers that could use framework agreements to monopolise infrastructure capacity for many years. The Commission implemented a Regulation, from December 2016, on procedures and criteria relating to framework agreements for the allocation of railway infrastructure, to provide new entrants with fairer access to the railway infrastructure and to optimise its use.

Priority rules (priority services)

Article 45 of Directive 2012/34/EU permits the infrastructure manager to give priority to specific services within the scheduling and coordination process. Many infrastructure managers make use of priority rules, and the principal types of service given priority are summarised in Figure 56.

[48] 'Overview of charging practices for the minimum access package in Europe', IRG-Rail (2017).

Figure 56: Principal types of services prioritised by infrastructure managers, 2016



Source: RMMS, 2018.

Note that:

- Two large Member States, France and Germany, did not report any priority rules.
- Two Member States with relatively liberal markets, Sweden and the United Kingdom, stated that priority was based on a range of decision-making criteria or on overall optimisation of the timetable.
- Between 2015 and 2016, some infrastructure managers reported that they had changed their priority rules.

The services most commonly prioritised are those provided under PSO, which are given Priority 1 in 11 Member States. The next most commonly prioritised services are international passenger services, followed by international freight services, then other domestic and passenger services. It is often necessary to prioritise international services to allow the creation of end-to-end paths crossing borders between Member States. Where they operate, domestic high-speed services are normally given a high priority.

Some infrastructure managers allocate high priority to other types of service. For example:

- In Austria (and Norway), a high priority is given to services operated under framework agreements.
- In Belgium, slow freight trains are given fourth priority, behind passenger trains and fast freight trains.
- In Finland, top priority is given to passenger traffic necessary for connections and freight traffic for the processing industry.
- In Croatia, second priority is given to combined freight transport.
- In Hungary and Lithuania, low priority is allocated to maintenance trains.

Successful and rejected path allocations scheduled and ad hoc train paths, numerous services

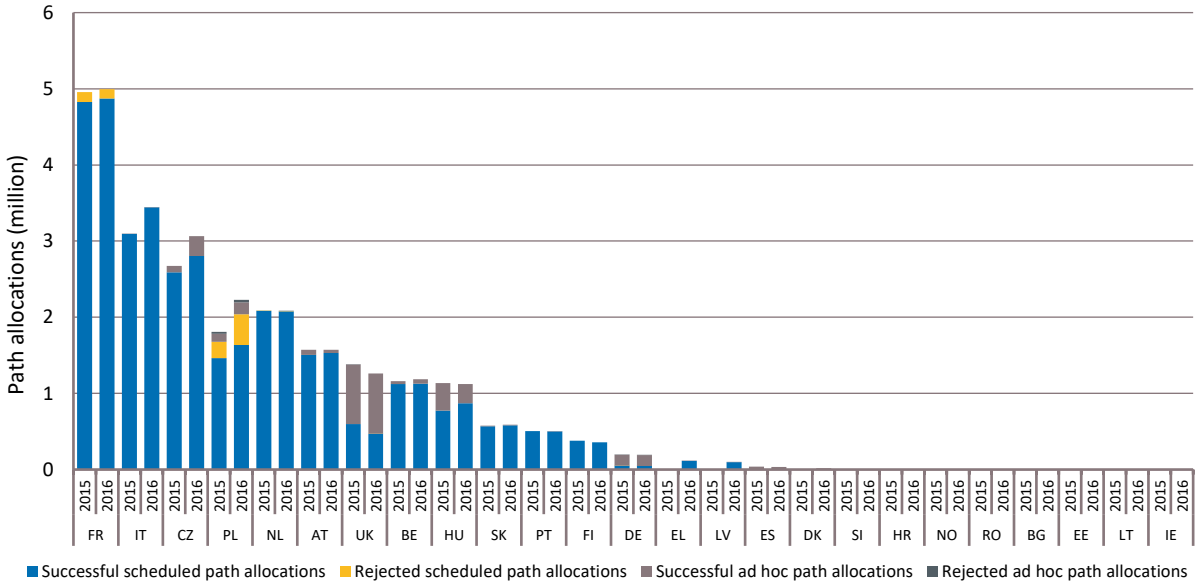
Member States are required to follow the path coordination processes set out in Article 46(1) of Directive 2012/34/EU, which permits either:

- scheduled path allocations, as part of a scheduled regular service; or
- ad hoc allocations, in the event of unforeseen disruptions.

Path allocations wither may be accepted or rejected by an infrastructure manager to resolve conflicting applications for infrastructure capacity.

Figure 57 shows the reported number of successful and rejected scheduled path allocations[49] in 2015 and 2016.

Figure 57: Successful and rejected scheduled path allocations, 2015 and 2016



Source: RMMS, 2018. No data for LU and SE. No 2015 data for EL, LV.

Timetabling and planning of capacity restrictions

The use of railway infrastructure is organised on the basis of timetables, which predetermine the trajectory of individual trains in the form of so-called 'train paths'. The basis for building timetables are path requests by railway undertakings and other applicants[50]. On this basis, infrastructure managers develop a timetable which reconciles all path requests in the best way possible, given the infrastructure capacity available. Path requests can be either submitted under the yearly working timetable, designed for planned traffic and on a more long-term basis, and as ad-hoc requests for spot traffic on short notice.

[49] The definitions in the RMMS reporting as regards the count of path allocations still need to be refined. For instance currently total for FR is almost 5 million and total for DE is only 190 000. These differences could be a result of on how daily path has been recorded - as any of 1, 7, 28 or 365.

[50] In addition to railway undertakings, the term 'applicants' includes other persons or legal entities with an interest in procuring infrastructure capacity, such as shippers, freight forwarders or combined transport operators.

As other elements of the European railway system, the timetabling procedures have evolved nationally and lack harmonisation, which hinders cross-border traffic.

Another issue is the adequacy of the timetabling process to the business models of rail freight transport. A material share of market demand is volatile and cannot be planned long in advance. For such market segments, ad-hoc path requests would be the most appropriate method to accommodate capacity needs. However, to secure infrastructure capacity, requests are rather made in the framework of the annual timetable process, thereby avoiding the risk of not receiving an ad hoc train path of suitable quality (or even none at all) due to the late stage. This often leads to suboptimal management of infrastructure capacity and a waste of resources, since train paths are typically modified or even cancelled, when the real capacity needs become more precise.

Last but not least, insufficient coordination of capacity restrictions creates significant problems for running trains in certain regions of Europe. Capacity restrictions are necessary to allow maintenance and enhancement works on the infrastructure but their impact on rail traffic needs to be minimised by proper coordination at national and international level.

Box 10: New timetabling delegated act and Timetable Review project (RNE)

To improve this situation, the new Annex VII of Directive 2012/34/EU specifies a mandatory timeline for the establishment of the yearly timetable and introduces coordination and consultation processes between infrastructure managers and applicants. Capacity restrictions due to major planned infrastructure works must be taken into account at an early stage in the timetable process. This improves reliability for applicants, enabling both a better use of the infrastructure and more competitive transport services.

In parallel to this change in legislation, infrastructure managers and railway undertakings have launched a common effort to completely redesign the international timetable process with the goal to better respond to the market needs of both passenger and freight transport. For example, passenger operators would be able to secure train paths earlier than today, allowing them to start ticket sales sooner. Freight operators would benefit from a more flexible process allowing them to respond to demand on short notice. Thus, the specific requirements of each market segment will be better reflected in the process.

In 2017, the TTR project (‘redesign of the international timetable process’) was launched by RailNetEurope (infrastructure managers) and Forum Train Europe (applicants). The project addresses the details of the timetable process, supporting IT tools, the commercial and legal framework as well as a monitoring process. The new timetable process is planned to be introduced in a gradual process until 2025. Key elements of the new approach are currently being tested in three pilot projects situated on Rail Freight Corridor lines, covering the Mannheim-Miranda de Ebro, Munich-Verona and Rotterdam-Antwerp links until December 2020.

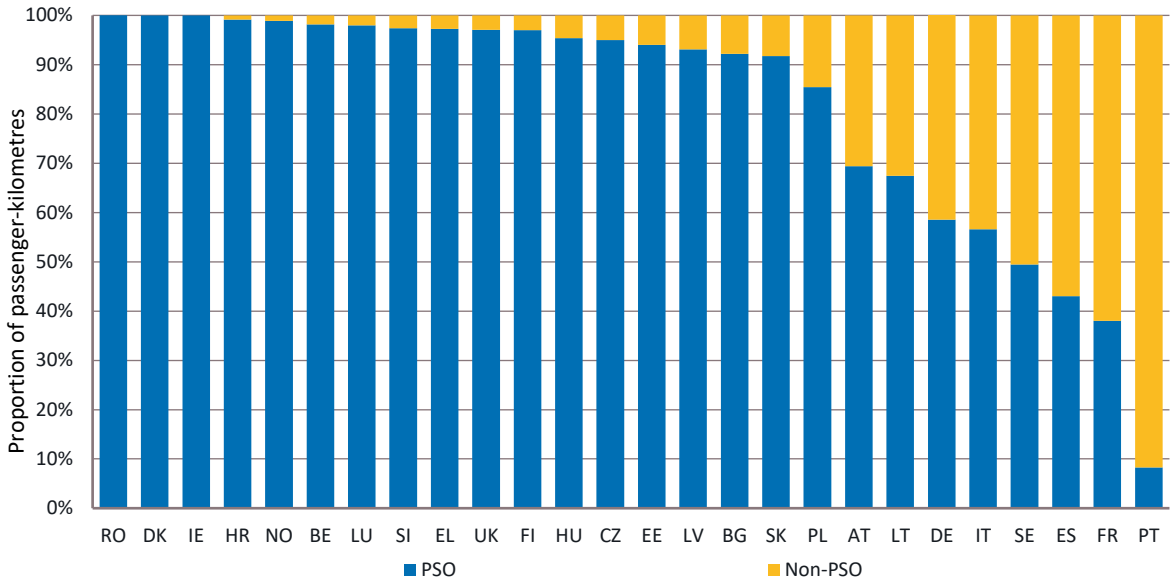
4.3 Rail transport services covered by public service contracts

4.3.1 PSO scope

Regulation 1370/2007, now amended by Regulation (EU) 2016/2338, defines a Public Service Obligation (PSO) as a requirement defined or determined by a competent authority to assure public passenger transport services in the general interest that an operator, if it were considering its own commercial interests, would not assume or would not assume to the same extent or under the same conditions without reward. The Regulation was intended to create an internal market for public passenger transport services by complementing the general rules on public procurement.

In 2016, just over 60% of total EU rail passenger-kilometres were travelled on services covered by a PSO. Figure 58 shows how this proportion varies among the States for which data are available.

Figure 58: Passenger-kilometres on PSO and commercial rail services, 2016



Source: RMMS, 2018. No recent data for NL.

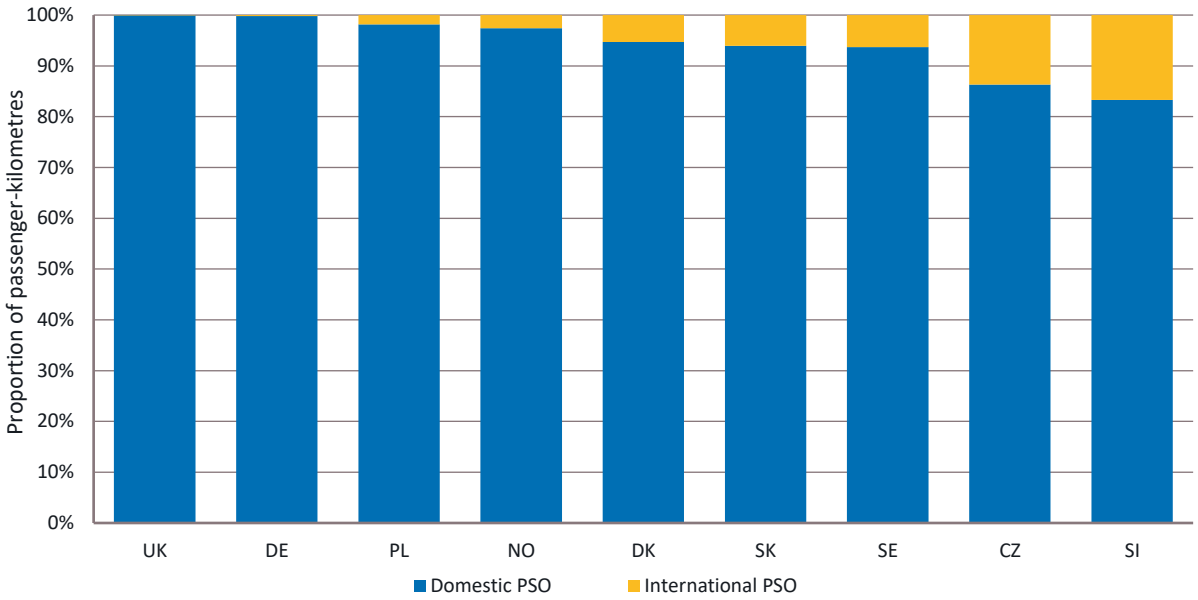
As indicated on the left of the chart, all domestic rail passenger travel on services in Romania, Denmark and Ireland was covered by a PSO. On the right of the chart, in contrast, several large Member States leave the incumbent operator to provide services on a commercial basis without a PSO, typically in long-distance and interurban markets. Over 30% of passenger-kilometres are on commercially-operated services in Austria, Germany, Italy and Sweden, which have commercial open access operators, and in Spain and France, which do not. Lithuania also has a large proportion of travel on services which are not covered by a PSO.

In Portugal, around 60-70% of services were reported as covered by a PSO until 2014, but this proportion appears to be only 8% in 2016 because the incumbent CP did not receive anymore compensations and all its traffic was considered as commercial.

The only large network which does not leave most long-distance services to be provided commercially is the United Kingdom where, since 1996, all the services of the former incumbent have been covered by PSOs, and the only non-PSO services are those provided by open access operators. The implications of this and other factors for apparent levels of subsidy in the United Kingdom are discussed in the paragraph on PSO compensation.

Figure 59 shows that six Member States and Norway specified a PSO for some international passenger services.

Figure 59: Passenger-kilometres on domestic and international PSO services, 2016



Source: RMMS, 2018.

States reported almost 3 billion passenger-kilometres of travel on cross-border PSO services in 2016 although the data appear to be incomplete.

Poland, Slovakia, the Czech Republic and Slovenia reported passenger travel on international PSO services, but do not identify across which borders the services operate, and hence it is not clear whether travel in other Member States has been reported by them. The largest volume reported was in the Czech Republic, with over 1.3 billion passenger-kilometres, representing almost 16% of travel on PSO services in the Czech Republic. The largest proportion of PSO passenger travel on international services was in Slovenia, with 20% of the total, although this amounted to only 100 million passenger-kilometres.

Denmark reported that 350 million passenger-kilometres occur on international PSO services, which operate into Sweden, over the Oresund Bridge, and possibly into Germany, across the land border between the two Member States. Germany did not report any corresponding data, but Sweden did, although Sweden has services to both Denmark and Norway. Belgium, Croatia, Luxembourg and the Netherlands reported international PSO in past RMMS surveys but not for 2016.

The United Kingdom reported 50 million passenger-kilometres, which must occur on the cross-border Enterprise services linking Belfast with Dublin, in Ireland, but these account for only 0.08% of total passenger-kilometres on PSO services. Ireland did not report corresponding data for the part of the service in its territory.

Box 11: Night Trains

The Commission receives many Parliamentary questions and letters from citizens about the gradual disappearance of passenger night trains.

Passenger night trains can be defined as any train consisting partly or wholly of rolling stock dedicated to, or reconfigured for, overnight travel. Night trains often differ from day trains in their patterns of operation, and passenger night services have several constraints that day-time services do not experience (or to a lesser extent):

- Reaching the destination within a given time slot is more relevant than to reach it as quickly as possible.
- Many night trains split and join portions.
- Night trains may operate only on some days of the week (or month, or during some seasons, or around specific holidays).
- Freight traffic may limit the commercial speed, punctuality and reliability of passenger night trains.
- Main central stations focus on commuter flows in the morning.
- Staff work overnight.
- More staff and cleaning work are needed.
- Dedicated rolling stock operates only at night, so that usage is not maximised.

Unfortunately, no consistent data are available to monitor the use and users of night train services, but an ad hoc study commissioned by the European Parliament in 2017[51] found that night travel in Europe has been declining for a long time. Night trains appear to have lost business passengers and are mainly used for leisure travel.

Night trains also face fierce and growing competition, particularly from aviation and coaches. The liberalisation of intra-EU air services in 1993 has led to the growth of low-cost airlines within Europe. International coach services were also liberalised in 2011, and three large Member States (Germany, France and Italy) also liberalised domestic coach services which over domestic long-distance are avid competitors to night trains. Many coach operators also provide overnight services, and their fares often undercut even the cheapest seats on night trains.

The EU plays only a limited role in relation to night trains, setting the overall regulatory framework for the entire sector. The provision of rail services is in first place a matter for railway undertakings, Member States or regional authorities based on business/public service considerations.

According to the study for the European Parliament, domestic night trains operate in 11 Member States, either under a PSO (national or specific to night trains) or commercially. International night trains currently serve or pass through 18 Member States, but three of them appear to be only connected by night trains to Russia. Night trains operated on a clearly commercial basis seem to be restricted to:

- a corridor including the service offered by SJ between Stockholm and Malmo in Sweden; and
- the ÖBB Nightjet network radiating from Vienna to a large area of central/Eastern Europe plus Slovenia, Croatia and Italy.

The measures of the Fourth Railway Package may help to generate more demand for rail services and such improve the business case also for overnight trains, creating new services and improving the customer-orientation of rail operators through competition.

Source: Steer Davies Gleave for the EP.

[51] 'Passenger night trains in Europe: the end of the line?',
Steer Davies Gleave for the TRAN Committee of the European Parliament,
http://www.europarl.europa.eu/RegData/etudes/STUD/2017/601977/IPOL_STU(2017)601977_EN.pdf .

Box 12: Emergence of low-cost services

A low-cost offer for rail services is emerging in the EU. In addition to existing services as Ouigo and Izy, FlixTrain recently entered the long-distance German market and RENFE announced the launch of a new low-cost service in Spain in 2019. According to a study commissioned by Getlink in 2018[52], a low-cost rail service could use peripheral stations to connect London to Paris via the Channel Tunnel with a slight longer travel time and overall cost saving between 25% and 30% compared to the premium offer of Eurostar.

Service	Description
OUIGO	– Subsidiary of SNCF. – Offering low-fares, high-speed services (8 destinations to the north, the north-west and the south-east of France). – Launched in 2013.
IZY	– Low-cost Thalys' brand. – Offering low-fares, standard-speed services on conventional lines between Brussels and Paris. – Launched in 2016.
FlixTrain	– Brand of FlixMobility group, as FlixBus. – Long-distance, low-fares train connections between Hamburg and Cologne (launched March 2018) as well as between Berlin and Stuttgart (launched April 2018). – FlixTrain plans to apply later this year for the rights to operate additional German routes from 2019. – FlixTrain will use a similar model to FlixBus, where FlixMobility handles network development, technology, sales, marketing and quality management, while operations and fleet management are provided by experienced external partners (Leo Express, BahnTouristikExpress, BTE, MRCE). – Integrated offer with FlixBus services.
EVA	– Low-cost RENFE service. – Offering low-fares, no-frills high-speed services between Barcelona and Madrid, integrated with other modes. – Launch announced by Spanish Ministry for the first quarter of 2019.

4.3.2 PSO award

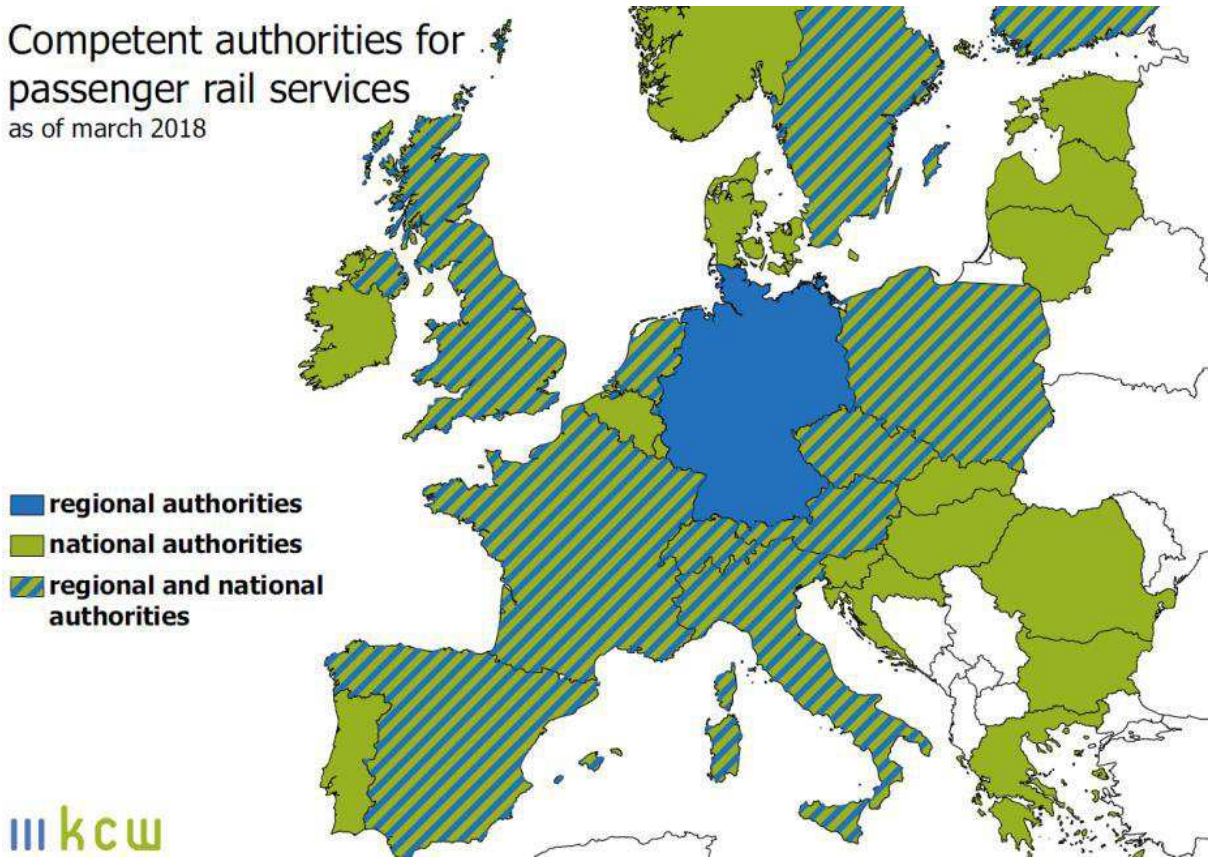
Public contracting authorities

Regulation (EC) No 1370/2007, now amended by Regulation (EU) 2016/2338, sets out the principal that 'Where a competent authority decides to grant the operator of its choice an exclusive right and/or compensation, of whatever nature, in return for the discharge of public service obligations, it shall do so within the framework of a public service contract.'

[52] http://www.lefigaro.fr/societes/2018/07/01/20005-20180701ARTFIG00093-des-trains-low-cost-pourraient-bientot-rejoindre-londres.php ; https://investir.lesechos.fr/actions/actualites/recap-week-end-getlink-pousse-a-une-offre-low-cost-entre-paris-et-londres-presse-1776080.php.

In practice, the nature and areas of responsibility of competent authorities for passenger rail services varies between States, as shown in Figure 60 drawn from a recent report for the Commission[53].

Figure 60: Competent authorities for passenger rail services, 2018



Source: KCW, 2018.

In a number of States, there is a single national competent authority for rail passenger transport. In many cases, there is also a single national incumbent railway and, as a result, there may be a single national public service contract (PSC) between the two parties.

In other States, procurement of rail transport has been devolved to other tiers of government. This is typically a region, province or county with a capital city or administrative centre, although in Germany the competent authorities are the States (Länder), three of which cover only the cities of Berlin, Bremen and Hamburg. More complex arrangements occur in the United Kingdom, where the competent authorities for rail services include a kingdom (Scotland), a principality (Wales), a province (Northern Ireland) and three cities (London, Manchester and Liverpool). These arrangements can involve a large number of PSCs, whether with a national incumbent operator, with established regional and local operators, or through competitive tendering.

Most States with devolved authorities also retain a national competent authority which can, if needed, specify PSOs for services linking different regions. The exception is Germany, where all responsibility for rail is devolved, and interregional PSCs typically require the cooperation of two or more Länder.

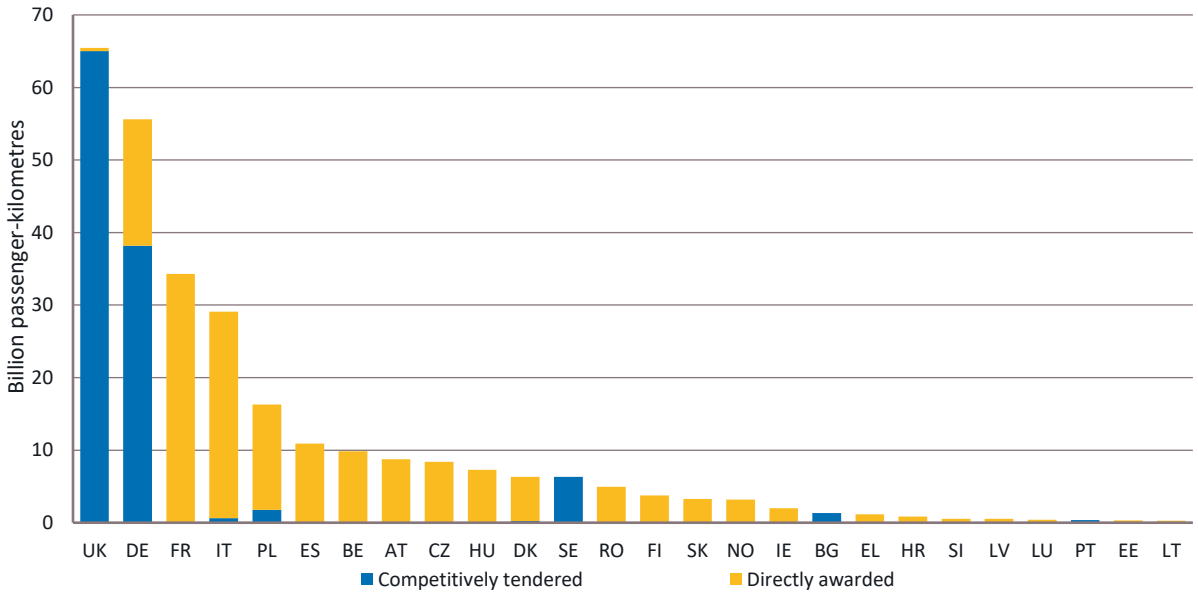
[53] 'Comprehensive analysis of the existing cross-border rail and transport connections and missing lings on the internal EU borders', KCW and others, March 2018.

Note that Article 7 of Regulation 1370/2007, now amended by Regulation (EU) 2016/2338, requires that 'Each competent authority shall publish once a year an aggregated report on the public service obligations for which it is responsible, the selected public service operators, the compensation payments and exclusive rights granted to the said public service operators by way of reimbursement.'

Direct award versus tendering

Figure 61 shows the proportion of PSO services, measured in passenger-kilometres, which were competitively tendered or directly awarded in 2016.

Figure 61: PSOs competitively tendered and directly awarded, 2016



Source: RMMS, 2018. No data for NL.

Of the EU total 2016 PSO passenger-kilometres, 41% were on services which had been competitively tendered. However, over 96% of this competitive tendering occurred in three Member States which liberalised their services early:

- 57.0% in the United Kingdom, where long-distance services are subject to a PSO and competitively tendered, although during 2016 some operations had been directly awarded on a temporary basis;
- 33.5% in Germany, where some competent authorities continue to procure services by direct award; and
- 5.5% in Sweden, where all PSO services are competitively tendered.

According to data provided for this survey, limited competitive tendering has also been introduced in Portugal, Bulgaria, Denmark, the Czech Republic, Poland and Italy. In the Netherlands, the Passenger Transport Act of 2000 introduced competitive tendering at regional level[54].

[54] "Competitive Tendering in Local and Regional Public Transport in the Netherlands", ITF 2016-12 https://www.itf-oecd.org/sites/default/files/docs/competitive-tendering-public-transport-netherlands .pdf.

The Fourth Railway Package provides for the gradual opening of public service contracts' market from December 2019, giving a choice between competitive tendering and direct award until December 2023. From 24 December 2023 the principle of competitive tendering will apply and direct award will be possible only on the basis of exemptions.

Reforms to put in place an industry structure compatible with the requirements of the Fourth Railway Package have been approved in France and are also underway in Norway and Finland.

In France, a wide-ranging railway reform is currently underway. A framework law designed to align French legislation to the 4th railway package was adopted in June 2018. In the wake of the reform, the legal monopoly of the incumbent railway undertaking SNCF will come to an end. From December 2019, responsibility for procuring regional railway services will be transferred to the Regions, some of which are actively preparing for competitive tendering. As of 2020, open access will be introduced, including on the high-speed network.

In Norway, monopoly operator NSB has been restructured to create a separate rolling stock leasing company and ticketing and retail company. Rail services will be split into packages, two of which have already been identified, for competitive tendering. Package South includes services between Stavanger and Oslo, and Package North includes services between Trondheim and Oslo and local diesel services. Invitations to tender for Package South, on a net cost basis, were issued in October 2017[55].

In 2017, the Finnish government presented an ambitious reform with the aim of opening passenger rail transport to competition. Market opening will be based on tendering and on the corporate reorganisation of VR, the incumbent railway undertaking, to guarantee an equal and competition-neutral environment for all service providers. In particular:

- Three companies will be separated from VR Group Ltd: a rolling stock company, a maintenance company and a real estate company.
- A concession contract will be tendered for local passenger rail services in Southern Finland, and also used as a guide for further tenders.

Role of regulatory bodies in the PSO awarding process

Before December 2016, in the absence of common rules governing the award of PSCs, some Member States introduced competitive tendering of PSCs while most awarded them directly. The disparity in the rules among the Member States pose difficulties for railway operators to exploit the full potential of operating in an internal market. The Fourth Railway Package introduced a framework for competitive award of rail PSCs. According to the framework, under certain circumstances, Member States could directly award rail contracts, but in that event would be required to publish a reasoned decision behind the award and to ensure quality and cost efficiency improvement using clearly defined performance targets in the contract.

Overview of PSO contracts awarded during the reporting period

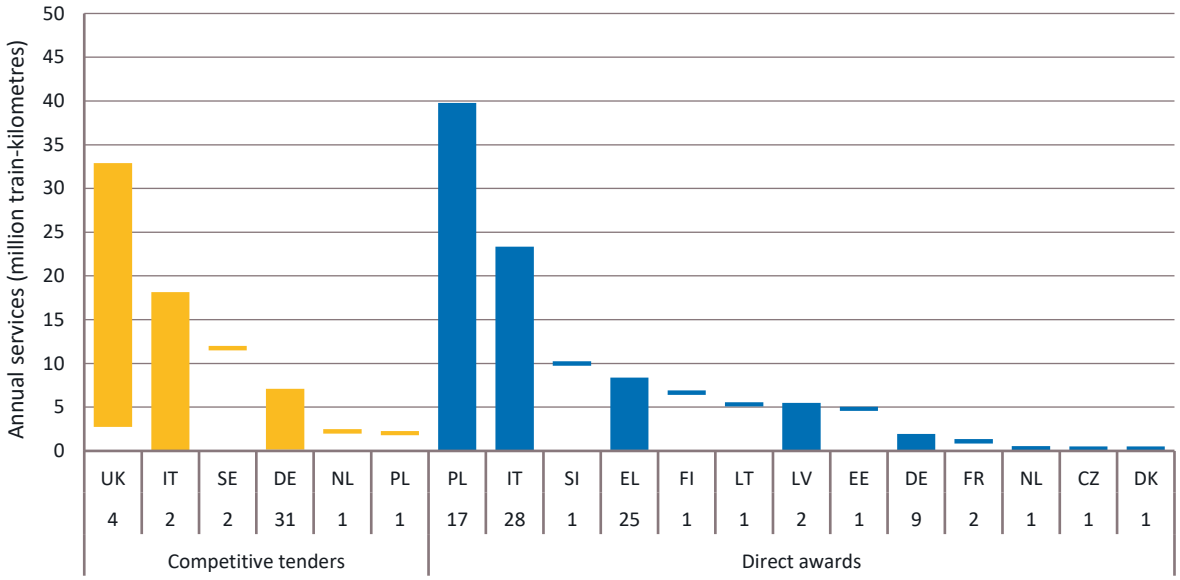
States were asked to provide information on the size of PSO contracts let during 2016.

Several States let no PSO contracts during that year, and the remainder let a mix of directly-awarded and competitively-tendered contracts, summarised in Figure 62:

[55] Further details are provided at https://www.jernbanedirektoratet.no/en/railway-tenders/upcoming-tenders/

- The numbers on the horizontal axis show the number of contracts let, where this is more than one.
- The length of the bars on the figure shows the range between the smallest and largest contract of each type let in each State.

Figure 62: PSOs competitively tendered and directly awarded, 2016



Source: RMMS, 2018.

Competitive tenders of up to more than 32 million train-kilometres per year were let in 2016:

- The United Kingdom let the largest contract, for services on the Greater Anglia franchise, using its system of leasing rolling stock, rather than requiring the new operator to provide stock. The smallest of the four contracts let was for 2.7 million train-kilometres.
- In Italy, the larger of two competitively-awarded contracts was for over 18 million train-kilometres.
- In Sweden, the larger of two contracts, for the Mälardalen services to Stockholm, was for 12 million train-kilometres.

Direct awards of up to 40 million train-kilometres per year were let in 2016, with contract durations of up to ten years or around 2026:

- Slovenia directly awarded all national services for ten years.
- Italy made direct awards for up to nine years, although the largest, for over 23 million train-kilometres, was only for one year.
- Greece directly awarded all services for five years in a series of 25 small packages, the largest of which was for over 8 million train-kilometres.
- Poland and Estonia directly awarded all national services for one year, in the case of Poland totalling 40 million train-kilometres.

Net cost and gross cost public service contracts

Public Service Contracts (PSC) can take many forms, although a common distinction is between net cost contracts and gross cost contracts.

In a net cost contract, the railway undertaking providing the contracted services receives the revenue from the services, at least partly with the aim of providing an incentive to improve service levels and quality to maximise that revenue. Net cost contracts were the chosen model when the United Kingdom decided to subject its existing PSCs to competitive tender in the mid-1990s. However, they can have disadvantages:

- Where revenues are low compared with costs, or the demand for rail services is inelastic to their quality (as can be the case with urban, suburban and commuter networks), revenue may provide little effective incentive to improve quality. Under these circumstances, it may be necessary to introduce a performance regime, whereby payments to the railway undertaking are related to the quality of service delivered.
- Railway undertakings may be unable to make reliable forecasts of revenue, particularly for longer term contracts, which can mean that they either earn higher-than-expected profits or incur losses. This can lead either to the withdrawal of the railway undertaking, or to a mechanism to share revenue risk with the competent authority, blunting the intended incentives to improve quality.
- Railway undertakings may only be willing to take the risk associated with revenue if they are also allowed to set fares, which can lead both to inconsistencies in the level and structure of fares and the need for some regulation of maximum fares.

In a gross cost contract, in contrast, the competent authority receives the revenue from the service. The railway undertaking is not exposed either to the risks of a poor demand forecast or to any resulting incentive to improve quality, which must instead rely on a performance regime. Gross cost contracts may be used:

- where revenues are shared between different modes, such as within a large urban area where many passengers use multimodal tickets, and it can be difficult to apportion revenue to rail;
- where the competent authority wishes to retain the flexibility to change the level and structure of fares; or
- where forecasting demand and revenue are difficult and railway undertakings are not prepared to accept exposure to the resulting risk.

Further types of contract have been adopted, particularly for transition arrangements at the beginning or end of PSCs.

No comprehensive EU-wide database exists on PSCs and the basis on which they have been awarded. In general, however:

- Gross cost contracts are typically used in PSCs for urban and suburban services, where fares are fixed and revenue is often shared between rail and other modes, or regional services, where fares revenue is low in relation to costs.
- Net cost contracts are most likely to be used on interurban or long-distance services although, except for in the United Kingdom, many such services are in practice operated commercially and not subject to PSCs.

Box 13: Provisions on competitive tendering of rail PSCs in the Fourth Railway Package

On 24 December 2017, Regulation (EU) 2016/2338 concerning the opening of the market for domestic passenger transport services by rail entered into force. This Regulation amended Regulation (EC) No 1370/2007 and set new rules for competent authorities when they act in the field of public passenger transport to guarantee the provision of services of general interest.

Most importantly, the amendment of the Regulation established the principle of competitive tendering of rail public service contracts. This principle will fully apply from 3 December 2019. The unconditional possibility to directly award public service contracts in rail will no longer be possible from 25 December 2023. During this transitional period, Member States should gradually introduce the principle of competitive tendering in their rail transport markets.

After 24 December 2023, competent authorities may deviate from applying the principle of competitive award only in exceptional situations specified in the Regulation. These exemptions encompass the possibility to award the public service contract directly in situations when a competent authority considers that the direct award is justified by structural and geographical characteristics of the market or network, and if the contract results in an improvement in quality of services or cost-efficiency, or both, in comparison to the previous one. The competent authority must publish its substantiated direct award decision.

The new Regulation also requires competent authorities to lay down specifications of public service obligations and their scope of application while respecting the proportionality principle and ensuring consistency with the policy objectives stated in public transport policy documents of the Member States. These objectives should be achieved in a cost-effective manner.

To contribute to fair and non-discriminatory tendering conditions for all railway undertakings the public service contract will require public transport operators to provide competent authorities with the information necessary for the preparation of the tender (such as passenger demand, fares, costs and revenues). Competent authorities must then share the information with all interested parties during a tendering procedure.

With a view to launching a competitive tendering procedure, competent authorities must also make public an assessment whether it is necessary to take measures to ensure non-discriminatory access to rail rolling stock. In compliance with State Aid rules competent authorities may take measures to ensure such access, for instance, by acquiring rolling stock, guaranteeing the financing of rolling stock, committing to takeover rail vehicles after the contract finishes and creating rolling stock pools jointly with other competent authorities.

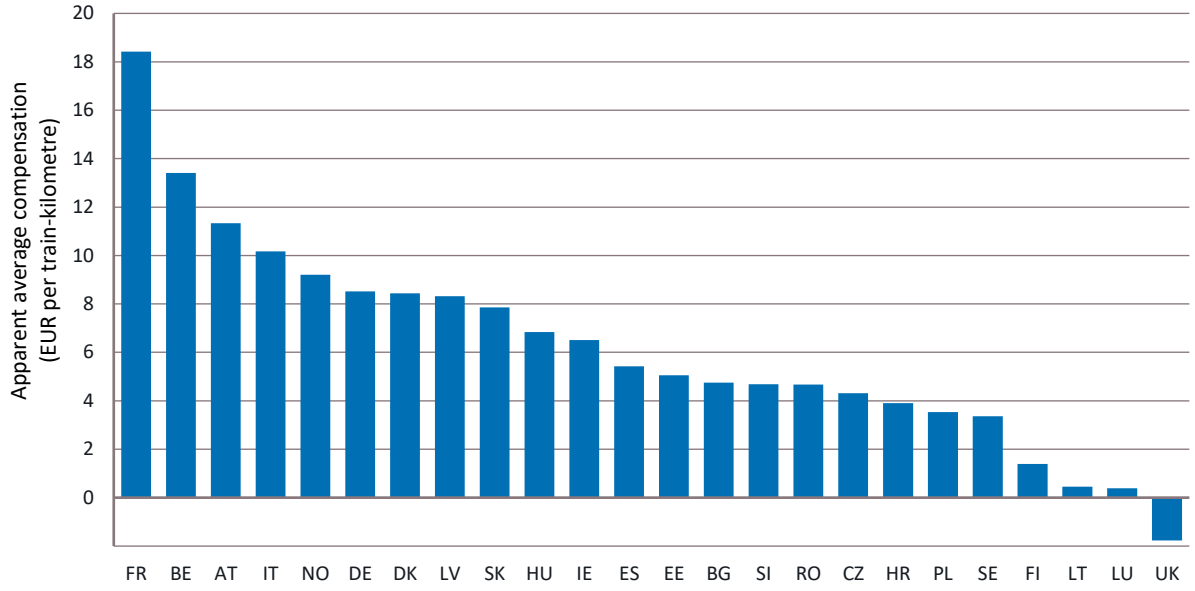
Finally, public service operators must comply with obligations applicable in the field of social and labour law established by Union law, national law or collective agreements.

4.3.3 PSO compensation

Apparent levels of PSO compensation

Figure 63 shows the apparent average levels of PSO compensation per train-kilometre paid in each Member State.

Figure 63: Apparent average PSO compensation, 2016



Source: RMMS, 2018. No data for EL, NL, PT.

The average compensation is negative in the United Kingdom, where bidders for PSO contracts ('franchises') may pay a 'premium' (negative subsidy) where they judge that services can be operated profitably at current (regulated) levels of access charges and fares.

Apparent levels of PSO compensation per train-kilometre vary widely, for several reasons:

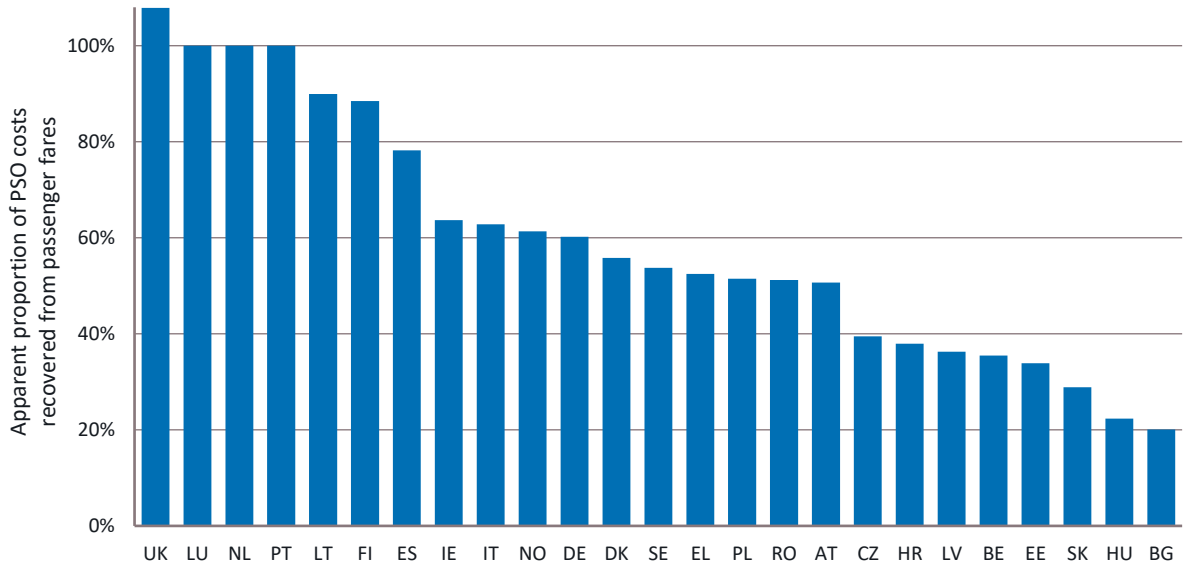
- The PSO requirement typically requires that the operator of the PSO services pays access charges to the infrastructure manager[56], and the level of these access charges therefore affects the payment required for the operator to maintain economic equilibrium. In the United Kingdom, for example, average fares on PSO services are relatively high, and access charges for the regulatory period 2014-2019 are lower than in the past. On average, PSO operators pay a 'premium' to operate the service, rather than requiring a subsidy, with the result that the apparent level of subsidy paid is negative.
- Trains vary widely in length, capacity, stopping pattern, traction type, quality and age. A train-kilometre of output, and the cost of producing it, varies even between trains operated on the same route with the same stopping pattern. Even if operated by the same train and crew, stopping services cost more than express services, because they take longer to produce each train-kilometre.
- Fares vary widely, depending on the range of fares available and the extent to which they are regulated or specified by national, regional or local competent authorities.
- Demand is sometimes broadly stable throughout the day, week and year and is sometimes highly peaked to serve daily commuting or annual festivals and holiday periods. The capacity of PSO services may need to be sufficient to serve peak demand, but may generate little revenue at other times when the services are still socially necessary.

[56] In Slovenia, passenger trains operating under PSCs are exempt from track access charges

Apparent recovery of PSO costs from passenger fares

Figure 64 shows the apparent proportion of PSO costs which are recovered through passenger fares (but excluding PSO operator revenue from other sources, such as catering, car parking and concessions on stations).

Figure 64: Apparent proportion of PSO cost recovered through passenger fares, 2016



Source: RMMS, 2018. No data for FR and SI.

The proportion of costs recovered through passenger fares may vary widely for the reasons set out above. In the case of at least some competent authorities, however, there may be an explicit policy that cost recovery should not be less than, or not be more than, a proportion intended to distribute costs between passengers and taxpayers.

4.4 Licensing

A railway licence is an authorisation issued to an undertaking by a licensing authority recognising its capacity to provide rail transport services as a railway undertaking. Licensing of railway undertakings is regulated by Articles 16 to 25 of Directive 2012/34/EU. A licence may cover only passenger or freight services or both. It is valid throughout the EU, as long as the railway undertaking fulfils the obligations laid down in European legislation. Licensing ensures that access rights to railway infrastructure are applied throughout the EU in a uniform and non-discriminatory manner.

To facilitate access to the market by new operators, the Commission adopted implementing Regulation (EU) 2015/171 on certain aspects of the licensing procedure. This reduced the administrative fees for start-up railway undertakings and shortened the time to market. It ensured that national licensing authorities publish all relevant licensing data on ERA's website.

Active licences

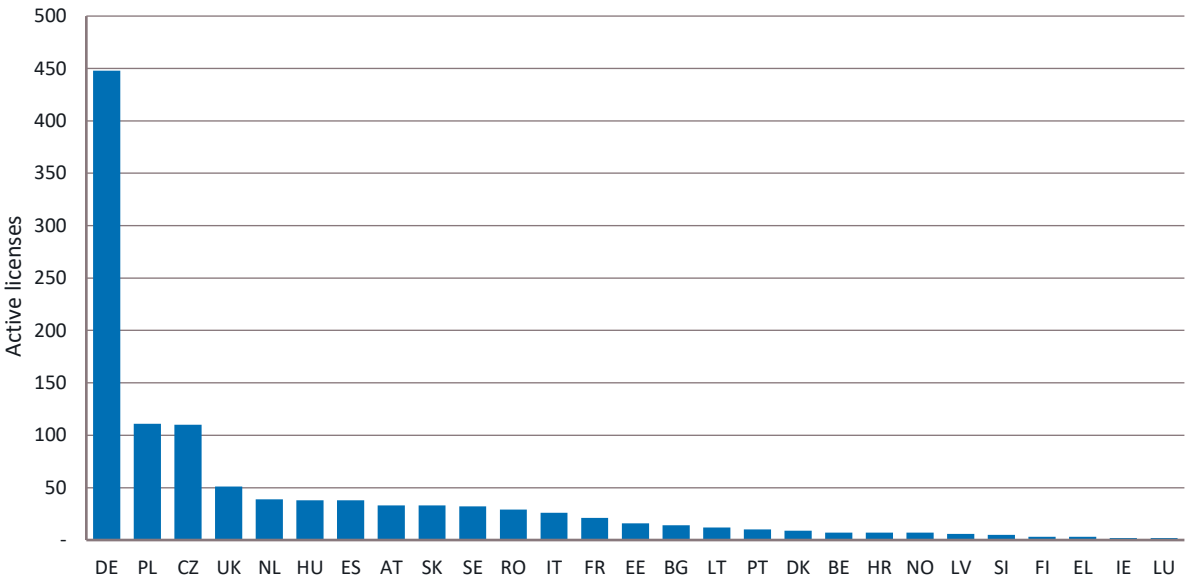
A count of licences can be considered as a proxy for the number of active railway undertakings in a Member State. At any one time, licences can be active or passive:

- **Active licences:** a licence granted to a railway undertaking that has ***started*** and ***not ceased*** operations within the periods fixed by the Member State in accordance with Article 24(4) of Directive 2012/34/EU.
- **Passive licences:** a licence granted to a railway undertaking that has ***not started*** or has ***ceased*** operations within the periods fixed by the Member State in accordance with Article 24(4) of Directive 2012/34/EU, and licences which have been suspended or revoked.

According to the Recast Directive and the relevant national legislation, licences for the performance of rail transport services within the EU and the European Economic Area must be uploaded by national licensing authorities to the European Railway Agency Database of Interoperability and Safety (ERADIS)[57].

Figure 65 shows the total number of active licences by State reported at the end of 2016, according to RMMS.

Figure 65: Active licences by country, 2016



Source: RMMS, 2018, PL data from ERADIS.

At the end of 2016, Germany reported 448 active railway undertakings, reflecting the highly fragmented nature of railway undertaking operations there. Poland and the Czech Republic also reported over 100 active railway undertakings and the United Kingdom reported more than 50.

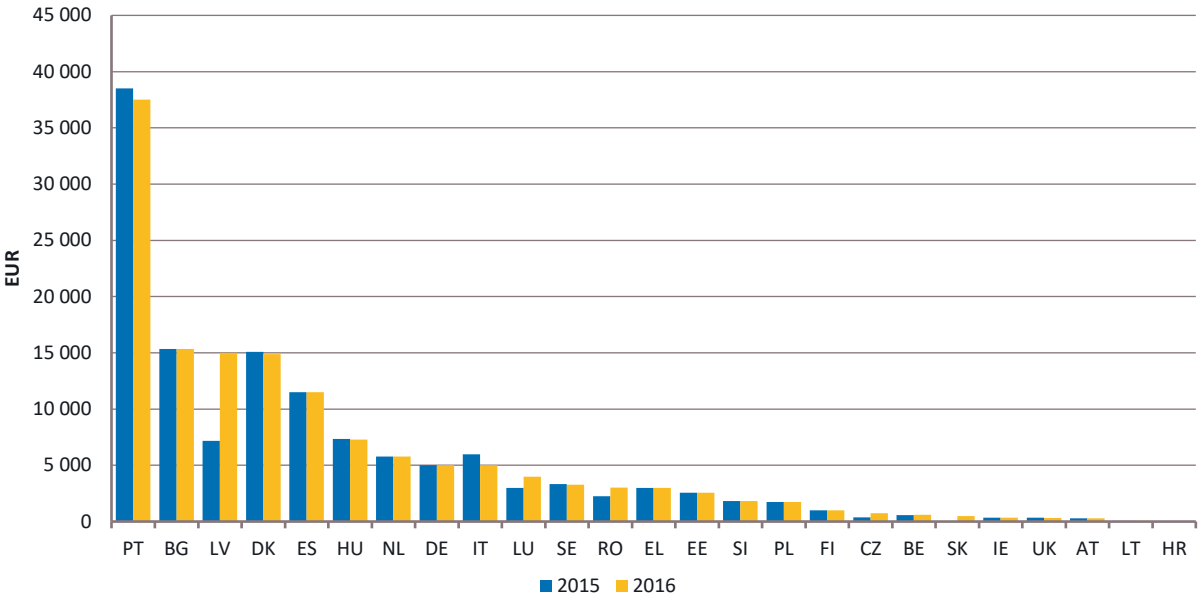
Average fee to obtain a licence

States were asked to provide information on the average fee and time required to obtain a licence.

Figure 66 shows the reported average fees in 2015 and 2016.

[57] Available at https://eradis.era.europa.eu/.

Figure 66: Average fees to obtain a licence by country, 2015 and 2016



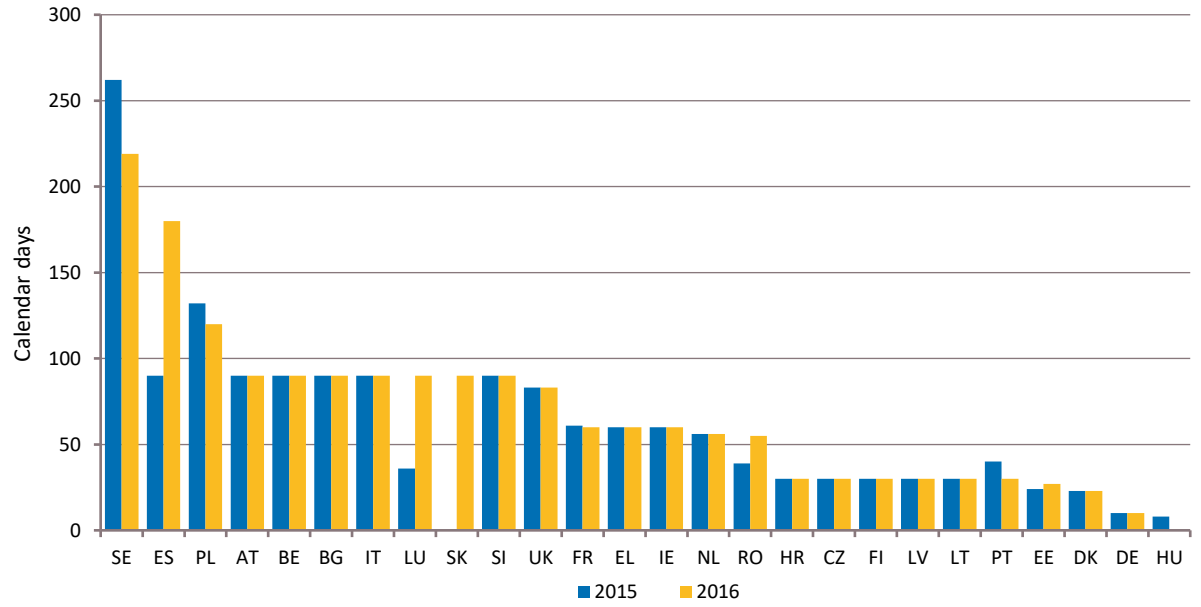
Source: RMMS, 2018. FR and NO reported that licence costs are zero. LV charge is a State duty, not a licence fee.

Charges more than doubled in Latvia, where the payment is a State duty rather than a licence fee, and rose in Luxembourg, Romania and the Czech Republic. Latvia joined Bulgaria and Denmark with charges of around EUR 15 000, but the highest charges were in Portugal.

Average time to obtain a licence

Figure 67 shows the reported average number of calendar days to obtain a licence in 2015 and 2016.

Figure 67: Average time to obtain a licence by country, 2015 and 2016



Source: RMMS, 2018. No data for NO. No 2016 data for HU.

Many Member States reported an average time to obtain a licence of 90, 60 or 30 calendar days (three months, two months or a month). Sweden, Spain and Poland reported the longest times,

although the exact time might depend on the complexity of the application, or the number of queries, and might not be the fault of the licensing authority. Nonetheless in Germany, where many licences are held, the reported average time to obtain a licence was only 10 calendar days.

4.5 Degree of market opening and utilisation of access rights

4.5.1 Legal liberalisation and actual entry in the rail market

IRG-Rail is a network of independent rail regulatory bodies from 31 EU and non-EU countries. It produces an annual Market Monitoring Report[58] including, among other things, data on the dates of (de jure) legal liberalisation and (de facto) market entry, which are summarised in the charts below. The principal dates of liberalisation set out in EU legislation are:

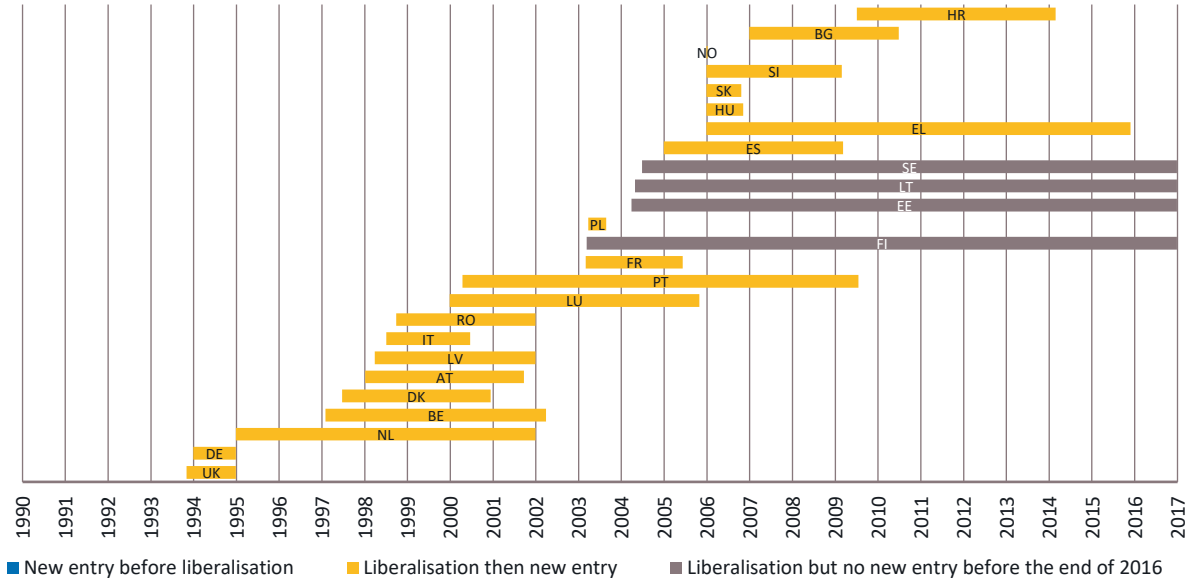
- From 1 January 1993, limited access was established by Directive 91/440/EEC.
- From 1 January 2007, the Second Railway Package liberalised international and domestic rail freight services.
- From 3 December 2009, the Third Railway Package liberalised international passenger services and some cabotage.
- From 2 December 2019, the Fourth Railway Package, through Regulation (EU) 2016/2338, will liberalise remaining passenger services, subject to measures to protect PSOs.

However, in some cases market entry had never been explicitly prohibited, and has been permitted in advance of the creation of a formal right of entry through liberalisation.

Legal liberalisation and licensing of first competitor in the freight market

Figure 68 shows the dates of legal liberalisation and the first recorded licence of a competitor in the international freight market.

Figure 68: Legal liberalisation and first licence in the international freight market



Source: IRG-Rail, 2018. No data for CZ and IE.

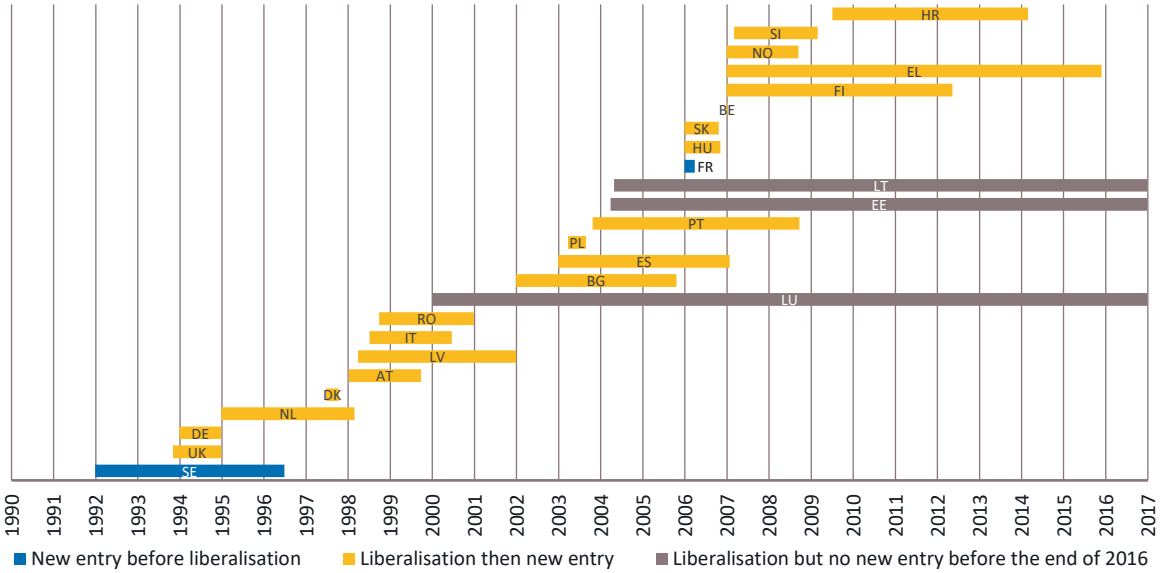
[58] Sixth IRG-Rail Market Monitoring Report 2018 available at https://irg-rail.eu/irg/documents/market-monitoring/186,2018.html .

Early liberalisers of the international freight market were the United Kingdom (the Channel Tunnel opened in 1994) and Germany, both of which saw rapid new entry. As other Member States liberalised, however, new licences were often slow to appear: seven years in the case of the Netherlands, and nine years in the case of Portugal.

Nonetheless, there have now been new licences in international rail freight transport in all but four Member States: Finland, Estonia, Lithuania and Sweden. Finland has only one rail link to another Member State and, at least pending completion of the Rail Baltica project, the main links from Estonia and Latvia are to the Russian Federation. Sweden has an established cross-border rail freight flow, from Kiruna to the port of Narvik in Norway.

Figure 69 shows the dates of legal liberalisation and the first recorded licence of a competitor into the domestic freight market.

Figure 69: Legal liberalisation and first licence in the domestic freight market



Source: IRG-Rail, 2018. No data for CZ and IE.

Sweden reported licences in 1992, although the market was not formally liberalised until 1996. It was rapidly joined by the United Kingdom and Germany, both of which liberalised in response to Directive 91/440/EEC which came into force on 1 January 1993. Other Member States opened their markets in the following years.

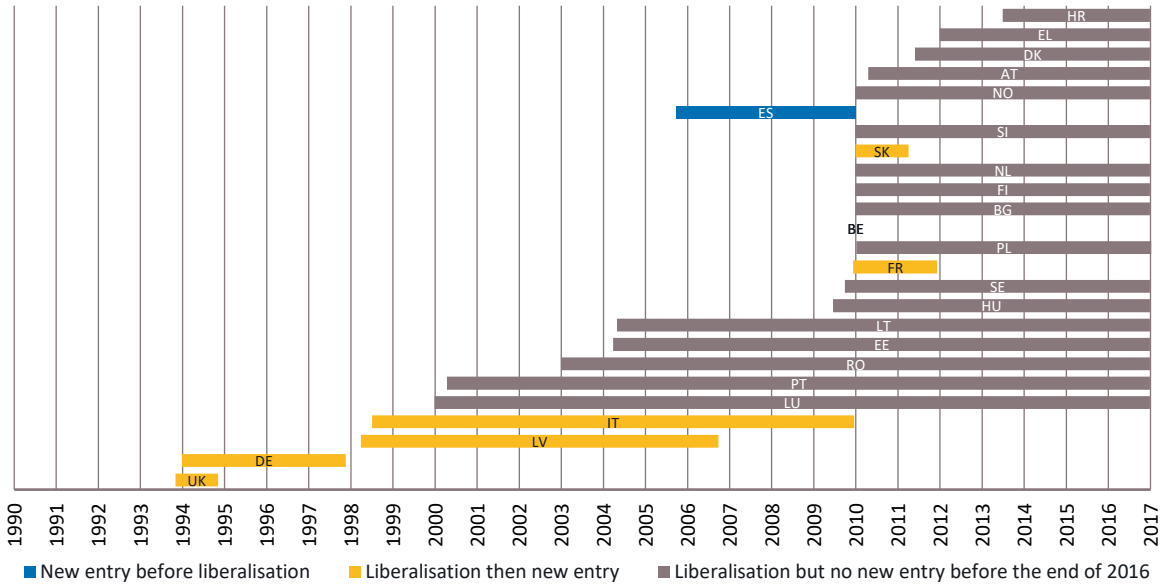
From 1 January 2007, the Second Railway Package liberalised all rail freight through the then Member States, including Belgium, Greece, Finland and Slovenia. Croatia liberalised its market before joining the EU on 1 July 2013. All these States now have at least one licenced domestic rail freight operator.

However, the period between market opening and new entry can be long. In Greece, it took almost nine years for the first licence to be issued for a new domestic freight operator. No new licences for domestic operators have emerged in Lithuania and Estonia, where rail freight is dominated by international transit traffic to the Russian Federation, or in Luxembourg, which reported no domestic rail freight.

Legal liberalisation and entry of first competitor in the passenger market

Figure 70 shows the dates of legal liberalisation and the first recorded licence of a competitor into the international passenger market.

Figure 70: Legal liberalisation and first licence in the international passenger market



Source: IRG-Rail, 2018. No data for CZ and IE.

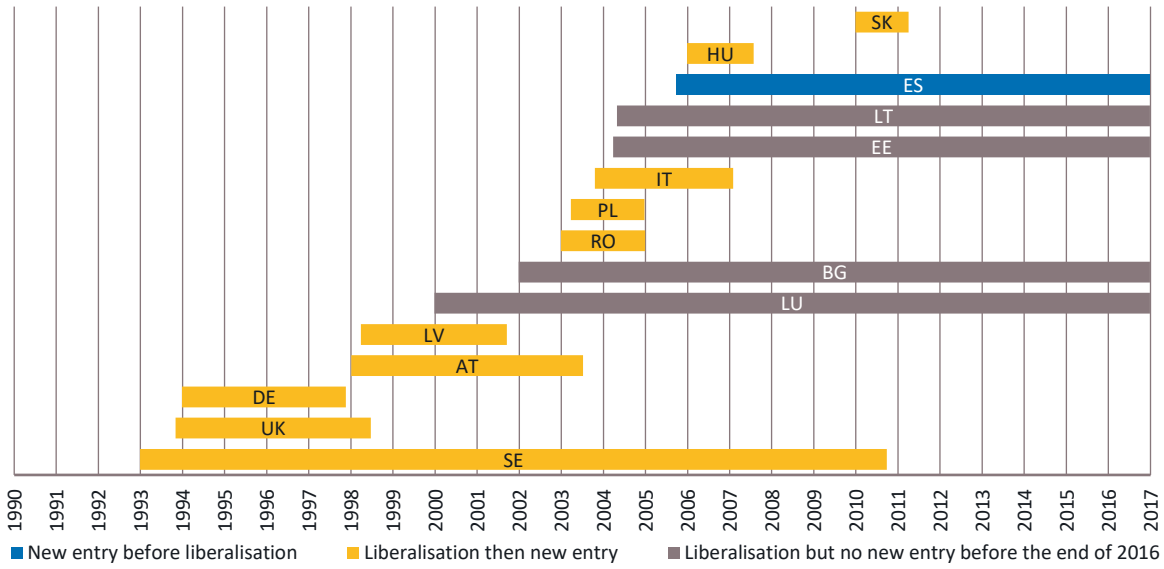
The United Kingdom and Germany were the first Member States to licence international passenger open access, in the case of the United Kingdom by Eurostar services through the Channel Tunnel on 14 November 1994. Within five years they had been joined by Latvia and Italy.

In contrast to the initiatives taken by many States to open their rail freight markets, Figure 70 shows that many did not license international open access passenger services until these services were liberalised by the Third Railway Package from 3 December 2009. In practice, Spain issued a licence before this date, and France and Slovakia issued licences soon afterwards.

However, many States have issued no licences for open access international passenger services. This includes Sweden, normally an early liberaliser: no open access services operate across its borders to either Copenhagen in Denmark or Oslo in Norway.

Figure 71 shows the dates of legal liberalisation and the first recorded licence of a competitor into the domestic passenger market.

Figure 71: Legal liberalisation and first licence in the domestic passenger market



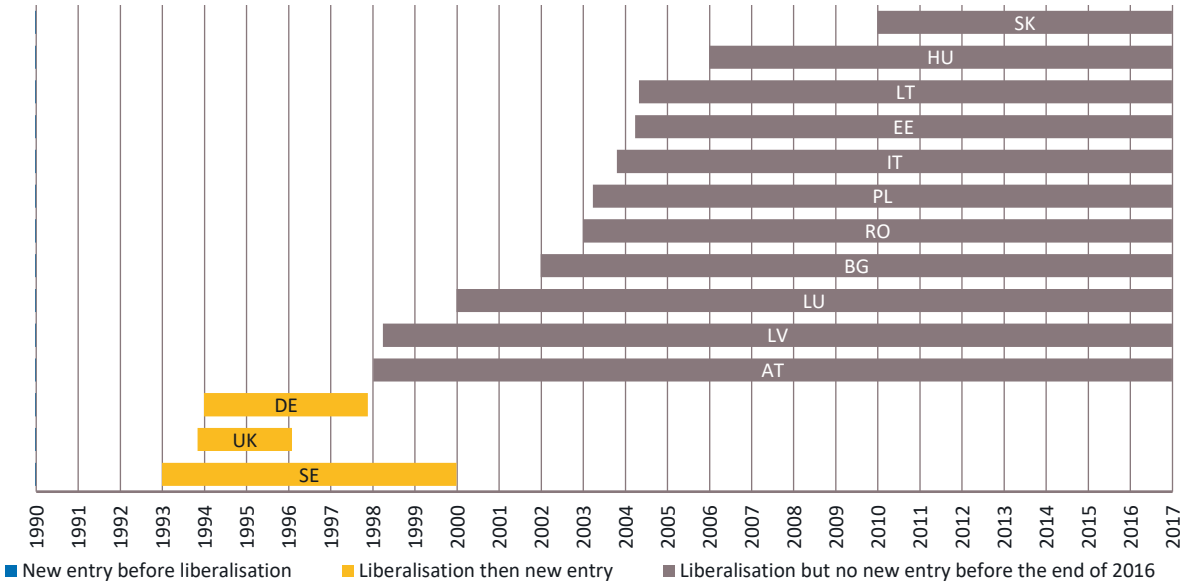
Source: IRG-Rail, 2018, for States which have liberalised domestic services. No data for BE, DK, EL, FR, HR, NL, PT, SI, FI, NO, CZ, IE.

Liberalisation of the domestic passenger market will not formally be required until the Fourth Railway Package comes into force on 2 December 2019. Nonetheless, several Member States have already benefited from liberalisation. Sweden notionally opened the market in 1993 but licensing was subject to regulatory restrictions until 2010.

Most other Member States that have opened their markets have issued new licences. The exceptions are Luxembourg, Estonia and Latvia (which have only small networks) and Bulgaria.

Figure 72 shows the dates of legal liberalisation and the first recorded licence in the domestic long-distance passenger market.

Figure 72: Legal liberalisation and first licence in the domestic long-distance passenger market



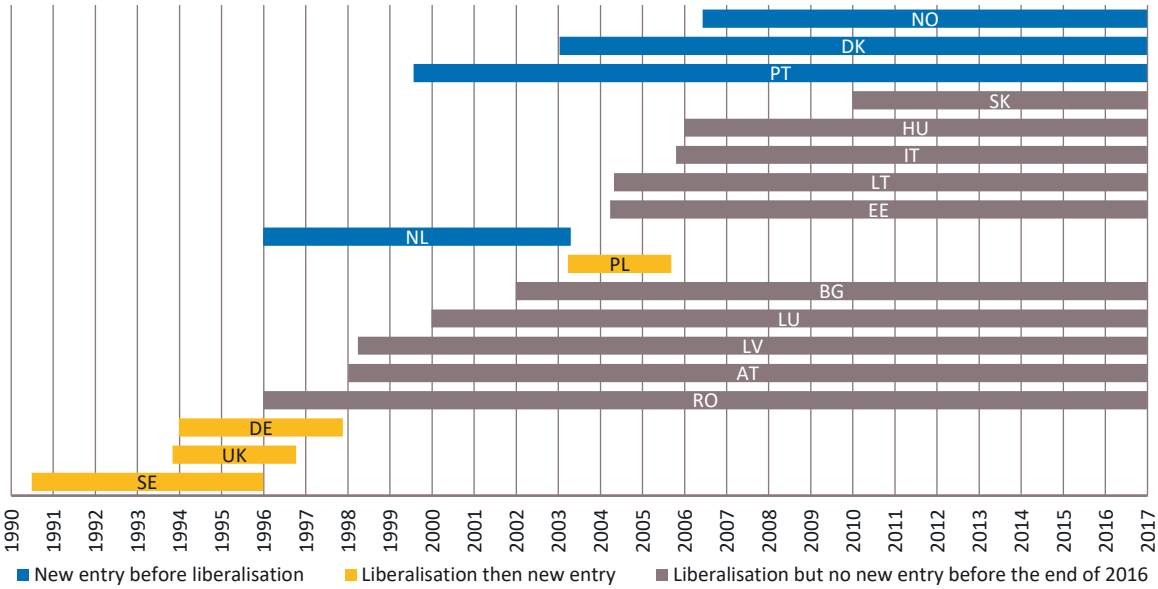
Source: IRG-Rail, 2018, for States which have liberalised domestic services. No data for BE, DK, EL, ES, FR, HR, NL, PT, SI, FI, NO, CZ, IE.

IRG-Rail reports that few Member States have issued licences to provide long-distance passenger services. Early liberalisers Sweden, the United Kingdom and Germany have seen competition, but in Sweden this was after a lag of seven years.

None of the other Member States which have liberalised their markets since 1998 have issued licences to provide long-distance passenger services. In many cases, the incumbent operator has continued to operate services, in some cases in the absence of a PSO and hence notionally on a 'commercial' basis. In practice, such incumbent operators may not identify or report whether some long-distance services are being operated at a loss.

Figure 73 shows the dates of legal liberalisation and the first recorded entry of a competitor into the domestic regional passenger market through competitive tenders.

Figure 73: Legal liberalisation and first competitors in the domestic regional passenger market



Source: IRG-Rail, 2018, for States which have liberalised domestic services. No data for BE, EL, ES, FR, HR, SI, FI.

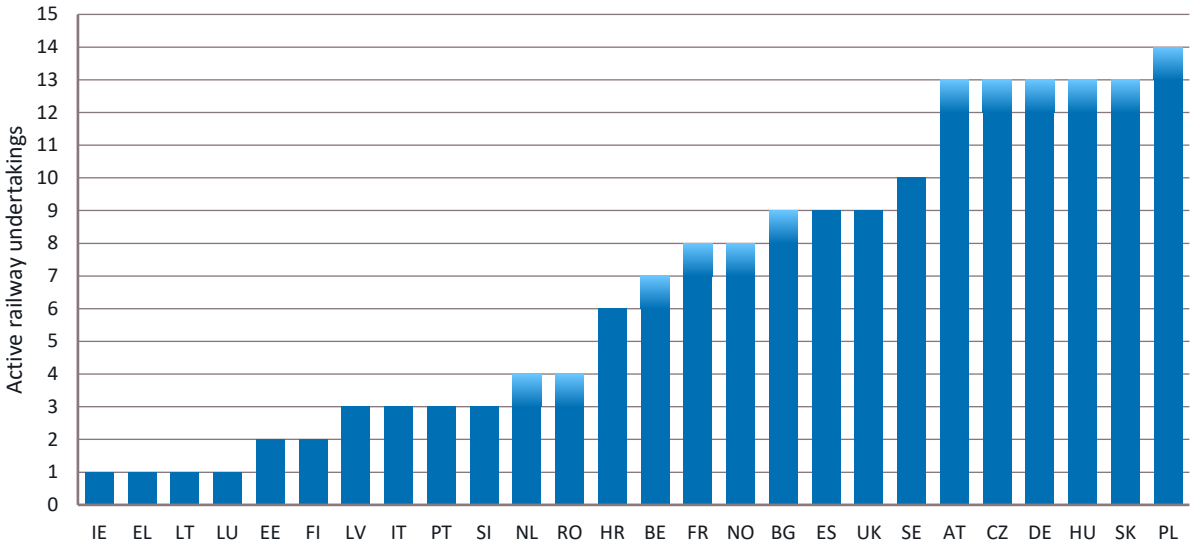
Four Member States reported having held competitions to provide domestic regional passenger markets in advance of de jure liberalisation. However, most Member States have seen no competitions for the provision of regional passenger services.

4.5.2 Freight market opening

Number of active railway undertakings in the freight market

States were asked to list principal and other freight railway undertakings, if necessary grouped and/or anonymised if they chose the option of keeping information confidential. In a number of cases railway undertakings with lower market shares were grouped under the category “others”. Figure 74 therefore shows the reported number of active railway undertakings in the freight market in each State in 2016. In the figure, “others” has been interpreted to mean “at least two more”. For example, the Netherlands reported one main operator plus “others”, which the chart represents as “at least three (solid), and may be more (tapered)”.

Figure 74: Active railway undertakings in the freight market by country, 2016



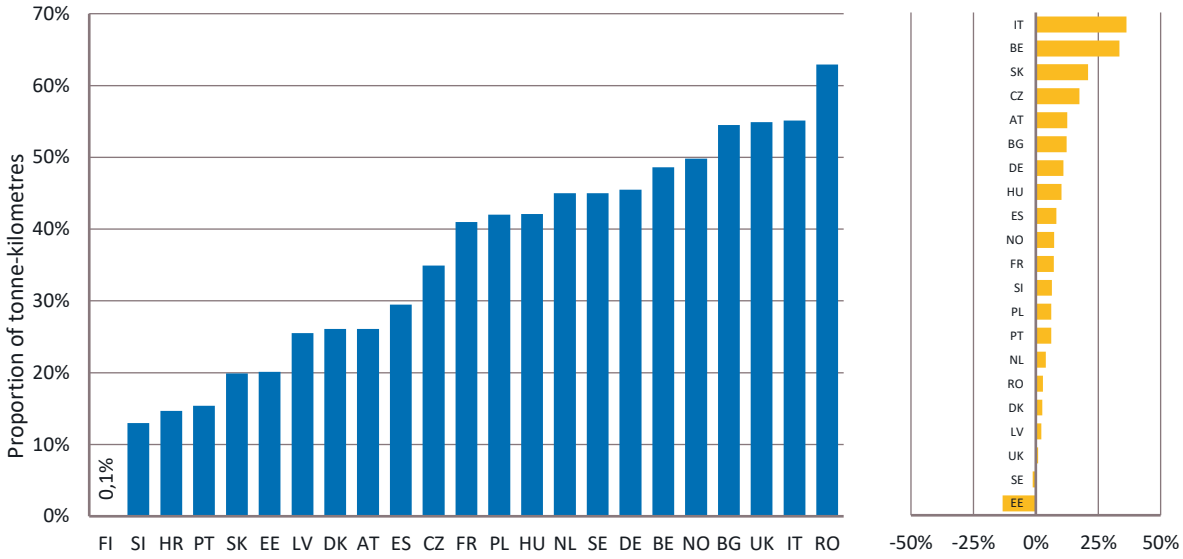
Source: RMMS 2018. No data for DK. PL two principal operators are in the same group.

Poland reported two incumbent domestic freight operators, PKP Cargo and PKP LHS, which however are in the same group, plus at least eleven other operators.

Evolution of market shares of competitors in the freight market

Figure 75 shows the shares of the domestic freight market, as measured in tonne-kilometres, which are not served by the historic incumbent operator. The chart on the right shows the percentage change in new entrant market share between 2011 and 2016.

Figure 75: Competitors in freight, market share, compound average growth rate 2011-2016

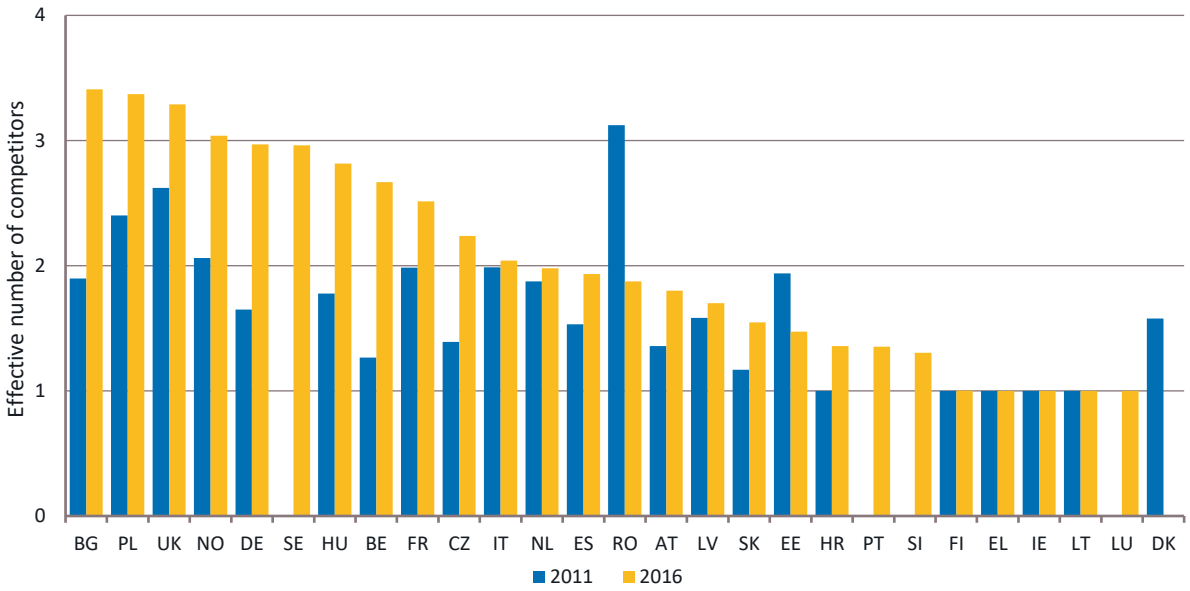


Source: RMMS, 2018. One operator with 100% share in EL, IE, LT, LU.

On average, competitors had 39% market shares in national markets in 2016, an increase of 13% compared to 2011. Figure 76 illustrates the effective number of operators in each domestic freight

market, using the reciprocal of the Herfindahl-Hirschman Index (HHI) as a broad measure of the level of competition[59].

Figure 76: Effective number of competitors in domestic rail freight, 2011 and 2016



Source: RMMS, 2018.

The HHI cannot identify whether, for example, some operators dominate or monopolise one or more regions or products, or control all the rail wagons suitable for a particular commodity. It is nonetheless a broad measure of the extent to which there has been new entry in the market[60].

Four Member States (Greece, Ireland, Lithuania and Luxembourg) still have only a single domestic rail freight operator. All the other Member States have at least some competition and, with the exceptions of Estonia and Romania, there was more effective competition in 2016 than in 2011. On this measure, the most competitive markets in 2016 were Bulgaria, Poland, the United Kingdom, Norway, Germany and Sweden.

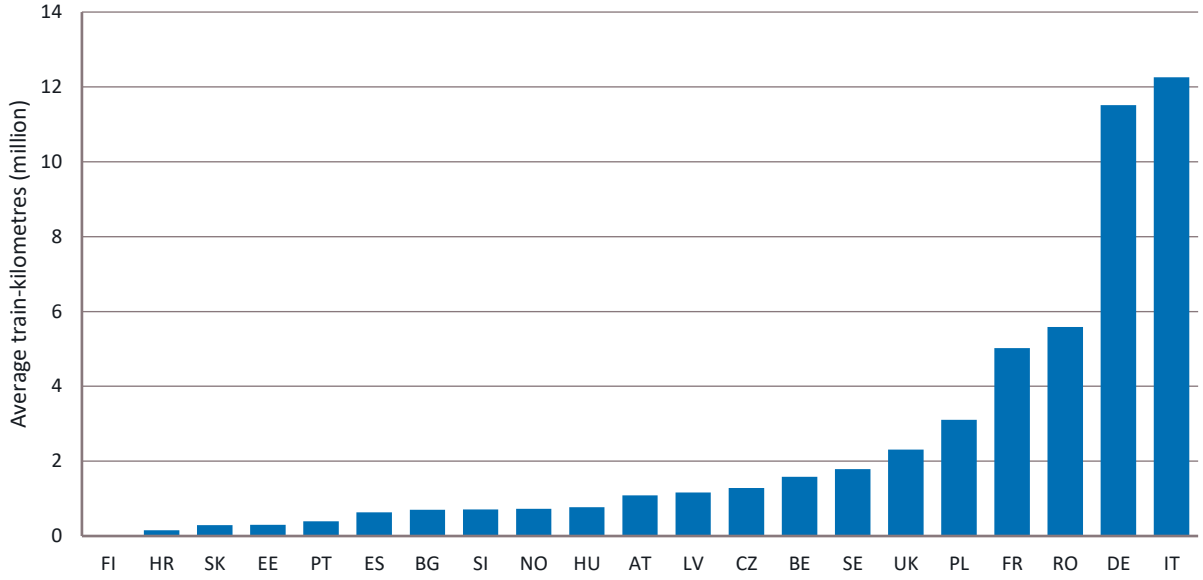
Average size of new entrants in the freight market

In many States, the incumbent rail freight operator has been joined by one or more new entrants. Figure 77 shows the average size of these new entrants, measured in million train-kilometres within that State.

[59] The HHI is the sum of the squares of the market shares of each operator. This has the effect that if, for example, two operators each have 50% market share, the HHI is 0.5 and the reciprocal of the HHI, shown on the chart, is two. In practice, the market is unlikely to be divided equally among the operators.

[60] The RMMS results contained an 'other' category (an aggregation of small RUs with a market share of more than 1% but not in the top nine), which was considered a single entity in the HHI calculations, which has the effect of reducing the measure of competitiveness.

Figure 77: Average size of new entrants in freight market by country



Source: RMMS, 2018. No new entrants in LT, SE (see Figure 68). No data for DK, EL, IE, LT, LU, NL.

The largest new entrants are in North West Europe, particularly in Italy, Germany, France and the United Kingdom, and in Central and Eastern Europe, notably in Romania and Poland. Denmark, Greece, Ireland, Lithuania and Luxembourg have only one operator in the freight market.

Member States provided information on the market shares of the largest freight operators on their networks, but to preserve confidentiality many did not identify the operators, and the RMMS does not require their ownership to be revealed. Information on ownership released by IRG-Rail suggests that, as of May 2018, patterns of freight activity outside the country of ownership include:

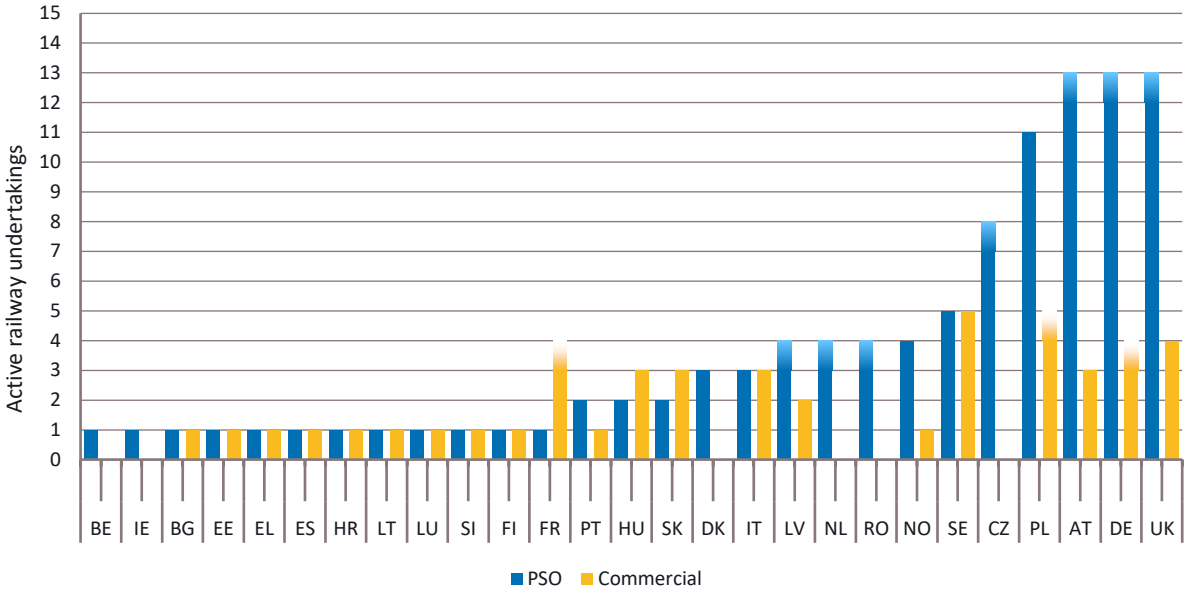
- German activity in Bulgaria, Hungary, the Netherlands, Poland and the United Kingdom;
- Polish activity in the Czech Republic and Slovakia;
- Slovenian activity in Hungary; and
- Swedish activity in Norway and the United Kingdom.

4.5.3 Passenger market opening

Number of active railway undertakings in the passenger market

Figure 78 shows the reported number of active railway undertakings in the passenger market. In the figure, “others” has been interpreted to mean “at least two more”. For example, Latvia reported one main PSO operator plus “others”, which the chart represents as “at least three (solid), and may be more (tapered)”.

Figure 78: Active railway undertakings in the PSO and commercial passenger market by country, 2016



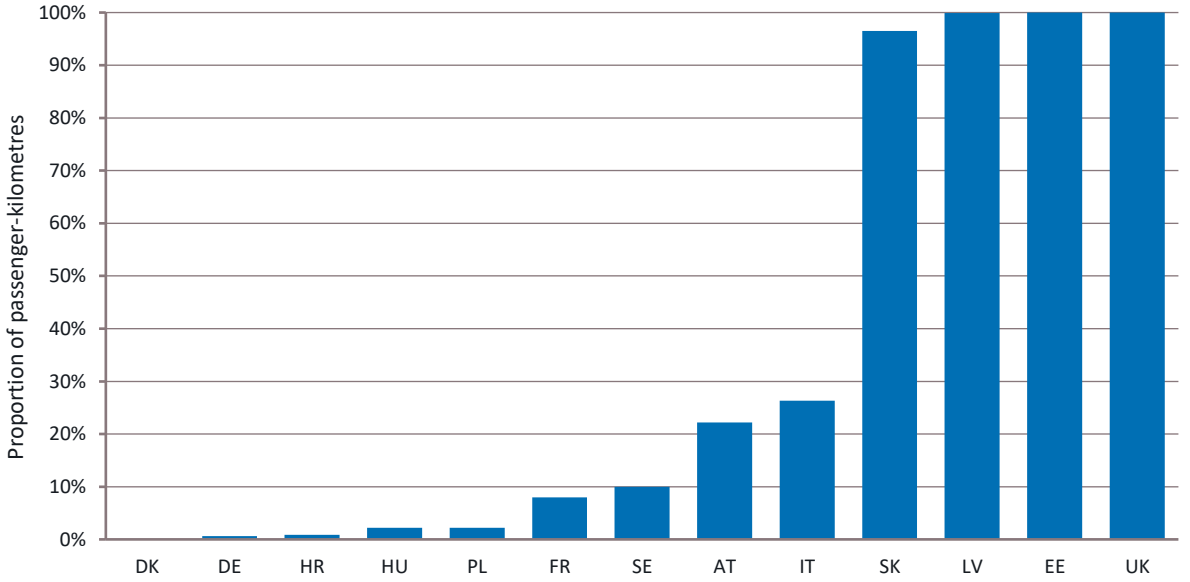
Source: RMMS 2018. No data on commercial operators in BE, CZ, DK, IE, NL, RO.

Member States were asked to report railway undertakings with a market share of more than 1%, and may in principle have excluded some small railway undertakings, including those operating commercially. On this basis, every State except France, Hungary and Slovakia reported more PSO railway undertakings than commercial railway undertakings, and Poland, Austria, Germany and the United Kingdom all reported many more PSO railway undertakings than commercial railway undertakings.

Evolution of market shares of competitors in the commercial passenger market

Figure 79 shows the shares of the commercial (non-PSO) passenger market, which is not served by the historic incumbent operator.

Figure 79: Competitors in commercial passenger market, market share, 2016

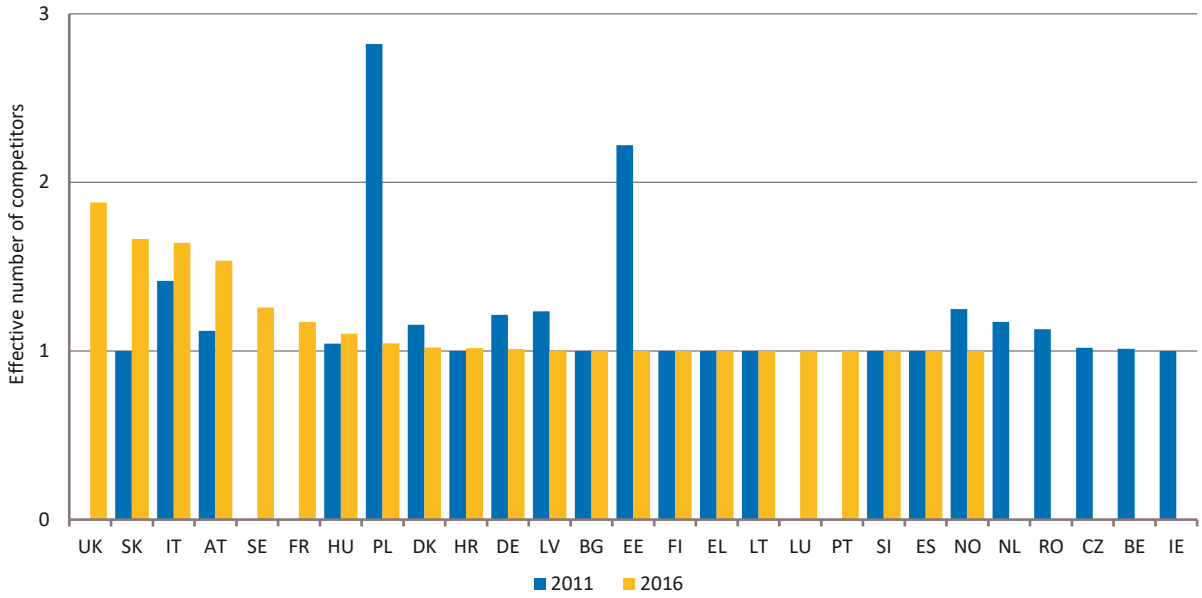


Source: RMMS, 2018. No data for BE, CZ, IE, NL and RO.

The Member States with the highest new entrant shares are the United Kingdom, Estonia, Latvia and Slovakia. However, the data for the United Kingdom may be misleading, as all pre-existing services, including those which were commercially viable, are operated under a PSO, and hence all non-PSO services are operated by new entrants. While the Czech Republic has not replied, there is established open access competition there, with two new entrants, RegioJet and Leo Express, operating between Prague and Ostrava.

Figure 80 illustrates the effective number of operators in each commercial passenger market, as measured in passenger-kilometres, using the reciprocal of the Herfindahl-Hirschman Index (HHI) as a broad measure of the amount of competition.

Figure 80: Competitors in commercial passenger market, effective number, 2011 and 2016



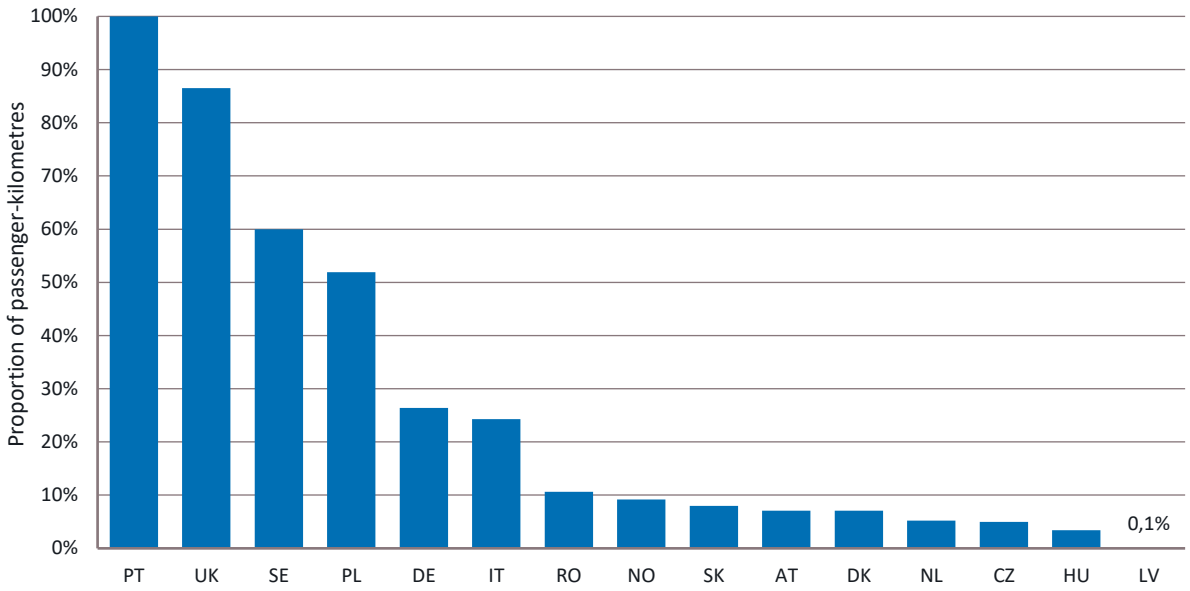
Source: RMMS, 2018. No 2016 data for BE, CZ, IE, NL, RO. No 2011 data for FR, LU, PT, SE.

Most networks have only a single operator of commercial services, but by 2016 Latvia, Germany, Poland, Hungary, France, Sweden, Austria, Italy, Slovakia and the United Kingdom had more than one. In the case of the United Kingdom, all the commercial operators are new entrants and there are no incumbent commercial services. There are also three operators in the Czech Republic which did not provide data for 2016.

Evolution of market shares of competitors in the PSO passenger market

Figure 81 shows the shares of the PSO passenger market, as measured in passenger-kilometres, not served by the historic incumbent operator.

Figure 81: Competitors in PSO passenger market, market share, 2016

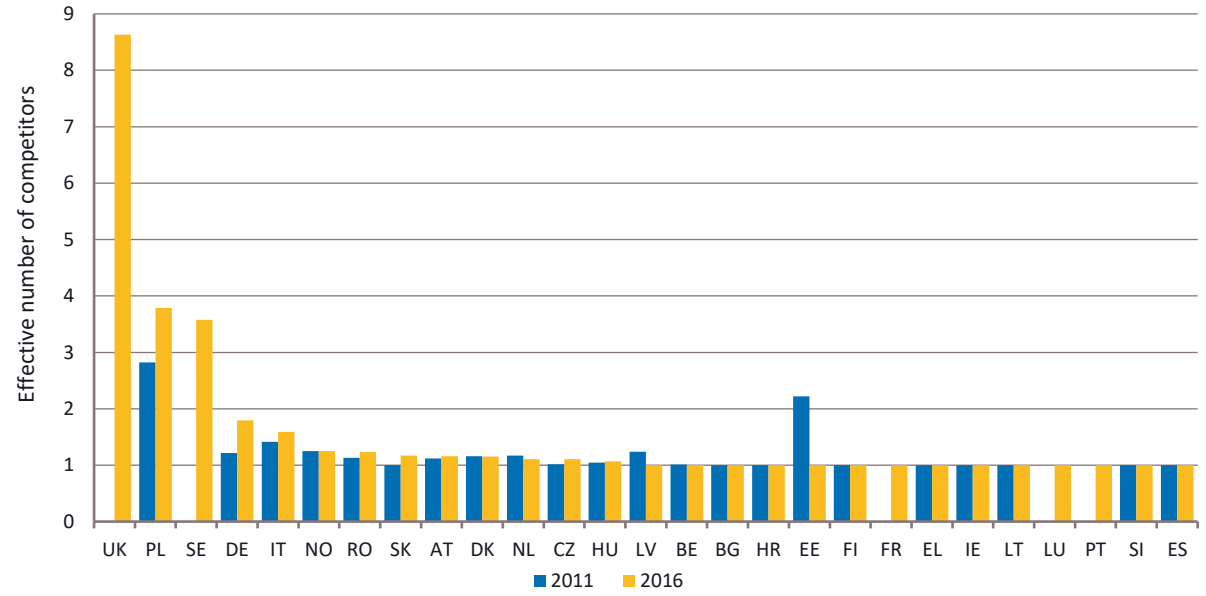


Source: RMMS, 2018. All other Member States reported a single operator.

In Portugal, the apparent 100% commercial share occurs because in 2016 the only PSO contract was with the non-incumbent Fertagus, all other operations being reported as commercial. In the UK, there is no incumbent operator, but the chart shows the 87% share of all operators other than the largest, Govia Thameslink.

Figure 82 illustrates the effective number of operators in each PSO passenger market, as measured in passenger-kilometres, again using the reciprocal of the Herfindahl-Hirschman Index (HHI) as a broad measure of the amount of competition.

Figure 82: Competitors in PSO passenger market, effective number, 2011 and 2016



Source: RMMS, 2018. No 2011 data for UK, SE, FR, LU, PT.

Most networks have either only a single PSO operator or a dominant incumbent and a small number of minor operators. The exceptions are Italy, Sweden, Poland, Germany and the United Kingdom. In

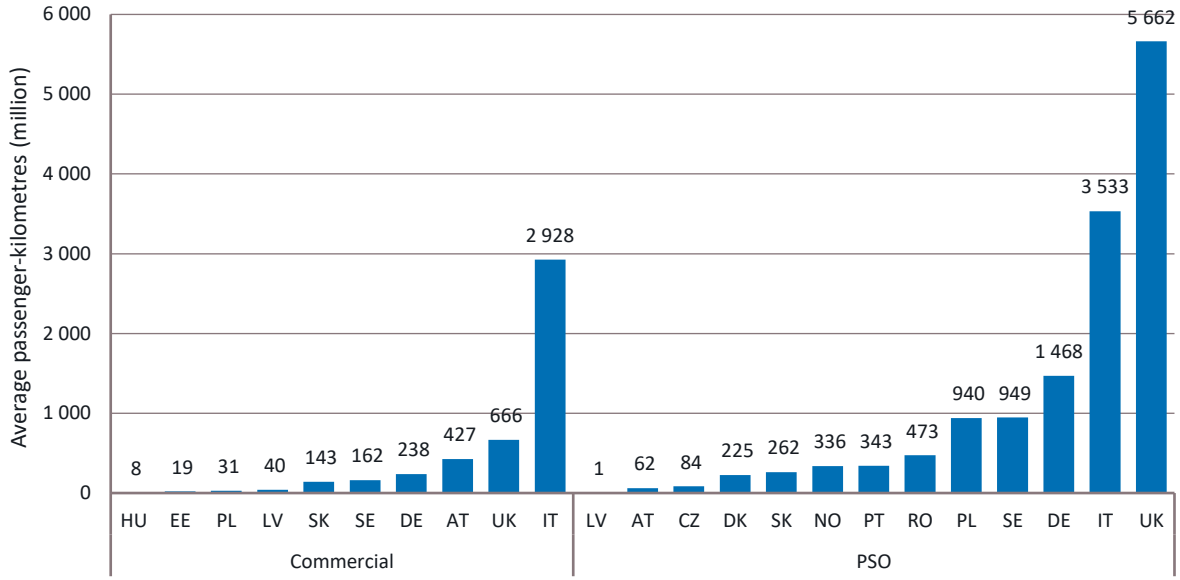
the United Kingdom, where there is no longer an incumbent, the effective number of competitors is more than eight, as measured by the reciprocal of the HHI.

The estimated average of competitors' market shares in both PSO and commercial passenger markets in 2016 was 25%, an increase of 6% compared to 2011.

Average size of new entrants in the passenger market

Figure 83 illustrates the average size of new entrants in the PSO and commercial passenger markets, as measured in million passenger-kilometres.

Figure 83: Average size of new entrants in commercial and PSO passenger markets



Source: RMMS, 2018. 2015 data for FR.

Within commercial services Italy stands out, with new entrants of average size almost 3 billion passenger-kilometres, followed by the United Kingdom (0.7 billion passenger-kilometres) and Austria (0.4 billion passenger-kilometres).

Presence of passenger incumbents abroad

Member States provided information on the market shares of the PSO passenger operators on their networks, but to preserve confidentiality some did not identify the operators, and the RMMS does not require them to identify the ownership structure of the operators. Information on ownership released by IRG-Rail[61] suggests that, as of May 2018, patterns of PSO passenger activity outside the country of ownership include:

- Czech activity in Slovakia;
- German activity in the Czech Republic, Denmark, Poland and the United Kingdom;
- French activity in Germany and the United Kingdom;
- Netherlands activity in Germany and the United Kingdom;
- United Kingdom activity in Germany;
- Hong Kong activity in Sweden and the United Kingdom; and

[61] https://irg-rail.eu/irg/documents/market-monitoring/186,2018.html.

– Japanese activity in the United Kingdom.

Box 14: State of play of market opening in the passenger market

Despite the adoption of legislation designed to open rail markets, as outlined in previous sections, the mode share of railways in intra-EU transport has remained below 8% (see Figure 19). The lack of common rules governing the award of PSCs led some Member States to introduce competitive tendering and others to rely on direct awards. The differences in regulatory systems among the Member State made it difficult for railway companies to exploit the full potential of operating in an internal market.

Consequently, the 'market pillar' proposal of the Fourth Railway Package proposed amendments to Regulations 1370/2007 to remove remaining legal, institutional and technical barriers for improving the quality and efficiency of rail passenger transport services. The proposal introduced a framework for competitive award of PSCs for public transport by rail and several provisions fostering frequency and punctuality of services, cost-efficiency of public rail transport services, customer satisfaction, and quality of rolling stock.

Following the provisional agreement reached by the European Legislator on 19 April 2016, the European Parliament Committee on Transport and Tourism adopted the proposals on 5 December 2016, and subsequently the legislative proposal was finally approved by the European Parliament on 13 December 2016 to introduce the principle of competitive award of rail PSCs. Under certain circumstances Member States could choose to directly award rail contract and would publish a reasoned decision behind the award of such contract, however in such cases provisions for quality and/or cost efficiency improvement needed to be ensured in the contract using clearly defined performance targets.

In addition, to increase competition for rail contracts, Member States must ensure effective and non-discriminatory access to suitable rail rolling stock for operators wishing to provide public passenger services by rail. Finally, transparency in the definition of public service obligations and the geographical scope of PSCs as well as implementing measures of staff protection in the case of a change of public transport operator. The impact assessment showed that the proposed amendments would have an economic, environment and social impact amounting to a net present value of between EUR 21 and EUR 29 billion over the 2019 to 2035 period.

Scope for regulatory bodies to limit open access in the passenger market

The Fourth Railway package opens domestic passenger markets to competition in all Member States[62]. Railway undertakings must be granted the right of access to railway infrastructure in all Member States for the purpose of operating rail passenger services under equitable, non-discriminatory and transparent conditions. Railway undertakings will have the right to pick up passengers at any station and set them down at another.

The EU legislator, however, put in place mechanisms to balance the objective of effectively opening up the market for domestic 'open access' rail passenger services in the EU with the need to protect the economic equilibrium of services provided under an existing public service contract.

Railway undertakings' right to access rail infrastructure to provide 'open access' passenger services on Member States' domestic markets can be restricted only where the national rail regulatory body decides, on the basis of an objective economic analysis, that the new service would cause substantial damage to the economic equilibrium of the existing public service contract, in terms of profitability of the services or higher net cost to the competent authority. This is the only situation in which

[62] See in particular Directive 2016/2370 amending Directive 2012/34/EU.

Member States may, if their legislation provides for it, restrict access to their infrastructure once passenger markets are fully opened to competition in 2019.

Box 15: Implementing act on the Economic Equilibrium Test

In November 2018 the Commission adopted a draft implementing act on the Economic Equilibrium Test (EET)[63]. This legislation, which has been negotiated with Member States, is designed to provide guidance to regulatory bodies who may be called upon to carry out an objective analysis (the EET) to establish whether a new open-access service would have a substantial impact on the economic viability of an existing public service.

The new implementing act replaces implementing Regulation 869/2014 which was tailored for a market where only international passenger traffic was open to competition.

The new Regulation establishes not only general criteria, but also a clear procedure and timeline for requesting and performing the economic equilibrium test, to ensure legal certainty for all the parties involved. In particular, it prescribes:

- Rules for notification of a planned new rail passenger service to infrastructure managers and regulatory bodies
- Deadline for requesting the economic equilibrium test
- Information requirements and procedure for the economic equilibrium test
- Contents of the economic equilibrium test and assessment criteria
- Cooperation between regulatory bodies competent for a proposed new international passenger service.

4.6 Development of employment and social conditions

4.6.1 Employment in rail

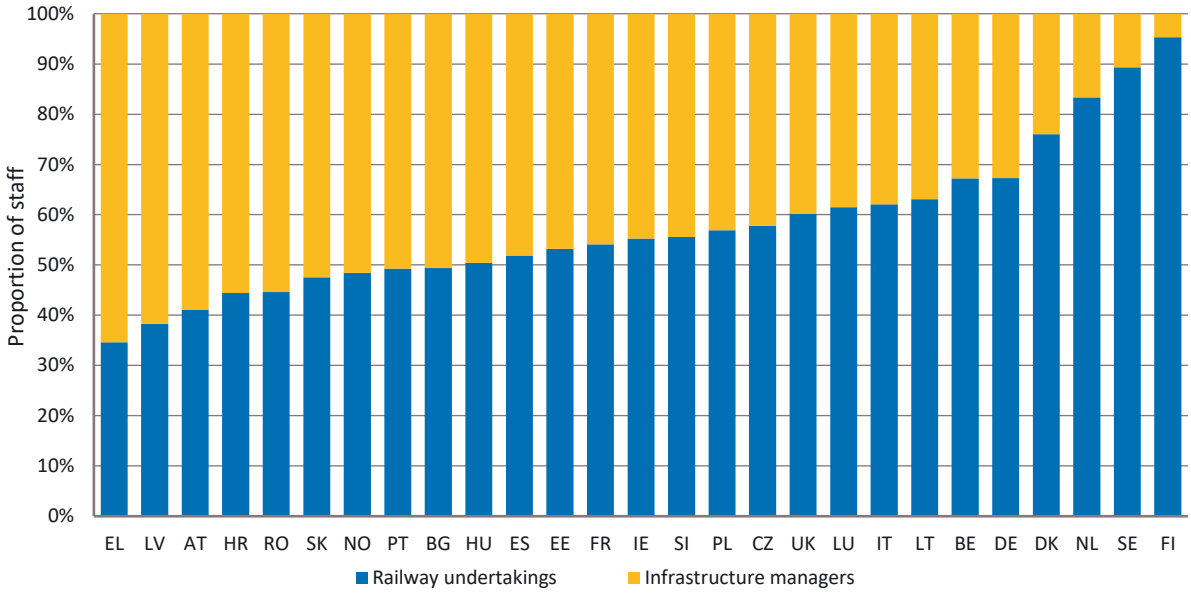
Labour force of infrastructure managers and railway undertakings
Staff employed in incumbent undertakings versus alternative undertakings

In 2016 just over one million people were reported as employed in the European railway sector, about 600 000 of them by railway undertakings and 440 000 by infrastructure managers. However, a large part of the apparent increase on earlier years results from the restructuring of the railways in France, as illustrated in Figure 86 below.

Figure 84 shows the reported distribution of these staff between infrastructure managers and railway undertakings in 2016.

[63] Commission Implementing Regulation (EU) 2018/1795 of 20 November 2018 laying down procedure and criteria for the application of the economic equilibrium test pursuant to Article 11 of Directive 2012/34/EU of the European Parliament and of the Council, OJ L 294, 21.11.2018, p. 5–14.

Figure 84: Employees of infrastructure managers and railway undertakings, 2016



Source: RMMS, 2018.

In practice, the distribution of staff between railway undertakings and infrastructure managers varies for several reasons, including that:

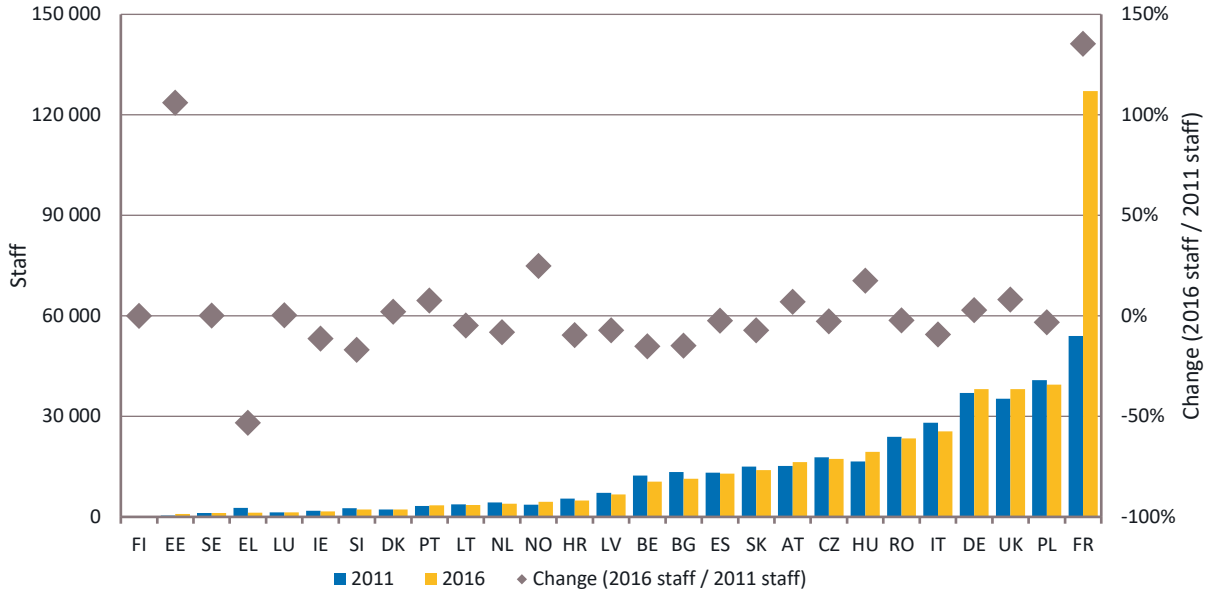
- The respective roles of infrastructure managers and railway undertakings vary: for example, activities such as staffing stations, or providing passenger information, or security, may be the responsibility of the infrastructure manager in some cases and railway undertakings in others.
- Either or both parties may be part of larger organisations, so the number of staff associated with railway infrastructure or operations may need to be estimated by the parent organisation.
- Either or both parties may subcontract activities to other organisations, whose staff do not appear as part of the rail industry. Examples include maintenance and cleaning staff, those responsible for the management and provision of rolling stock, particularly where there are rolling stock companies (ROSCOs), and staff carrying out work on infrastructure renewals and enhancements.

While the distribution of staff varies for the reasons set out above, the data suggest that in markets with extensive liberalisation, such as the United Kingdom, Italy, Germany and Sweden, a large majority of staff may be employed by railway undertakings[64].

Figure 85 and Figure 86 show that employment growth within the sector varies, with a significant fall in employment in the Central, Eastern and Southern European Member States, and a rise in those in Northern Europe.

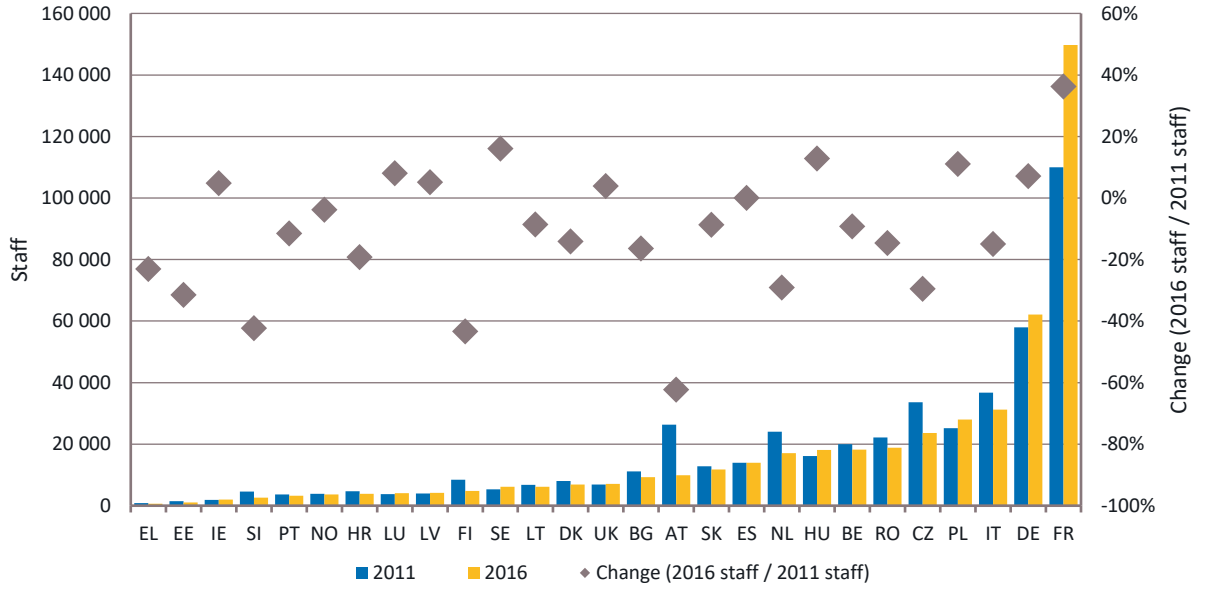
[64] Employment data published here are in some cases not directly comparable with 2014 data published in the Fifth RMMS report. In the case of multimodal infrastructure managers for example, instead of providing the total staff of the infrastructure manager as in previous surveys, for 2016 Member States were asked to estimate the number of people working on rail activities. In addition, under Regulation 2015/1100, Member States also provided data for non-incumbent infrastructure managers; this was not the case for 2014 data. Also, employment data reported by Member States in the RMMS questionnaire are not comparable with the Statistical pocketbook 2018, based on Eurostat data and referring only to railway undertakings' staff.

Figure 85: Employees of infrastructure managers, 2011 and 2016



Source: RMMS, 2018.

Figure 86: Employees of incumbent railway undertakings, 2011 and 2016



Source: RMMS, 2018. 2014 data for 2011 for EE. 2013 data for 2011 for HR.

Between 2011 and 2016, reported employment rose by 8% in total, comprising a fall of 0.2% among railway undertakings and a rise of nearly 22% among infrastructure managers. However, as can be seen from the figures, this change appears to be dominated by increases in the number of reported staff at both infrastructure manager and incumbent railway undertaking in France.

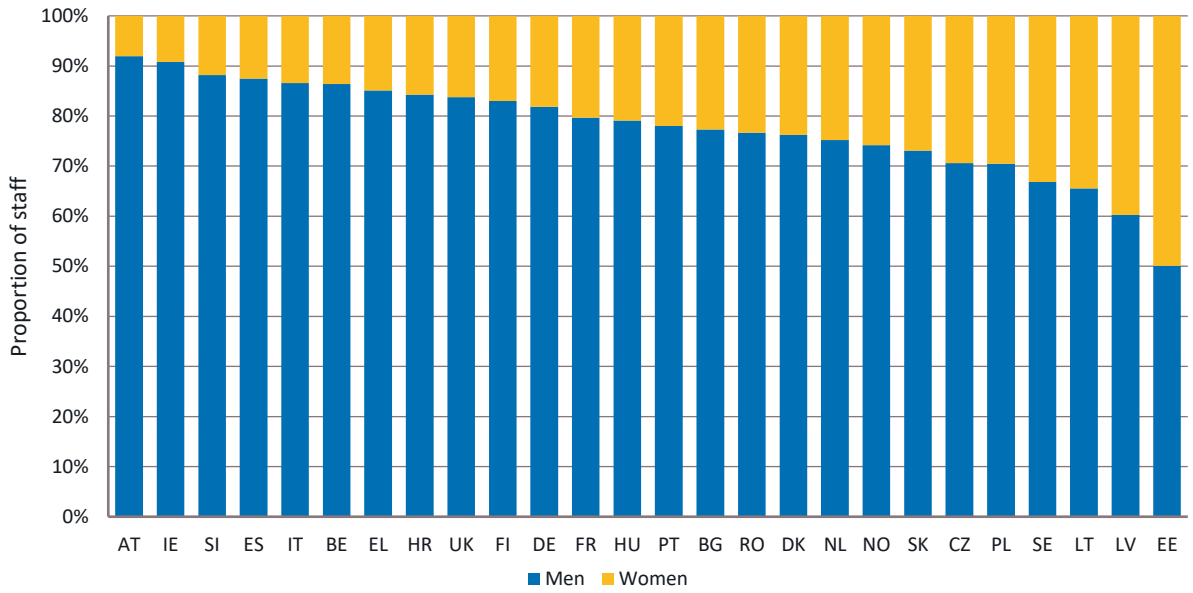
4.6.2 Socio-demographic structure of the rail labour market

Structure by gender

Following the adoption of Regulation 2015/1100 ('the RMMS Regulation'), the RMMS survey now collects data on gender and age structure of the rail staff.

Figure 87 shows the gender mix of railway staff reported by the Member States and Norway.

Figure 87: Employees by gender structure, 2016



Source: RMMS, 2018. No data for LU.

On average, only 21% of the EU's rail workforce were women. The proportion of female staff varies widely, rising to 50% ('equality') in Estonia and over 30% in the other Baltic States and Sweden.

The most recent survey published by rail social partners[65] provides some additional insights:

- Between 2013 and 2016, the proportion of female railway workers had generally risen, by 3.2% for on-board personnel, 3.1% for engineers, 1.4% for managers, 1.2% for traffic management and 0.4% for locomotive drivers.
- Nearly one-third, 32.4%, or of on-board personnel were women although, at the other extreme, only 2.2% of locomotive drivers were women.

From 2016, several measures have been implemented to promote employment and career development of women, including initiatives to improve health and hygienic conditions, flexible working hours, reduced working time, unpaid leave, and review of recruitment procedures.

[65] CER (2017), Fourth annual report on the development of women's employment in the European railway sector, *joint recommendation of the CER – ETF- EIM project.*

Box 16: Gender aspects in rail

The rail sector remains a male dominated sector, especially when it comes to technical positions such as drivers or technicians and managerial positions.

In addition to the challenges related to work-life balance and violence[66] , one of the main barriers to tackle to attract young people and women to the rail sector is cultural because of persisting negative stereotypes. This is true also for younger people in general of either sex. It follows from the study on 'Making the transport sector attractive to future generations'[67] that the rail transport sector is emotionally disconnected from young people. Their image of the typical rail worker is a modest 40-50 male, train driver or conductor. They see rail professions as stable but routine and monotonous.

As the rail workforce is ageing, it is crucial to tackle these issues if we want to make the sector attractive.

To increase the gender balance of the transport sector and to make it appealing to women, the Women in Transport – EU Platform for change was launched on 27 November 2017[68]. The Platform is action oriented. Several EU associations from the rail sector[69] have joined the Platform, as well as the European Union Agency for Railways (ERA). The EU associations may directly bring actions to the Platform or channel actions from their members.

A Declaration to ensure equal opportunities for women and men in the transport sector and an online module to exchange good practices are now also available online[70]. The Declaration has already gathered signatories from the rail sector, including 836 employees from the Italian railway company, Ferrovie dello Stato Italiane.

Finally, the Commission has commissioned a study entitled a 'Business case to increase female employment in transport'[71] which presents the benefits of more gender balanced teams, with good practices, including from the railway sector, and which provides a toolkit for companies interested in increasing their gender balance.

Structure by age

Following the adoption of Regulation 2015/1100 ('the RMMS Regulation'), the RMMS survey now collects data on the age of the workforce, subdivided into three groups. Figure 88 compares the reported proportion of staff in each group with the equivalent distribution in 2012, based on UIC data, reported in the RMMS 5 Staff Working Document (Figure 37).

66 http://www.etf-europe.org/files/extranet/-75/47768/ETF%20summary%20report%20VAW%20at%20work%20in%20transport%20EN.pdf.

67 https://ec.europa.eu/transport/themes/social/studies/social_en

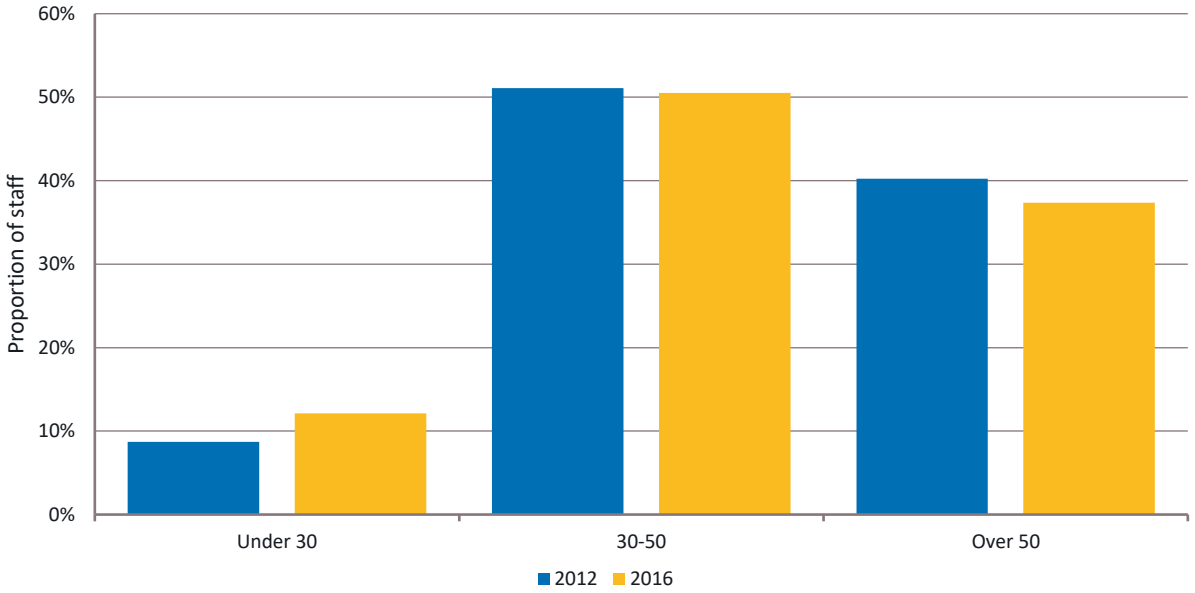
68 https://ec.europa.eu/transport/themes/social/women-transport-eu-platform-change_en.

69 CER (Community of European Railway and Infrastructure Companies;
UIP (International Union of Wagon Keepers);
UNIFE (Association of the European Rail Industry); and
ETF (European Transport Workers' Federation).

70 https://ec.europa.eu/transport/themes/social/women-transport-eu-platform-change_en.

71 Not yet published when this report was finalised.

Figure 88: Employees by age group, 2012 and 2016



Source: RMMS, 2018 and UIC (for 2012).

If the age of railway workers was equally distributed between 20 and 60, then 25% would be over 50 and 25% would be under 30. In contrast, in 2012, around 40% of the railway workforce were over 50, and fewer than 10% were under 30, suggesting that there could be potential future staffing shortages as older workers retire. This may be exacerbated by factors such as:

- long-term recruitment freezes due to the financial crisis;
- State budgets cuts; and
- changes to national pension schemes that require workers to work longer.

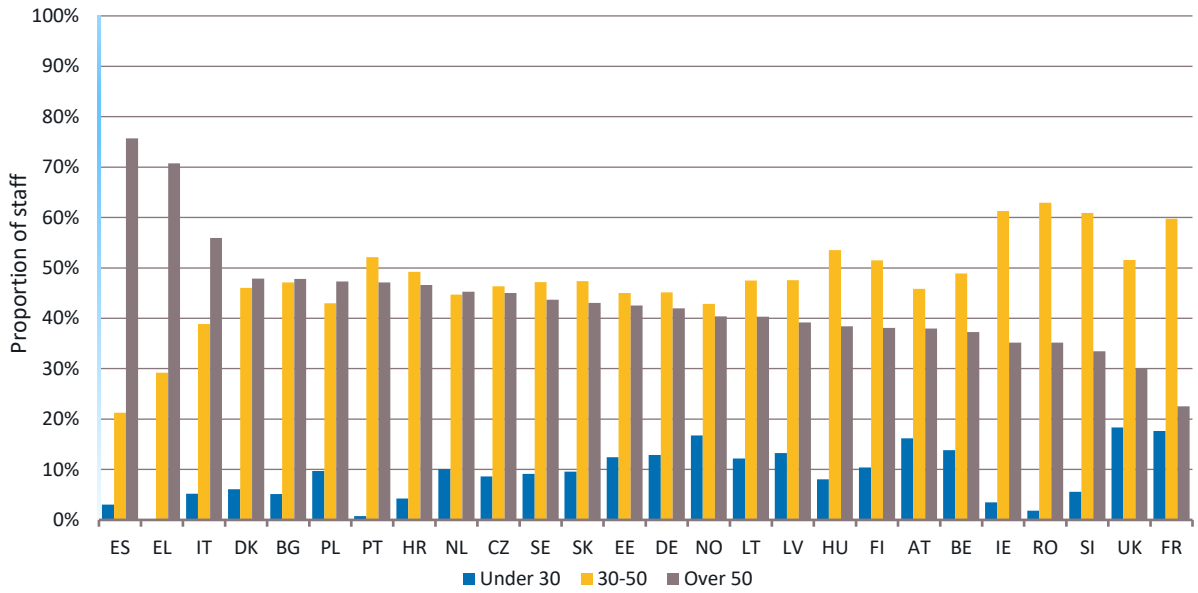
However, as the figure shows, the overall age profile had improved slightly by 2016, with 37% of the workforce over 50 and 12% under 30. At least two effects may have contributed to this change:

- Older workers may have been retiring.
- New entrant operators may have been hiring relatively young staff.

Despite the apparent improvement in the age pyramid over the years, the high percentage of railway staff older than 50 in 2016 still suggests that a large contingent of workers is expected to leave the railways soon.

Figure 89 shows the distribution of railway staff by age group in the different States, sorted by the proportion over 50 years old.

Figure 89: Employees by age group and country, 2016



Source: RMMS, 2018. No data for LU.

The effect of an aged workforce appears to be greatest in Spain, Greece and Italy, where over 50% of the workforce were over 50 years old in 2016. In contrast, less than 35% of the workforce were over 50 in France, the United Kingdom and Slovenia, although in France this may partially reflect the relatively young retirement age granted to some railway workers[72]. France and the United Kingdom also have a relatively high proportion of workers under 30, at least compared with other Member States.

Structure by contract type

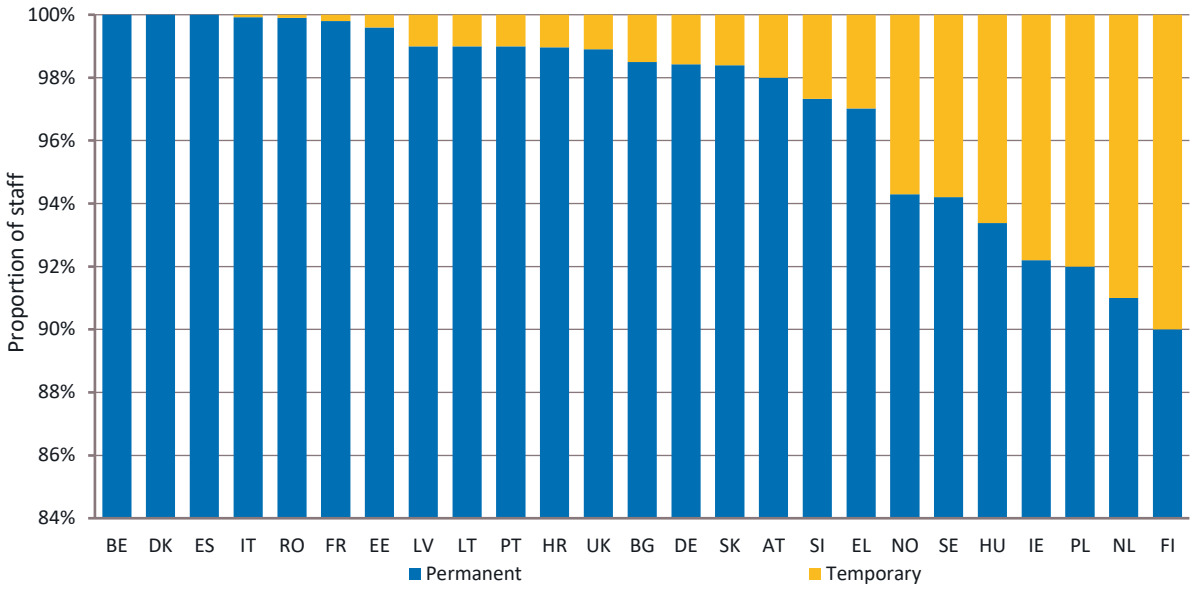
The RMMS survey also collected information on three aspects of employment contracts:

- whether staff were permanent or temporary (employers may wish to have sufficient permanent staff to deal with normal levels of activity);
- whether their working hours were full-time or part-time (employees may wish to have the option of working patterns compatible with their other activities, such as childcare or education); and
- whether they were in apprenticeships or training (employers and employees may both benefit from higher skills).

Figure 90 and Figure 91 show the proportions of temporary and permanent employees of the main infrastructure manager and the incumbent or other main railway undertakings, where available.

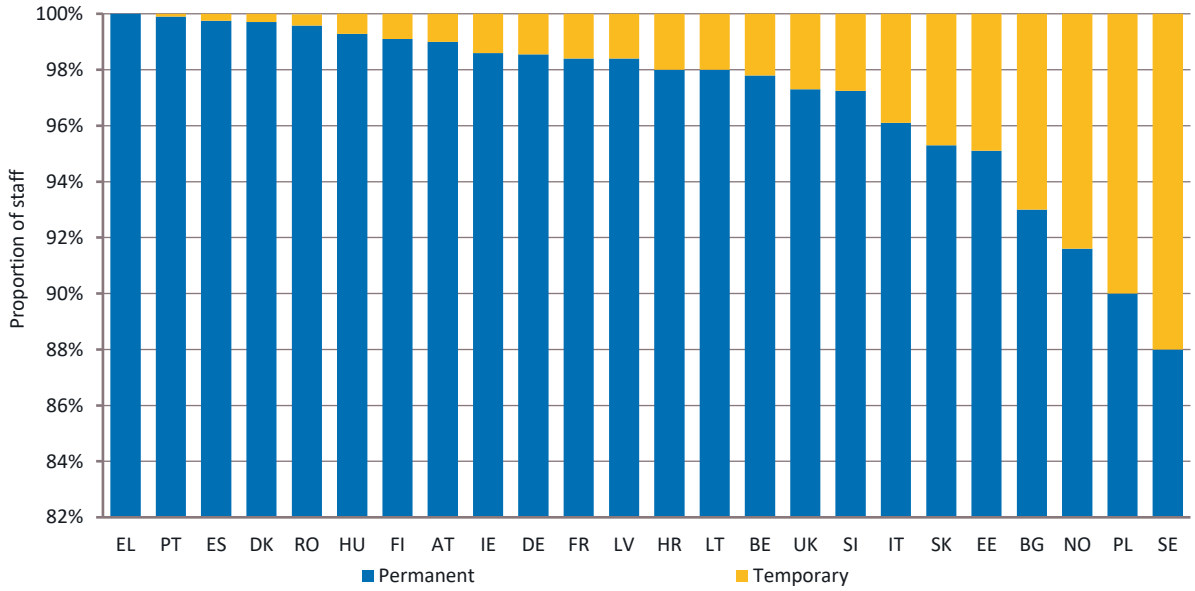
[72] Locomotive drivers could retire as early as 52 in France.

Figure 90: Employees of main infrastructure managers by contract type, 2016



Source: RMMS, 2018. No data for CZ, LU. 2015 data for ES, FR.

Figure 91: Employees of incumbent or main railway undertakings by contract type, 2016



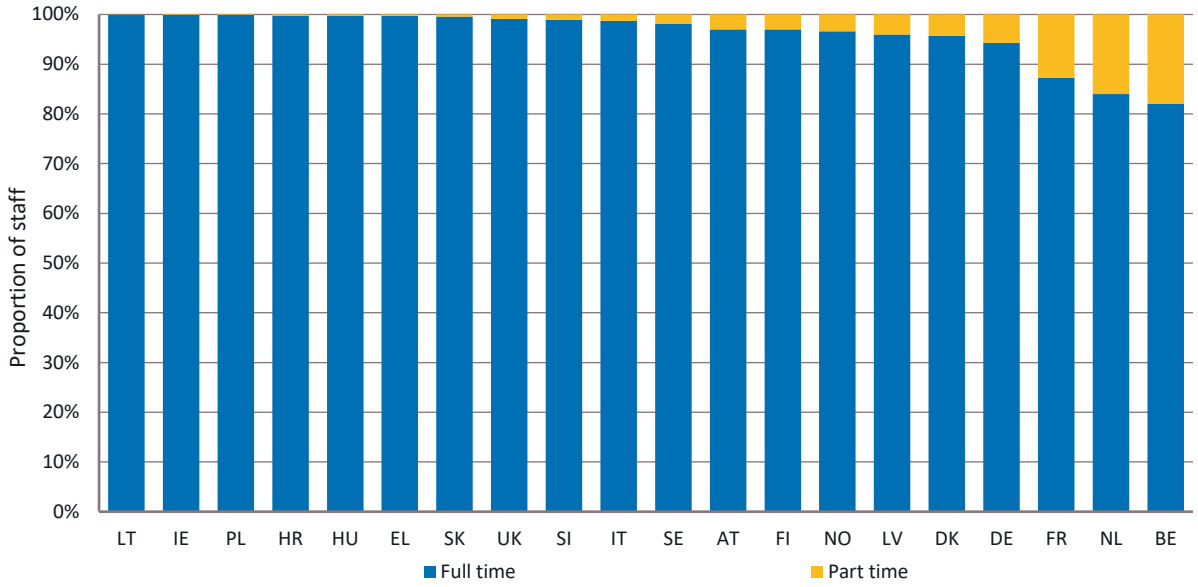
Source: RMMS, 2018. No data for CZ, LU, NL.

Most States reported that 90% or more of the staff of their infrastructure managers and incumbent or main railway undertakings were permanently employed. This may reflect practical issues, including the need for highly trained staff such as locomotive drivers and signal operators to be retained within the railway, and also past or historic employment policies, particularly where permanently employed railway staff have a particular status[73].

Figure 92 and Figure 93 show the proportions of full-time and part-time employees of the main infrastructure manager and the incumbent or other main railway undertakings, where available.

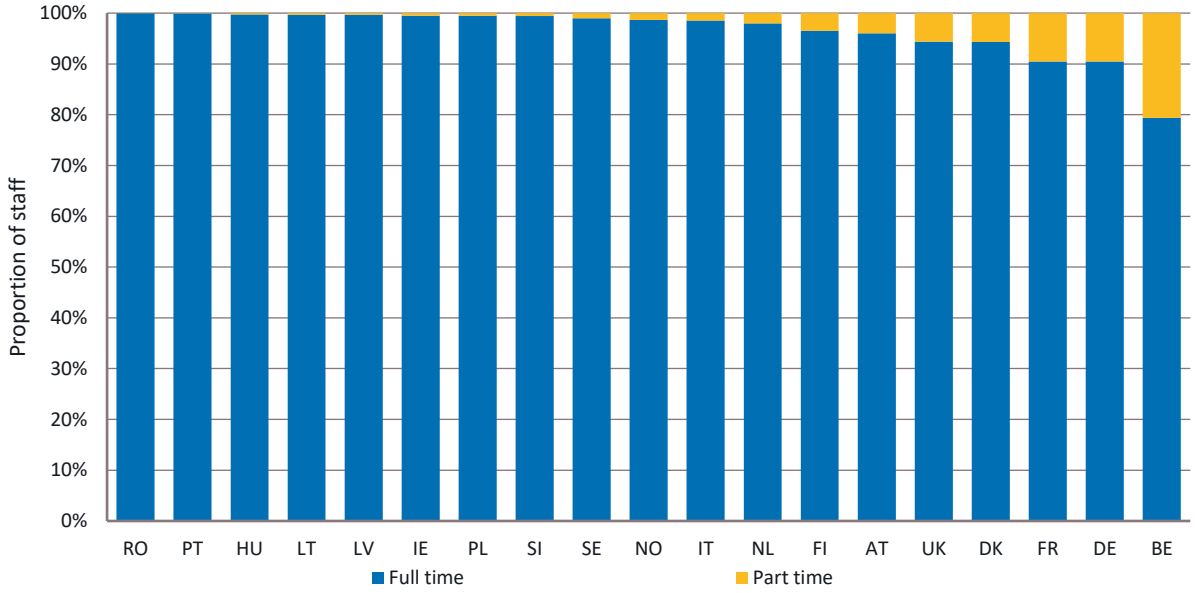
[73] Such as 'Cheminot' in France or 'Beamte' in Germany.

Figure 92: Employees of main infrastructure managers by time worked, 2016



Source: RMMS, 2018. No data for BG, CZ, EE, ES, LU, PT, RO. 2015 data for FR, IT, LT.

Figure 93: Employees of incumbent or main railway undertakings by time worked, 2016

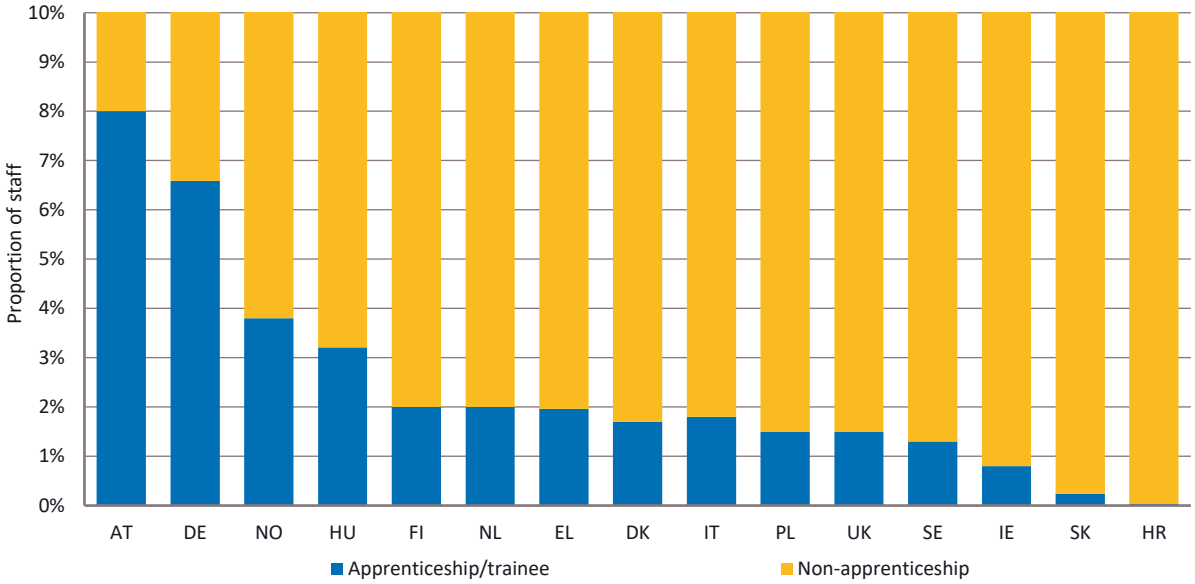


Source: RMMS, 2018. No data for BG, CZ, EE, EL, ES, HR, LU, SK. 2015 data for PT.

Most infrastructure managers and railway undertakings reported that 80% or more of their staff were employed full time. Railways operate seven days a week over long hours (and in some cases 24 hours per day) and many functions, including control and signalling staff, and train crew and on-board staff, cannot be provided solely by staff employed for a 5-day week during normal hours.

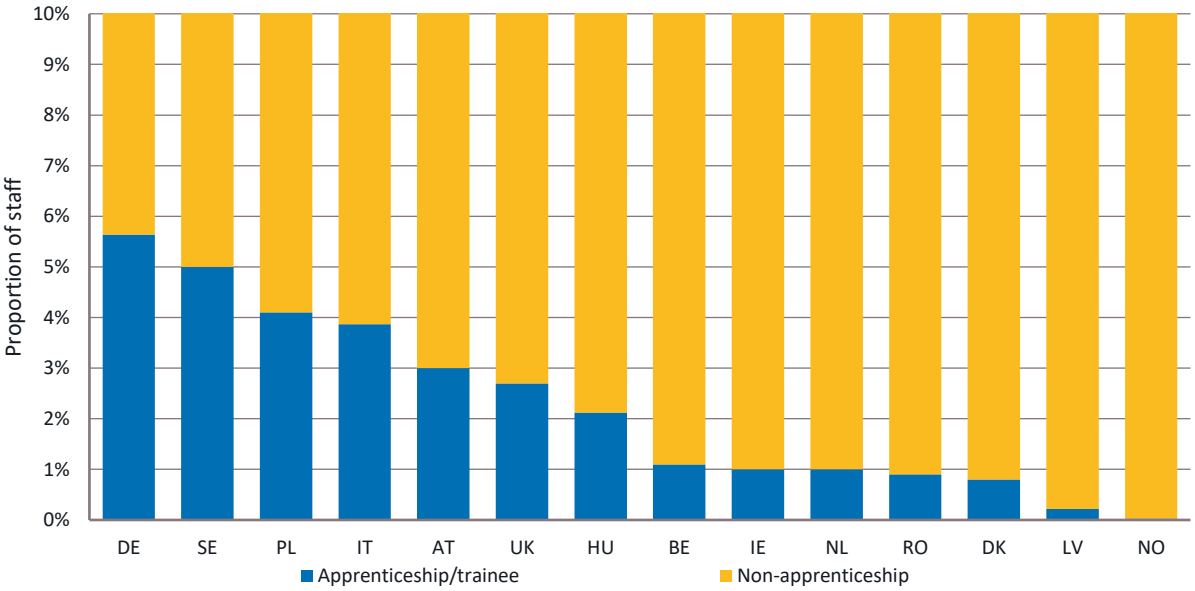
Figure 94 and Figure 95 show the proportions of employees who are currently in an apprenticeship or other training within either the main infrastructure manager and the incumbent or other main railway undertakings, where available.

Figure 94: Employees of main infrastructure managers in training, 2016



Source: RMMS, 2018. No data for BE, BG, CZ, EE, ES, FR, LT, LU, LV, RO, SI. 2015 data for IT.

Figure 95: Employees of incumbent or main railway undertakings in training, 2016



Source: RMMS, 2018. No data for BG, CZ, EE, EL, ES, FI, FR, HR, LT, LU, PT, SI, SK. 2015 data for RO.

Austria reported that 8% of the staff of the main infrastructure manager, ÖBB-Infrastruktur AG, were in apprenticeships or training. Germany reported that over 5% of the incumbent railway undertaking, Deutsche Bahn AG, were in apprenticeships or training. However, many infrastructure managers and railway undertakings reported that no staff were in any formal training programme.

Box 17: Training in the rail sector

There are long-standing and emerging skill shortages for drivers, engineers and other technical professions in the European railway sector. In addition to a number of efforts undertaken at EU level to improve the sector's attractiveness, some railway companies have begun funding students'[74] college course/university degrees, particularly for occupations such as engineering with significant skills shortage. Apprenticeship schemes[75] have been designed to attract young people, providing paid employment opportunities and training for a long-term career in the railway sector. However, regional differences in skills shortages will also have to be taken into account.

There have also been advances in the use of technology to improve railway efficiency and safety and to change the customer experience. For example:

- Travel agents and station-based sales staff may be replaced by internet-based booking tools and by station ticket machines respectively.
- Station-based ticket inspectors may be replaced, at least in part, by automatic gates.
- Train guards may be displaced by Driver-Only Operation (DOO) or replaced by on-board catering, ticket inspection or security staff.

Modern trains may be more reliable and be designed to take significantly less time to maintain, clean and prepare.

4.7 Harmonisation

4.7.1 EU legislation

Following Directive 91/440/EEC, effective from 1 January 1993, the Commission has adopted four railway packages:

- In 2001, the First Railway Package ('rail infrastructure package') allowed rail operators to access the trans-European network on a non-discriminatory basis for the purpose of operating international freight services.
- In 2004, the Second Railway Package liberalised the rail freight market from 1 January 2007, introduced common procedures for investigating accidents, and established safety authorities in the Member States.
- In 2007, the Third Railway Package introduced open access rights for international rail passenger services and a European train driver licence, and strengthened rail passengers' rights.
- In 2016, the Fourth Railway Package was adopted to complete the single market for rail services and to make it more competitive with other transportation modes.

The technical pillar of the Fourth Railway Package, adopted by the Council in April 2016, focused on interoperability, safety and a renewed role for the European Rail Agency. It included:

- Regulation (EU) 2016/796 on the EU Agency for Railways and repealing Regulation (EC) no 881/2004;
- Directive (EU) 2016/797 on the interoperability of the rail system within the EU (Recast of Directive 2008/57/EC); and

[74] Promoting employment and quality of work in the European rail sector, CER (2016)

[75] Study on a pilot project: Making the EU transport sector attractive to future generations, *A study prepared for the European Commission DG Mobility and Transport* (2017)

- Directive (EU) 2016/798 on railway safety (Recast of Directive 2004/49/EC).

The market pillar of the Fourth Railway Package, adopted in December 2016, was intended to complete the process of market opening that began with the implementation of the First Railway Package. It laid down rules for improving impartiality in the governance of railway infrastructure, and introduced the principles of mandatory tendering for PSCs in the railway sector to enhance competition in rail passenger service markets, thereby encouraging railway operators to improve the quality of their services, and their cost effectiveness. The market pillar comprises two Regulations and a Directive.

- Regulation (EU) 2016/2338 amends Regulation (EU) 1370/2007 dealing with the award of PSCs for domestic passenger transport services by rail. It came into force on 24 December 2017 and many of its provisions apply from the timetable of 2 December 2019.
- Directive 2016/2370/EU amends Directive 2012/34/EU dealing with the opening of the market of domestic passenger transport services by rail and the governance of the railway infrastructure. Many of its provisions apply from the timetable of 14 December 2020.
- Regulation (EU) 2016/2337 repeals Regulation (EEC) 1192/69 on the normalisation of the accounts of railway undertakings.

Two key features of the market pillar are:

- 'Competitive tendering' from the 2020 timetable: with certain limited exceptions, competent authorities which have recourse to a third party other than an internal operator must award PSCs on the basis of a competitive tendering procedure.
- 'Open access' from the 2021 timetable: Member States may limit rights of access only if the exercise of the right would compromise the economic equilibrium of one or more PSCs.

4.7.2 Transposition

Rail Directives can only have their intended effects if they are completely and correctly transposed into Member States' national law by the foreseen deadlines and effectively applied thereafter.

Transposition monitoring of EU regulation

At 13 July 2017, the status of transposition of rail Directives was as set out in Table 6.

Table 6: Status of transposition of Rail Directives, 13 July 2017

Directive	Number of countries which the EC considers had not transposed at 13 July 2017
2016/882 (am. 2007/59) – language requirements	7
2014/106 – Interoperability	1
2012/34 – Single European Rail Area	5

Source: DG MOVE.

4.7.3 Infringements

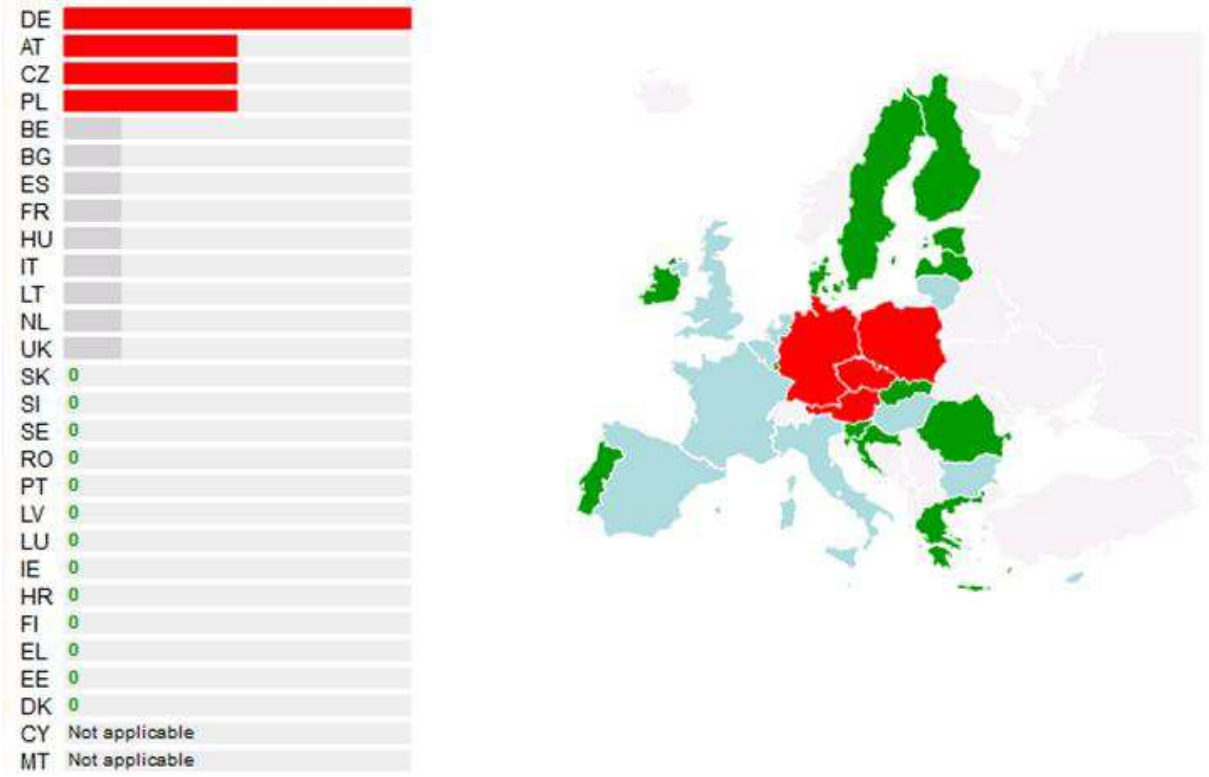
Monitoring of infringement proceedings related to the EU market regulation

Infringement proceedings may be started when the Commission considers that, for example, an EU Directive has not been transposed timely and correctly into national law, or Single Market rules

(either in the Treaty on the Functioning of the European Union or in secondary legislation) have been incorrectly applied. Infringement proceedings only start when a letter of formal notice is sent to the Member State in question. However, only the Court of Justice can rule regarding a breach of EU law.

Figure 96 shows the number of pending infringement proceedings in the field of rail transport at 13 July 2017.

Figure 96: Pending infringement proceedings in the field of rail transport, 13 July 2017



Source: DG MOVE Transport Scoreboard.

4.7.4 External dimensions of rail transport policy

The implementation of the EU rail acquis by Switzerland and EEA Countries ensures a level of harmonisation and interoperability for the rail industries, which is the basis for free market access. In rail matters, Switzerland cooperates with the EU through the bilateral Land Transport Agreement, which provides for reciprocal opening of land transport and complements the Free Trade Agreement. Switzerland applies the European Technical Specifications for Interoperability (TSIs) as accepted standards and rules of diligence (Implementation provisions to the Railway Ordinance).

The Commission provides support to the candidate and potential candidate countries for EU membership, particularly for the planning, development and financing of the rail component of trans-European transport networks, and for the transposition and implementation of the EU rail acquis. The Transport Community Treaty[76] , which was signed between the EU and the six Western Balkan countries (Albania, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, Kosovo[77], Montenegro and Serbia) and has been applicable since 2017, provides a strong basis for the progressive integration of the region, including through agreements on rail freight corridors. In

[76] Treaty establishing the Transport Community, OJ L 278, 27.10.2017, p. 3.

[77] This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

addition to investments, a new rail strategy is needed to bring the Western Balkans into the main EU network and market and to promote the gradual opening of the regional rail market[78]. The development of the southern rail transport corridor also involves close cooperation with Turkey. EU cooperation and technical assistance in the rail sector also extends further beyond towards the neighbouring countries, notably in the southern and eastern regions.

Since 1st July 2011, the European Union acceded to the Convention concerning International Carriage by Rail (COTIF)[79], and became a member of the Intergovernmental Organisation for International Carriage by Rail (OTIF), which brings together 46 States of the Pan-European region, including 26 EU Member States. OTIF develops uniform legal regimes for international rail transport as regards technical interoperability, dangerous goods and railway contract law. OTIF and the European Commission, assisted by the European Union Agency for Railways (ERA), co-operate to maintain equivalence between EU and OTIF legislation concerning railway interoperability and safety to the extent necessary for international rail traffic, in order to facilitate the rail transport services and recognition of authorisations between the EU Member States and non-EU OTIF Contracting States.

The Organization for Cooperation between Railways (OSJD) is a platform for rail cooperation at ministerial level and at the level of railway companies that brings together 28 countries (including nine EU member States), with a view to creating a common rail transport space in Eurasia. The Commission, with the assistance of ERA, contributes to OSJD works through its participation, coordination and active role in relevant initiatives. Important developments take place in regard to the ongoing reform process to adapt OSJD to the current administrative, legal and economic situation in the rail sector where the Commission sees potential to promote further alignment of OTIF and OSJD regimes to contribute to more favourable rail transport conditions between Europe and Asia to underpin the new business opportunities for EU industry as a whole.

At global level, the European Commission and some Member States participate in the Group of Experts towards Unified Rail Law (GEURL) created in 2011 within the United Nations Economic Commission for Europe (UNECE), which aims at unifying railway contract law with a particular focus on Euro-Asian rail transport linkages. In February 2013, the project received political support as 37 member countries of UNECE signed the Joint Declaration on the promotion of Euro-Asian rail transport and activities towards unified railway law. In February 2018, the mandate of the GEURL was extended for two more years with the objective of preparing a legal instrument for the contract of carriage of goods across the Eurasian continent (when neither the provisions of OTIF nor OSJD apply, i.e. interface law), and to organise a series of pilot tests on designated freight corridors.

4.7.5 Regulatory bodies

Role and resources

Under Directive 2012/34/EU, on complaint or ex-officio, Regulatory Bodies have the power to:

- prevent/redress discrimination;
- check access to network and service facilities, charging, capacity allocation;
- monitor the competitive situation;

[78] A credible enlargement perspective for and enhanced EU engagement with the Western Balkans, COM(2018) 65 final.

[79] Council Decision 2013/103/EU of 16 June 2011 on the signing and conclusion of the Agreement between the European Union and the Intergovernmental Organisation for International Carriage by Rail on the Accession of the European Union to the Convention concerning International Carriage by Rail (COTIF) of 9 May 1980, as amended by the Vilnius Protocol of 3 June 1999, OJ L 51, 23.2.2013, p. 1.

- adopt non-binding opinions on the infrastructure managers' business plans, contractual agreement with the Member States on infrastructure financing and capacity enhancement plans);
- audit the accounts of railway undertakings, operators of service facilities and infrastructure managers to check accounting separation;
- draw conclusions from the accounts on State aid, informing competent authorities; and
- perform the Economic Equilibrium Test.

The Fourth Railway Package further extended the scope of regulatory bodies' powers to check:

- discrimination in traffic management, infrastructure renewals, maintenance;
- compliance with separation requirements; and
- conflicts of interest.

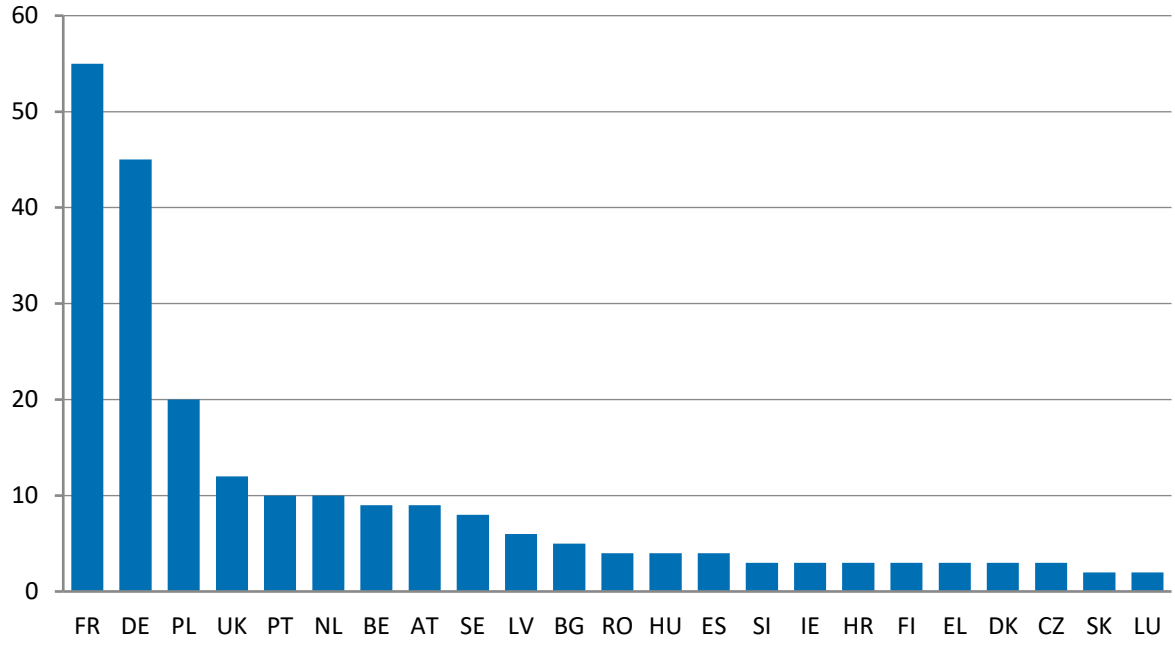
To comply with their duties, EU law gives regulators the power to request information from all actors, including data for market monitoring, and to impose penalties and fines if no reply. Regulatory bodies' decisions, which must be published, should be immediately binding and not subject to control of another administrative instance (judicial review).

National law in some cases even extends regulatory powers beyond what is enshrined in EU law. Multi-modal regulatory bodies can in some countries perform economic equilibrium tests across modes. In Italy the regulatory body sets ex-ante criteria for the determination of track access charges, criteria for PSO awards (either competitive or direct) including scope, method of compensation and efficiency improvements and works on the definition of network effects and efficient costs. In Portugal the regulator issues opinions on public service contracts, including on the calculation of financial compensation.

Directive 2012/34/EU (article 57) requires national regulatory bodies to cooperate among themselves and with other authorities. Regulatory bodies must exchange information on decision making principles and practice and on the problems of interpreting transposed Union railway law; in order to do so, they have to participate and work together in a network that convenes at regular intervals (European Network of Rail Regulatory Bodies – ENRRB).

Directive 2012/34/EU imposes to Member States to staff and manage their regulatory bodies in a way which guarantees their independence. Figure 97 shows the numbers of staff in the regulatory bodies.

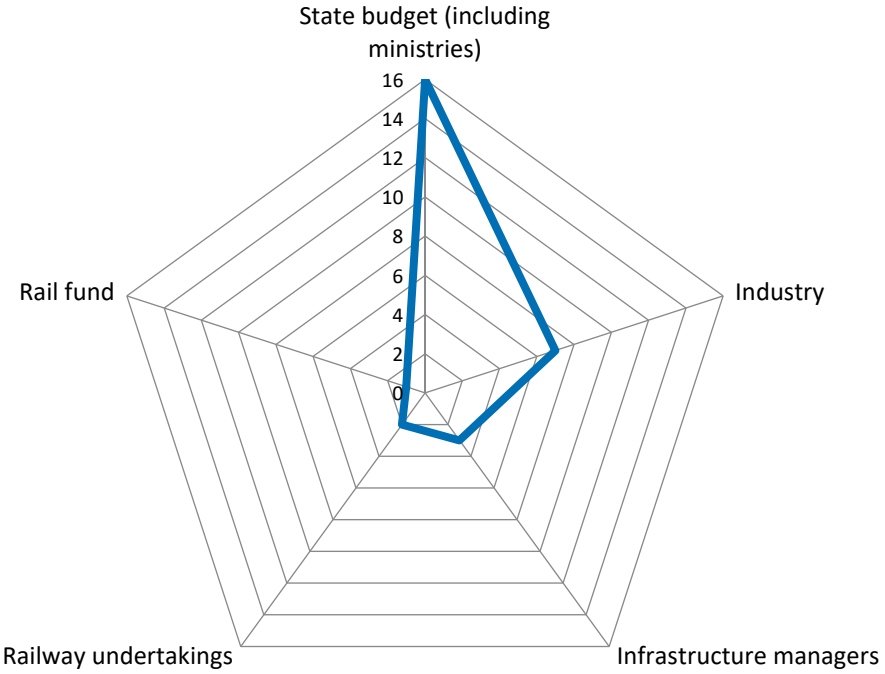
Figure 97: Regulatory bodies' staff dealing with rail market access, 2018



Source: Darebo 2018. No data for EE, IT, LT and NO.

Rail regulatory bodies in the EU are mainly funded by State budget (including Ministerial resources) and fees paid by regulated operators (infrastructure managers, railway undertakings or both), as shown in Figure 98.

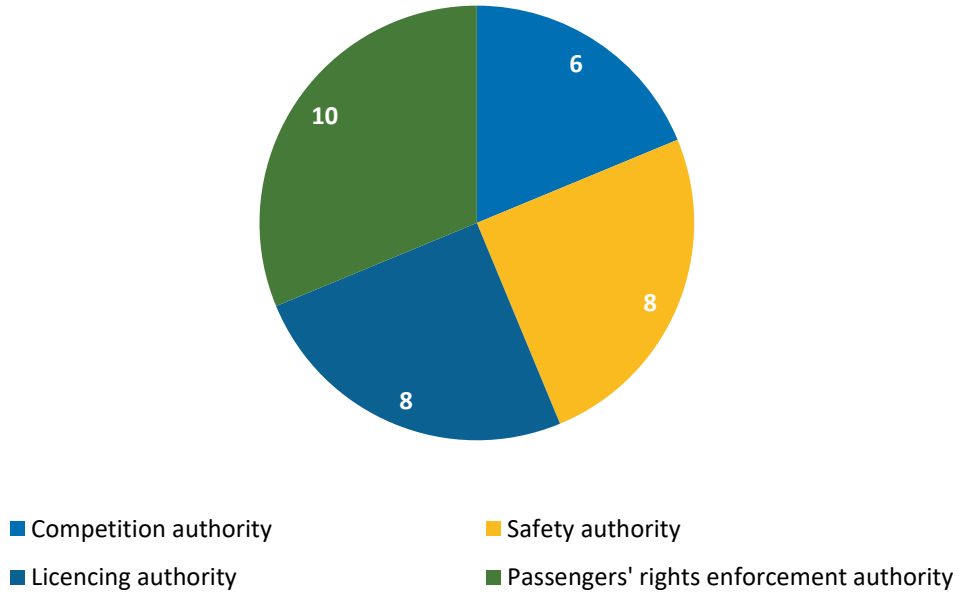
Figure 98: Regulatory bodies' funding in the EU



Source: Darebo 2018. No data for NO.

In a number of countries, rail regulatory bodies have also other functions related to the sector, they act as national licensing authorities, national safety authorities, passenger rights enforcement authorities, or they can be at the same time competition authorities, as shown in Figure 99.

Figure 99: Regulatory bodies with integrated competences for the rail market, 2018



Source: Darebo, 2018.

4.8 Digitalisation

Digitalisation is crucial for Railways for two main reasons:

1) It enhances the internal efficiency and effectiveness of railways, improving the capacity, use of infrastructure and the level of safety, by increasing the on-board intelligence, and decreasing the equipment needed by as much as 70% (notably track-side).
2) Digitally enhanced services for passengers and for freight add value for railways and can be better integrated in a multimodal logisgtic chain, for freight services, or in Mobility as a Service schemes, for passengers.

Improving internal efficiency of Railways

As far as the internal efficiency gains are concerned, digitalisation can increase infrastructure capacity, between 20% and 50% depending on the traffic type and signalling used. Among the induced benefits, aside the higher share of railways and the avoided greenhouse gas emissions, savings from avoided infrastructure investments shall also be considered and quantified.

Train control systems ensure that trains stop where necessary and travel at a speed safe for the line and modern signalling systmes can drastically improve performance.At the same time, incompatibility of national legacy control systems constitute a significant barrier to interoperability of the European railways. ERTMS ("European Rail Traffic Management System") is a major industrial project being implemented by Europe, a project which will serve to make rail transport safer and more competitive. ERTMS (is a common European standard and its deployment will provide the backbone for a digital, connected Single European Rail Area. Further to this, ERTMS will also enable the introduction of innovative technologies to the rail sector in an effective manner.

On 5 January 2017 the European Commission adopted the Implementing Regulation (EU) 2017/6 setting the new ERTMS European Deployment Plan (EDP). The EDP provides for about 30-40% of the Core Network Corridors to be equipped by ERTMS by 2023 (15 672 km). Only one third of that is

currently in operation so there is much still to do in the coming years. Around 2600 km should be put in operation with European Train Control System (ETCS) in 2018 (including 820 km of Spanish lines already in operation under ETCS 1 to be migrated to ECTS 2).Track-side equipment can be at the same time reduced by as much as 70% thanks to innovative version of ERTMS, with important savings on renewal, maintenance and fostered reliability.

Further energy savings linked to Automatic Train Operation (ATO), coupled with future lighter trains and higher loading factor can lead to energy savings between 20% and 50%. Also, ATO in parallel with ERTMS deployment will reduce operating costs for railway undertakings and maintenance costs for infrastructure managers, while further improving network capacity and punctuality.

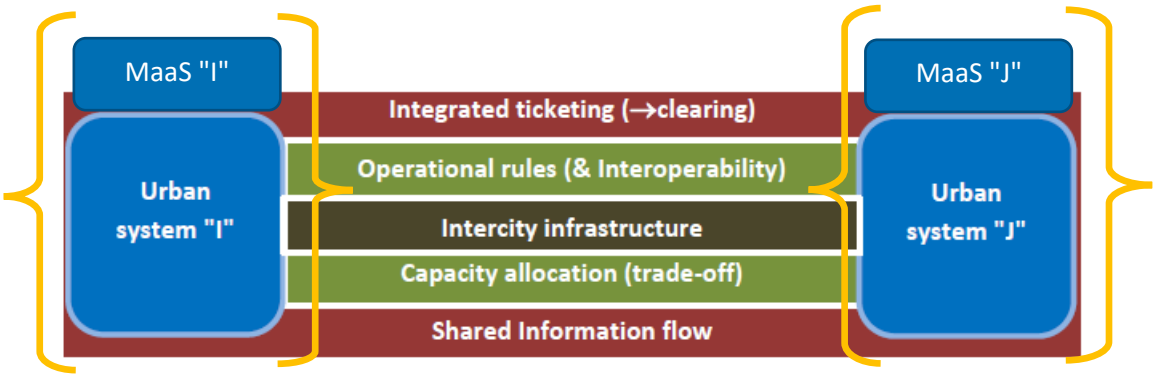
In addition, the use of remote sensing on board, slart trackside devices and drones provides the opportunity to collect a great amount of "big data", monitoring constantly the essential parameters to prevent failure of rail infrastructure and mobile assets, while optimising maintenance.

Provision digitally-enhanced passenger services

Ensuring a good level of integrated mobility involving a wide rail network across national borders, and a (or more) urban centre / poles connected with rail services is a challenge for the success of railways, in an environment where Mobility as a Services (MaaS) provides a viable alternative to provate car use and ownership.

The efficient integration of public transport with rail calls for:

- a **shared, integrated ticketing system** –wide-ranging agreements, common ticketing / commercial tools and the existence of reference standards and technical interfaces are needed to ease this process;
- a **shared, integrated information system**, allowing for relevant information to be easily available– this include awareness raising on the availability of the service (service planned), real-time information on the service (service deployed), pricing, ticketing, etc. (– e.g.: a multimodal travel companion currently being developed under Shift2Rail).



Increasing use of Information Technology (IT) is providing customers with various means of interacting with transport systems, including railways. These include, typically:

- before travel, information enabling them to plan their journey, such as information on timetables, facilities and fares;
- during travel, real-time information on services and disruption, and communications through WIFI and other media; and

- after travel, processes for Pay As You Go (PAYG) fares and for claiming compensation and refunds for delays and cancellations - some railway undertakings now automatically refund some or all of the fare if it was specific to a train which ran late or was cancelled.

Before travel, railway undertakings, like other transport services including air and coach travel, provide information in electronic format on their timetables, facilities and prices. Timetables, facilities and prices may be published on the website of the railway undertaking, by other parties such as the infrastructure manager, or by specialist apps or websites related to particular urban areas, international travel, or niches such as railway sleeper services. Information can be included on facilities for the disabled as well as on services such as facilities on trains and at stations, including information on local transport connections and taxis. Not all websites or apps are able to quote fares information or sell tickets, which now come in distinct forms:

- Conventional paper tickets may be sold at a station, collected from a machine, or sent by post.
- E-tickets, often with a barcode or QR code capable of operating ticket gates, may be printed at home. In some cases they are valid only with a unique document, so as to avoid fraud by printing duplicates.
- M-tickets may be downloaded onto, and stored on, a mobile device, which in some cases can be used to operate a ticket gate.

During travel, passengers now have access to a range of real-time information. Information on train departures and arrivals has long been displayed at stations and on platforms, but may now also be available on trains, websites and apps. This enables travellers to identify that a train is delayed, will depart from a different platform, will no longer be on time for an original connection, or has been cancelled. Onboard displays may now indicate which toilets are occupied (or working) and in which parts of the train seats are still available.

Two major innovations have aided travel on urban and suburban rail networks:

- Smart card tickets may allow passengers to carry a pass covering a journey, line or number of zones, permitting unlimited travel for a period, or be pre-loaded with cash to allow Pay As You Go (PAYG) for individual journeys. A national smart card system, OV-chipkaart, now operates in the Netherlands.
- 'Contactless' payment, developed in London but being licenced to other cities, allows passengers to use a credit or debit card, or a mobile phone, to register the start and end of each journey and to pay in arrears.

However, PAYG systems require that passengers present their tickets at readers, or ticket barriers, at the start, and sometimes the end, of each journey. Where there is a culture that stations should be open, as in Germany, paper tickets remain the norm.

Provision of information raises a number of challenges for the industry and for regulatory bodies and competition authorities. For example:

- To establish a level playing field with other modes, timetable and pricing information needs to be available sufficiently far in advance for potential passengers to plan and book with confidence. Airlines typically offer booking one year ahead, but in the case of railways this may only be possible three months ahead.
- To establish a level playing field between rail operators, new entrants may need to be given non-discriminate access to booking platforms (and ticket offices and ticket machines) which have historically been controlled by the incumbent operator.

- To provide accurate real-time information on station information displays, websites and apps, one system (typically provided by the infrastructure manager) must have access to, and present, information on the services of all relevant railway undertakings.
- Where smart cards or PAYG systems are used, mechanisms are needed to identify, or estimate, on which service(s) the passenger travelled and to which operator(s) their fares should be allocated or apportioned, and to make the appropriate payments.
- With the exception of the Netherlands, smart card and PAYG systems tend to be confined to a city or region, rather than operating across a Member State.

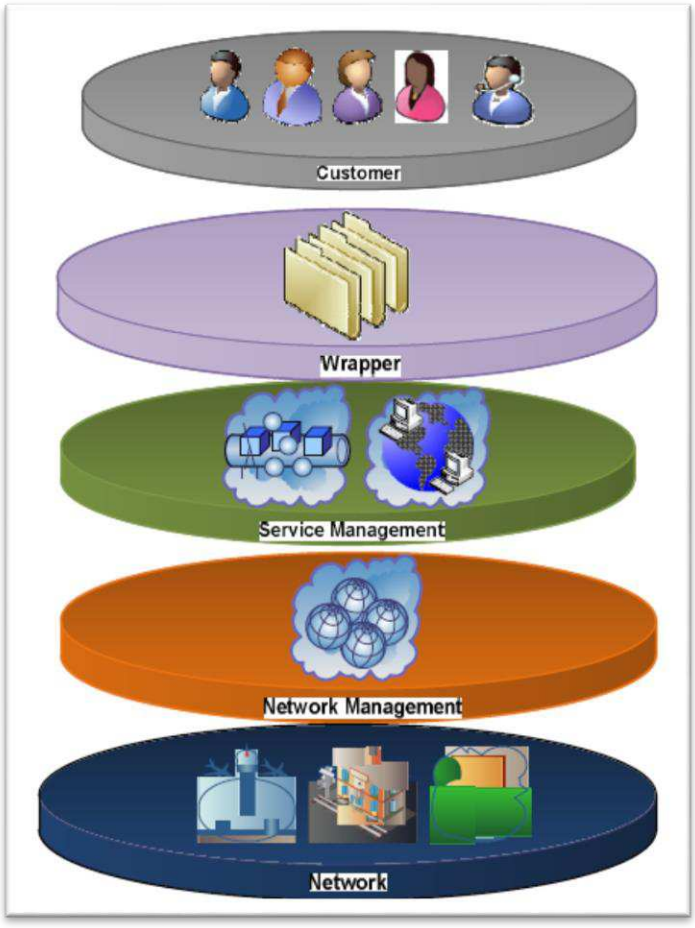
Provision of digitally-enhanced freight services

Digitalisation provides the opportunity for Railways to be a fully integrated multimodal component of the single EU transport area and the productive and logistic chains, from an administrative, contractual and operational point of view.

Such a transparent approach leads to the provision of improved products to the customers and total transparency on the means of transport used, up to freight operators to manage the door-to-door service.

It is increasingly important for rail to combine the full capacity provided by long block trains along the freight routes (starting from the Rail Freight Corridors), with flexible services (stop-and-go in automated terminals, thus overcoming the dichotomy single wagonload / full trainload.

Managing such services calls for a digital logistic management integrated in real-time with the Traffic (and Wagon/ITUs) Management System.



Enhanced multimodal integration for freight shall be pursued via electronic management of all the commercial elements: consignment content information, ownership and contractual and insurance-related.

Evolving towards red-tape free e-freight calls for a smooth interface of public registers with Distributed Ledger Technology (DLTs), such as the one used in blockchains, ensuring both transparency, traceability and encryption of sensitive data, thus ensuring secure/selective fully digitalised information flows and proceeding – including administrative and contractual ones.

Information gathering (both administrative and logistic-related) shall start from the port / entry point in the EU via multimodal digital interfaces, with the Logistic Single Window environment, with a multimodal EU-wide, single e-consignment note.

Smart train and goods real-time tracking and tracing requires an enhanced reliability of train services with a credible, tested ETA.

Digitalisation of rail services should be accompanied by a digitalisation of freight operations, enabling efficiency in energy (therefore CO_2 reduction) and capacity. Bringing electrification to the rail freight will also enable new digital technology to emerge, from automatic couplers to virtual coupling.

A rail freight system fully connected will allow further improvements with the managing of Big Data. Intelligence can be built around predictive maintenance, mobility management, and the creation of new smart services.

Business analytics coupled with Artificial Intelligence can provide reliable transport demand forecasts, therefore allowing the network to be used at its optimal capacity and cost efficiency.

4.9 Multimodal and intermodal transport

4.9.1 Combined transport

In November 2017, as part of the Second Mobility Package[80], the Commission adopted its proposal to amend Directive 92/106/EC (Combined Transport Directive[81]) with an aim to provide new and more effective support measures for modal shift. The proposed amendments would considerably increase the eligibility of intermodal operations (from 41.7% to 72.7%) for the support provided under the Directive and were assessed to bring along an additional modal shift to rail, inland waterways and short sea shipping of 69.9 billion tonne-kilometres in the period until 2030. For the rail sector, the most important amendments are the inclusion of national combined transport operations, the removal of a minimum distance for eligible rail legs and new economic support measures, including support for transhipment terminal building and encouragement for Member States to provide appropriate operational support for combined transport operations.

The proposal is currently in the ordinary legislative procedure with both the Council and the European Parliament discussing their amendments. The negotiations are expected to continue at least until mid-2019.

In addition, the CEF Transport 2018[82] call for proposals included a new priority for the support of investments in combined transport transhipment terminals that is aimed at supporting the amendments proposed by the Commission.

4.9.2 Internalisation of external costs

Providing the correct price signals and taking account of externalities is key for making the right modal choices and for any discussion on multi-modal transport.

As a first step, the Commission published in 2018 a case study analysis of the burden of taxation and charges on transport. It gathered information on taxes, charges and subsidies for twenty carefully selected representative routes for all modes of transport.

This prepared the ground for a more comprehensive study on the internalisation of external costs, which is ongoing and will allow to assess the extent to which the ‘user pays’ and ‘polluter pays’ principles are implemented in the EU countries and in other advanced economies. The study, called ‘Sustainable Transport Infrastructure Charging and Internalisation of Transport Externalities’, aims at

[80] https://ec.europa.eu/transport/modes/road/news/2017-11-08-driving-clean-mobility_en.

[81] Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between Member States, OJ L 368, 17.12.1992, p. 38–42

[82] https://ec.europa.eu/inea/sites/inea/files/2018_cef_transport_call_text_final.pdf.

assessing the current state-of-play of the extent of internalisation per mode and per country, and at identifying options for further internalisation and provide recommendations on possible applications. This will be achieved through an update of the handbook on external costs, a fresh analysis on the total and average external costs, an assessment and comparison of internalisation measures with external costs, as well as an assessment and comparison of infrastructure charges and infrastructure–related expenditure.

4.9.3 New tools, consignment notes and cargo and vehicle positioning

In logistics, one of the most important requirements of end customers (i.e. the actual shippers of goods) is the reliability of the transport services provided. In an ideal situation, this means on-time delivery according to schedule. As this cannot always be ensured, reliability of transport services also includes that shippers are constantly provided with reliable and up-to-date information about the estimated time of arrival (ETA) of their shipments. In addition to that, exchanging ETA information between all partners involved is a prerequisite for improving the operational efficiency within the logistics chain.

Digitalisation has a huge potential to generate and provide such information to end customers based on close cooperation of all actors in the logistics chain. In EU legislation, information exchange related to the provision of freight services by railway undertakings, including connections with other modes, is covered by the Technical Specifications for Interoperability on 'telematics applications for freight' (TAF TSI). TAF TSI provides a technical framework for data exchange but does not specify concrete systems and processes.

Implementing data exchange in practice is where the ELETA projects comes in. The project, launched by a consortium of 6 intermodal operators coordinated by the Royal Dutch Transport Federation, aims to demonstrate the practical benefits of exchanging ETA data, paving the way for a network-wide roll-out. The project was launched following the commitments and priorities identified by the railway sector in its 2016 declaration 'Boosting International Rail Freight'[83].

The project will implement data exchange for 12 existing intermodal trains as a pilot application, including all partners involved (terminals, intermodal operators, railway undertakings). The technical approach is based on the establishment of a communication channel between all partners, based on the existing, TAF-TSI compliant 'Train Information System', and the development of an integrated methodology to calculate ETA based on information provided by multiple partners. An impact assessment will estimate the benefits of a network-wide roll-out of ETA data exchange based on the experiences gained in the project.

More information about the ELETA project is available at the project:
http://www.uirr.com/projects/ongoing/item/21-electronic-exchange-of-eta-information/34-ongoing.html.

[83] Sector Statement on Rail Freight Corridors: 'Boosting International Rail Freight', Brussels, 20 May 2016, available at http://www.cer.be/sites/default/files/publication/Corridor_Sector_Statement_20160520_final.pdf.

5. The quality of rail services

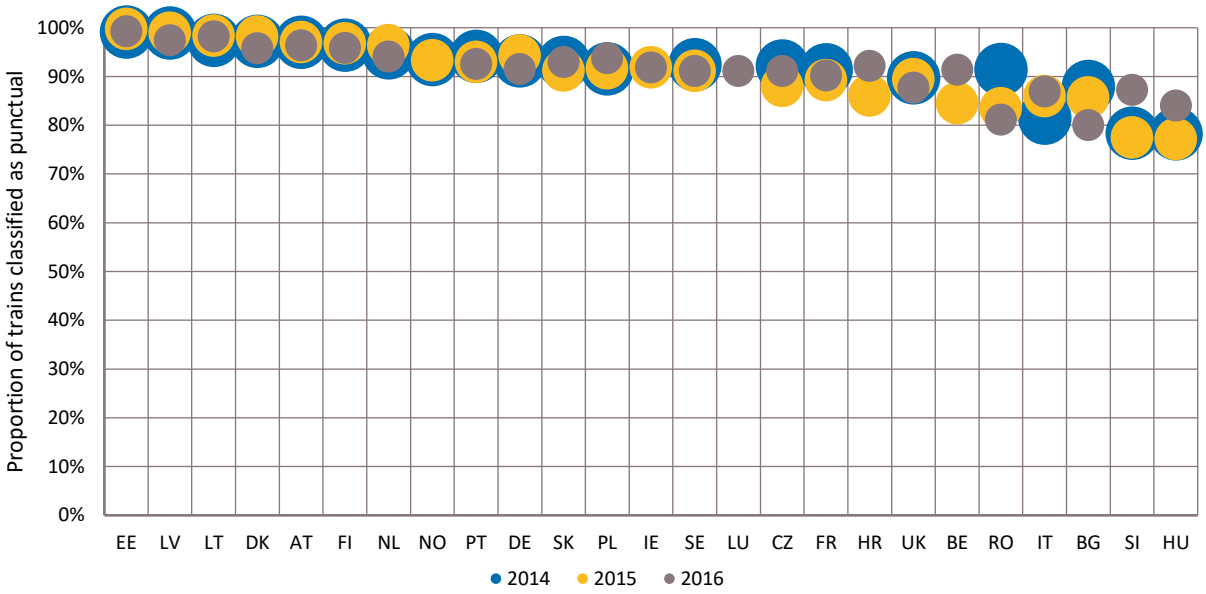
5.1 Punctuality and reliability of passenger services

Punctuality by category of services (regional/local, long-distance passenger services)

States were asked to report the proportion of passenger services arriving with a delay of 5 minutes or less, although arrival time is often checked only at the end of a journey and not at intermediate stations.

Figure 100 shows the reported punctuality of services classified as regional or local in each of the States in 2014, 2015 and 2016[84].

Figure 100: Punctuality of regional and local passenger services, 2014-2016



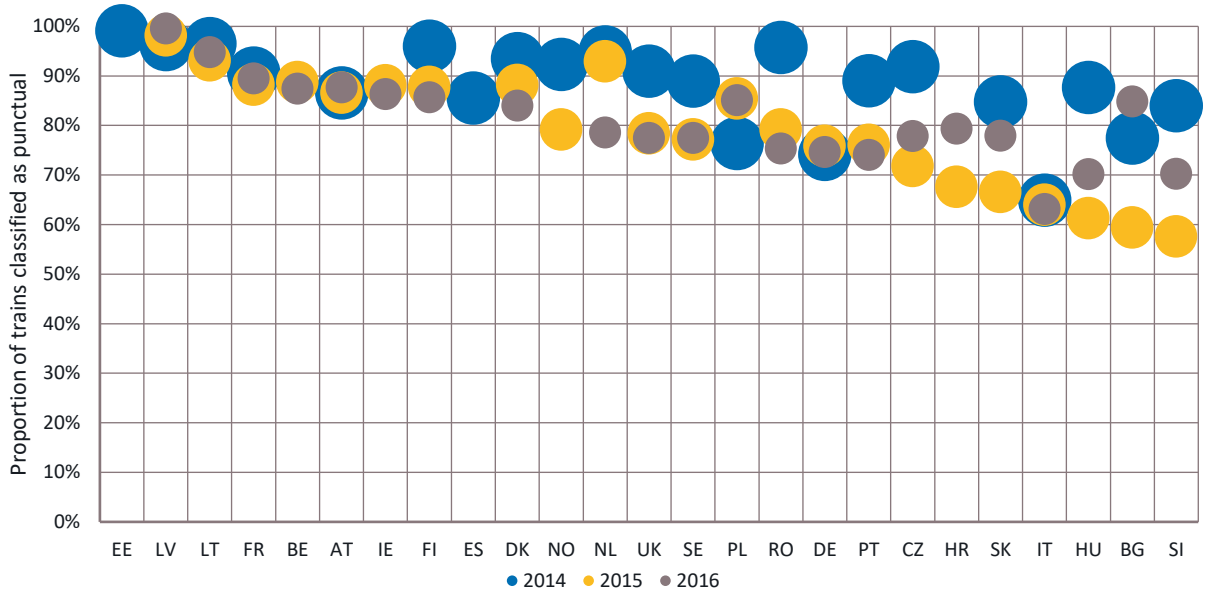
Source: RMMS, 2018. No data for ES, no reliable estimates for EL. No 2016 data for NO. No 2015 data for LU. No 2014 data for IE, LU, HR, BE.

On the definitions used, an average of 90% of passenger services were punctual. In 2016, punctuality was highest in the relatively small networks of the Baltic States, and worst in Bulgaria.

Figure 101 shows the reported punctuality of services classified as long-distance in each of the States in 2014, 2015 and 2016. Luxembourg does not classify any services as long-distance.

[84] According to RMMS, a train is defined as punctual if it is less than five minutes late, but definitions vary between States and types of service. For example, Germany reported that a train is defined as punctual if it is less than six minutes late (up to 5 minutes 59 seconds late).

Figure 101: Punctuality of long-distance passenger services, 2014-2016



Source: RMMS, 2018. No data for LU. No 2016 data for EE, NO, ES. No 2015 data for EE, ES. No 2014 data for BE, IE, E, HRL.

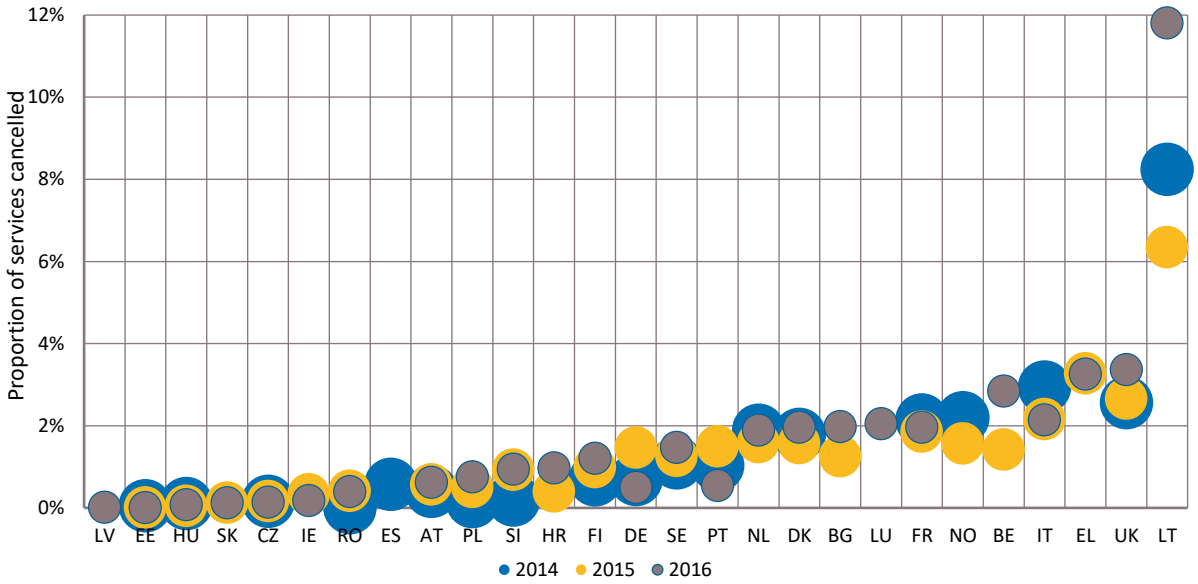
Long-distance services tend to be less punctual than regional and local passenger services, primarily because they operate over longer distances, and often over busier lines, and interact with a greater number of other services en route. On many networks, reported punctuality in 2015 and 2016 was lower than in 2014 This is due to a change in methodology – in 2014 the long-distance punctuality threshold was 15 minutes, while in 2015 it was lowered to 5 minutes – in line with the threshold applicable to local and regional services.

Reliability by category of service

States were asked to report the proportion of passenger services cancelled.

Figure 102 shows the reported proportion of services classified as regional or local which were cancelled, in each of the States in 2014, 2015 and 2016.

Figure 102: Reliability of regional and local passenger services, 2014-2016

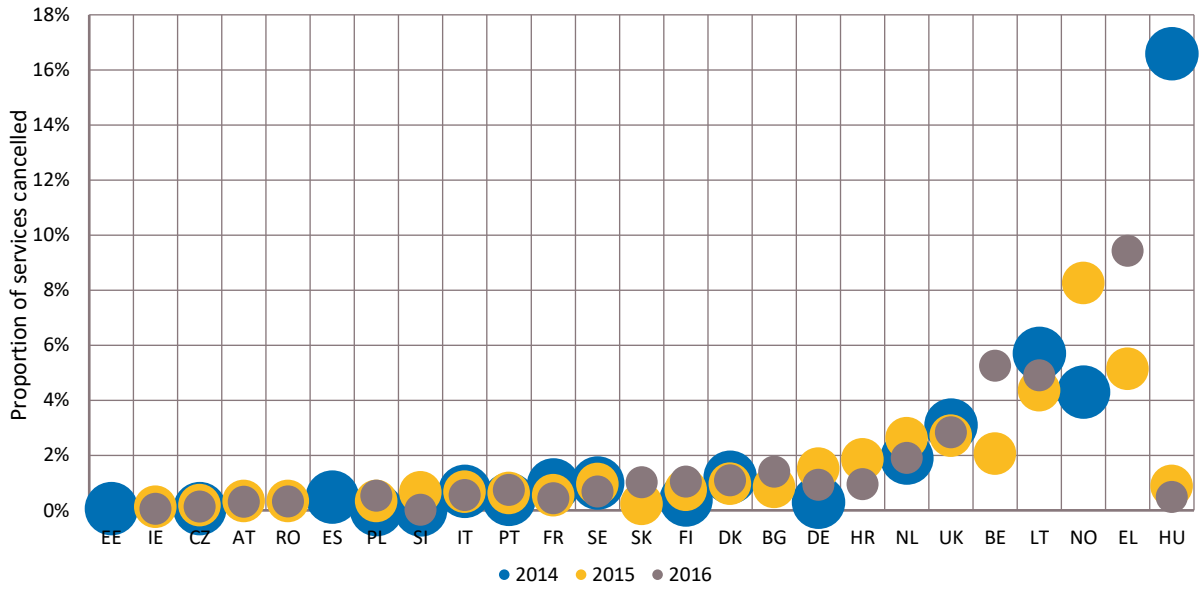


Source: RMMS, 2018. No 2016 data for NO, ES. No 2015 data for LU, LV, ES. No 2014 data for LU, LV, IE, BG, BE, EL, SK, HR.

Reported cancellation rates in 2016 were below 2% in most of the States.

Figure 103 shows the reported cancellation rates of services classified as long-distance in each of the States in 2014, 2015 and 2016. Luxembourg does not classify any services as long-distance.

Figure 103: Reliability of long-distance passenger services, 2014-2016



Source: RMMS, 2018. No data for LU, LV. No 2016 data for EE, ES, NO. No 2015 data for EE, ES. No 2014 data for IE, AT, RO, SK, BG, BE, EL, HR.

Greece, Norway, Lithuania, Belgium, the United Kingdom and Hungary all reported cancellation rates of over 3% in one or more years.

Box 18: Passenger Rights

Regulation (EC) No 1371/2007 on rail passengers' rights and obligations[85] (the Regulation) aims to protect rail passengers in the EU. It establishes passengers' rights to information, reservations and tickets, assistance, care and compensation in the event of delay or cancellation, free of charge assistance (for persons with disabilities and for persons with reduced mobility), compensation in the event of an accident, a quick and accessible system of complaint handling and full application and effective enforcement of EU law through national enforcement bodies (NEBs) designated by Member States.

The Regulation does not apply to all railway services: Member States may exempt urban, suburban and regional services from the application of the Regulation (apart from certain mandatory requirements). Domestic long-distance services can be exempted until 2024 at the latest.

The extensive use of these exemptions leading to a non-uniform application of the provisions was one of the main issues leading to a proposal for revision of the Regulation adopted by the Commission in September 2017. Other shortcomings were insufficient information for passengers and overall weak enforcement of the rules.

Under the proposed new rules domestic long-distance services will no longer be exempted from the Regulation, while Member States will be allowed to continue with exemptions of urban, suburban and regional services, except if they are provided across a border. The Commission's aim is also to further align rail passengers' rights with existing legislation on other transport modes, particularly as concerns non-discrimination, disability training, contingency planning, complaint-handling and enforcement. In the same spirit of consistency, the Commission proposed to introduce a new clause exempting rail companies from having to compensate passengers for delays due to force majeure circumstances, in line with the practices in other transport modes. In addition, the proposal strengthens the rights of persons with disabilities and of persons with reduced mobility. Member States will no longer be able to allow exemptions from the provision of assistance and compensation for damaged mobility equipment. Information must be provided in accessible formats in line with the requirements proposed in the European Accessibility Act. Rail staff will have to be trained accordingly.

5.2 Punctuality and reliability of freight services

Punctuality by category of services (domestic, international freight services)

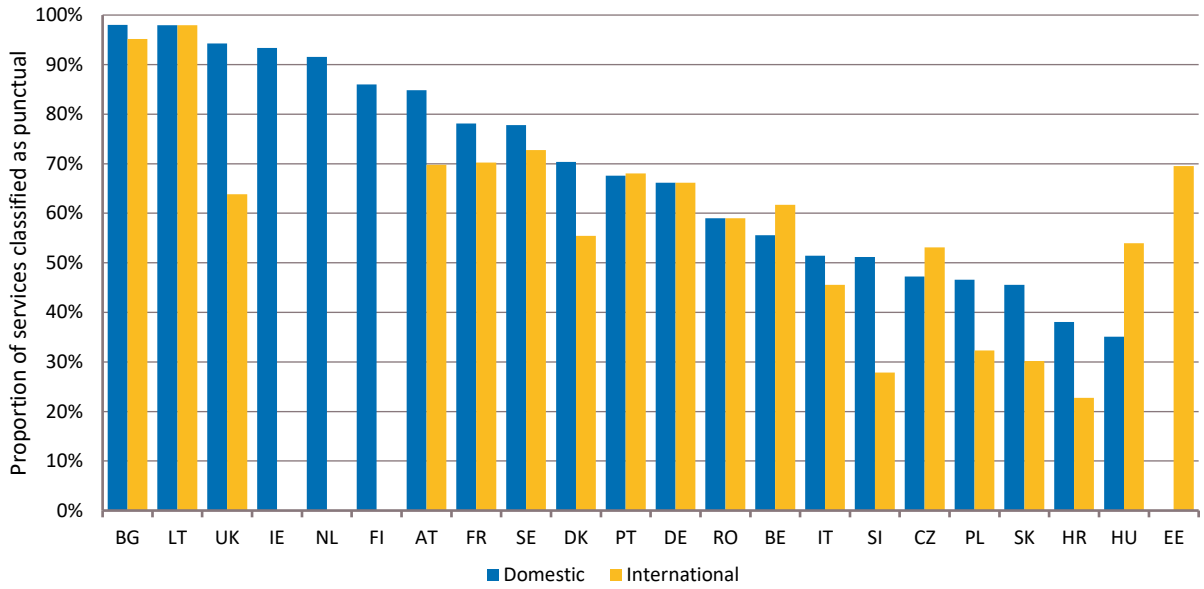
Since 2015, States have been asked to report on the performance of freight services.

Figure 104 shows the reported punctuality of domestic and international freight services in 2016[86]. On the definition used, on average 62% of freight services were classified as punctual.

[85] Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations (OJ L 315, 3.12.2007, p. 14).

[86] According to RMMS, freight services are defined as punctual if they arrive with a delay of 15 minutes or less.

Figure 104: Punctuality of domestic and international freight services, 2016



Source: RMMS, 2018. No data for EL, ES, LU, LV, NO. No domestic data for EE. No international data for IE, NL, FI.

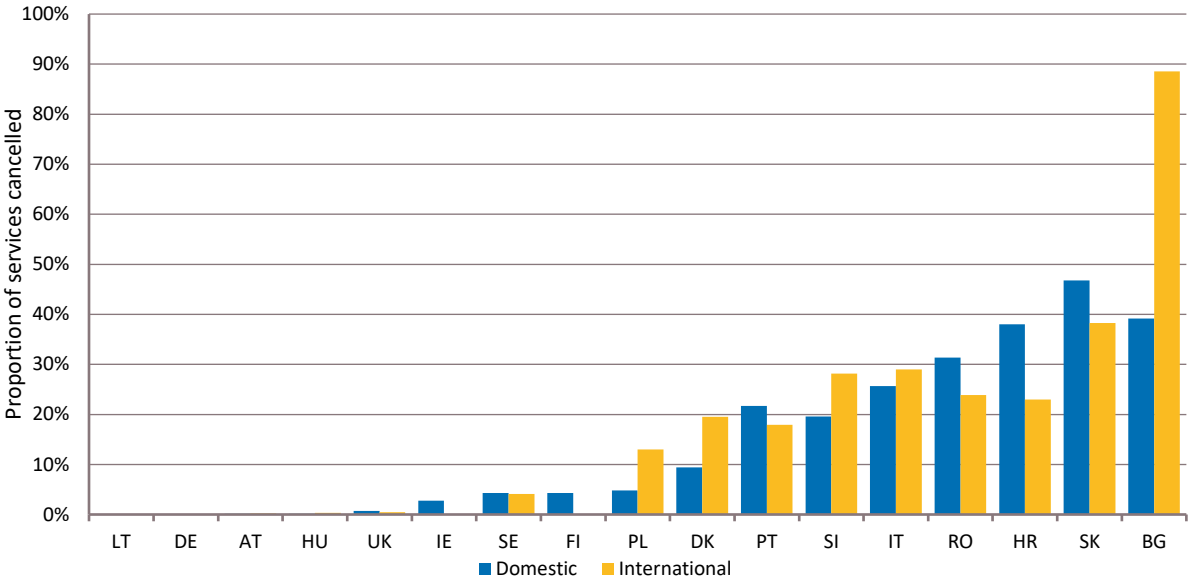
Most States reported that domestic freight services were more punctual than international services. This reflects the fact that international freight services travel over longer distances, may not be allocated a high priority, and can be subject to delays at borders which do not apply to domestic services.

Reliability by category of service

Since 2015, States were also asked to report the proportion of freight services cancelled.

Figure 105 shows the reported cancellation rates of domestic and international freight services in 2016. Not all States have this data available yet. In addition, assessment is not always straightforward because it is not easy to distinguish between the cancelled due to commercial reasons (i.e at the request of a customer) and rail related reasons. Therefore, further efforts need to be done to improve data quality and availability in this regard.

Figure 105: Reliability of domestic and international freight services, 2016

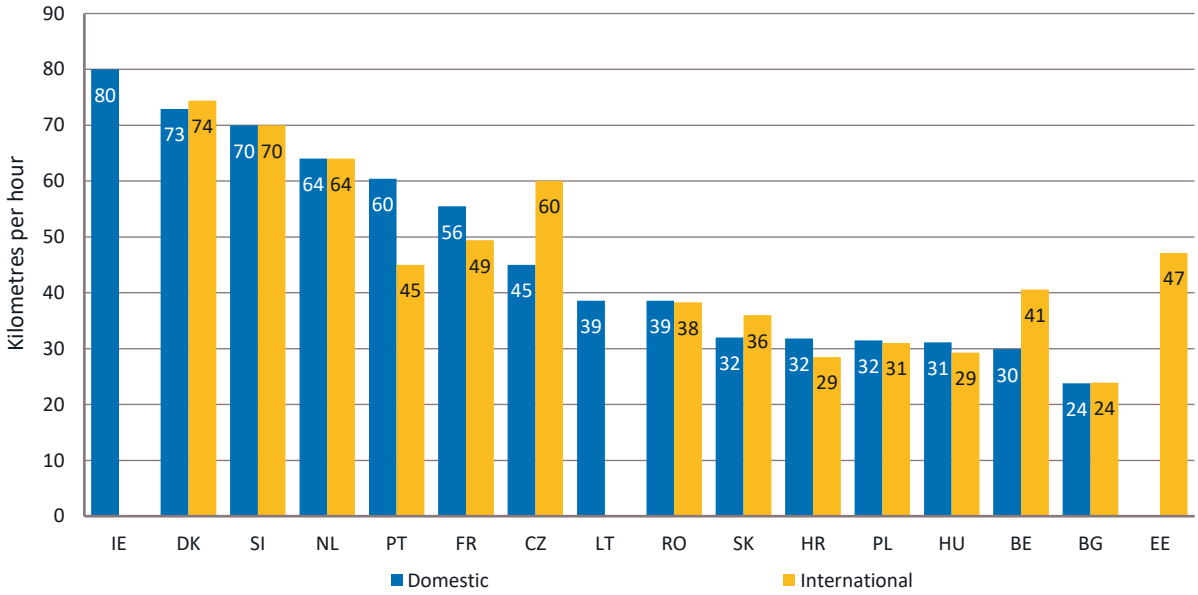


Source: RMMS, 2018. No data for BE, CZ, EE, EL, ES, FR, LU, LV, NL, NO. No international data for DE, IE, FI, LT.

Average timetabled speed of freight services

States were optionally asked to provide estimates of the averaged timetabled speed of domestic and international freight services. Figure 106 summarises the responses provided[87].

Figure 106: Average timetabled speed of freight services, 2016



Source: RMMS, 2018. No data for AT, DE, EL, ES, FI, IT, LU, LV, SE, UK, NO. No domestic data for EE. No international data for IE, LT.

While international freight trains were less punctual than domestic ones, their average speeds, at least within any given national network, were broadly similar, possibly because the same timetable

87 Optional in RMMS questionnaire.

paths may be used by either domestic or international freight trains. Figure 106 does not, however, show whether delays at crossing points between national networks materially reduce overall average speeds for international freight.

5.3 The role of regulators related to quality

Scope and responsibilities for the monitoring of quality of rail transport services differ across the Member States and Norway.

The Directive 2012/34/EU provides for Member States to supply to the Commission on an annual basis the necessary information on the evolution of framework conditions in the railway sector, including quality of rail transport services (Article 15(3)).

Directive 1371/2007 establishing rights and obligations for rail passenger service users states that railway undertakings should define, manage and monitor service quality standards for rail passenger services and that Member States must publish every year a report on their service quality performance together with their annual report. These reports must be available on the website of the Agency[88].

IRG-Rail published[89] a list of the main indicators of quality of rail services that are monitored by the independent bodies in charge of the enforcement of Regulation 1371/2007 (regulatory bodies or other institutions) in 24 Member States and Norway.

Unfortunately, these national indicators are not directly comparable, due to differences in the definitions of indicators to monitor (sometimes even between different responsible bodies in the same country). This is particularly true for delays.

Frequency of collection and publication of delays and cancellations also differs.

5.4 Safety

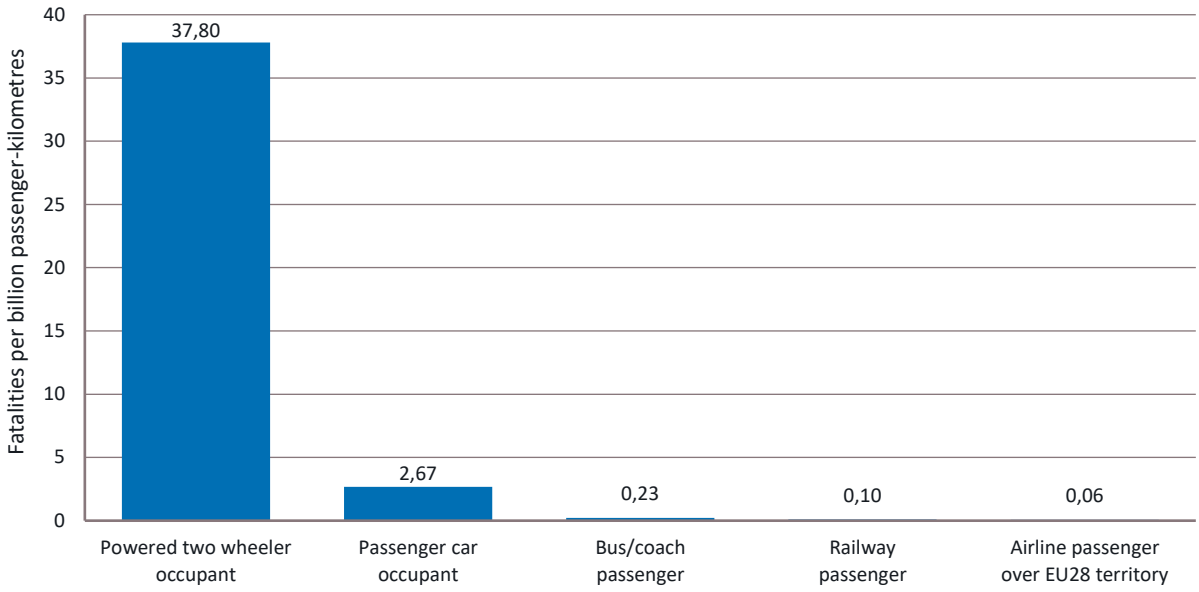
Safety remains a priority for the development of the Single European Railway Area. The recast of the Safety Directive included in the Fourth Railway Package (Directive 2016/798) provides for revised safety certification arrangements and migration to a single safety certificate. Instead of the current two-part system, a single safety certificate will be granted on the basis of a single application, to be valid in all Member States in which the railway undertaking operates.

The Agency will also become an EU-wide authority for safety certification of railway undertakings, while national safety authorities will continue to act as principal supervisors for railway undertakings and to issue safety authorisations for infrastructure managers. The Agency will have the power of monitoring activity, performance and organisation of the NSAs, to ensure alignment of criteria and procedures with those used by the Agency itself.

Rail is expected to remain one of the safest modes of travel. Figure 107 compares the risk of a fatal accident per billion passenger-kilometres for different modes.

[88] Available at https://eradis.era.europa.eu/interop_docs/ruSQPreports/default.aspx .
[89] IRG-Rail, Sixth Annual Market Monitoring Working Document, March 2018 (page 37).

Figure 107: Fatality risk of different transport modes, 2011-2015



Sources: ERA, "Report on Railway Safety and Interoperability in the EU", 2018[90].

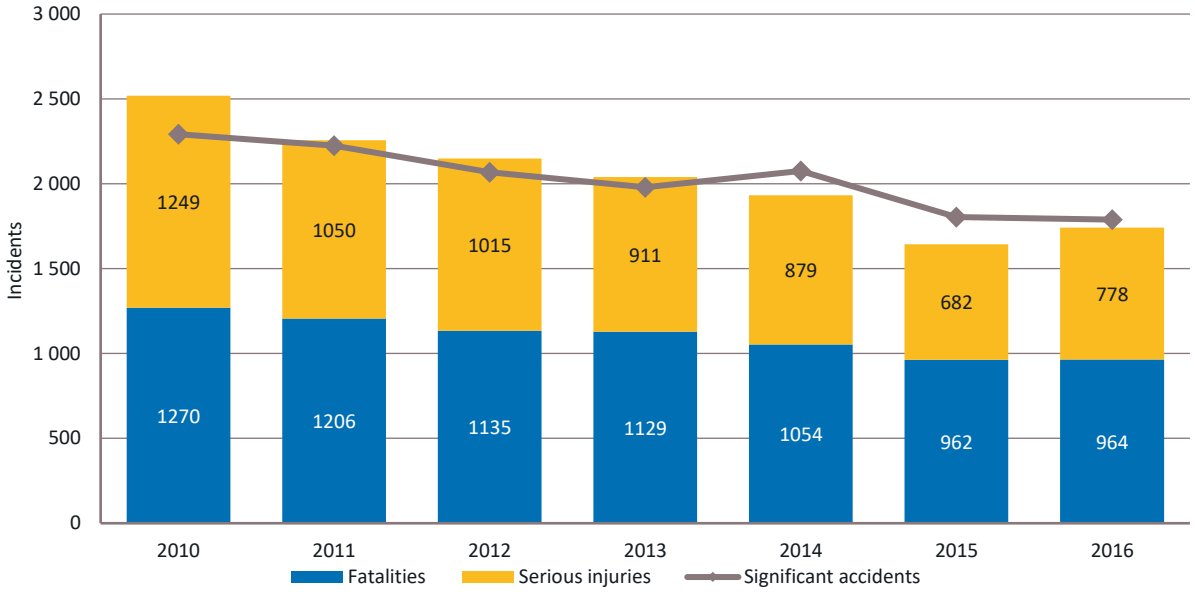
While rail travel is not as safe as air travel, it is nearly twice as safe as travelling in a bus or coach and around 25 times safer than travelling in a car.

Rail safety in Europe is managed at the operational level by both the individual Member States and the EU. Railway undertakings and infrastructure managers assess the risks associated with safe operations of trains and establish a Safety Management System (SMS). National Safety Authorities (NSAs) then assess the quality of SMSs before issuing safety certificates and safety authorisations to the operators and the infrastructure managers.

NSAs also have a legal obligation to report all significant accidents. National Investigation Bodies (NIB) must inform the Agency of the ongoing investigation, and send the final report to the Agency after the investigation is concluded. Figure 108 shows the number of significant accidents, fatalities and serious injuries over the period 2010 to 2016.

90 https://webgate.ec.europa.eu/multisite/era/sites/era/files/library/docs/safety_interoperability_progress_reports/railway_safety_and_interoperability_in_eu_2018_en.pdf

Figure 108: Significant rail accidents and resulting casualties, 2010-2016



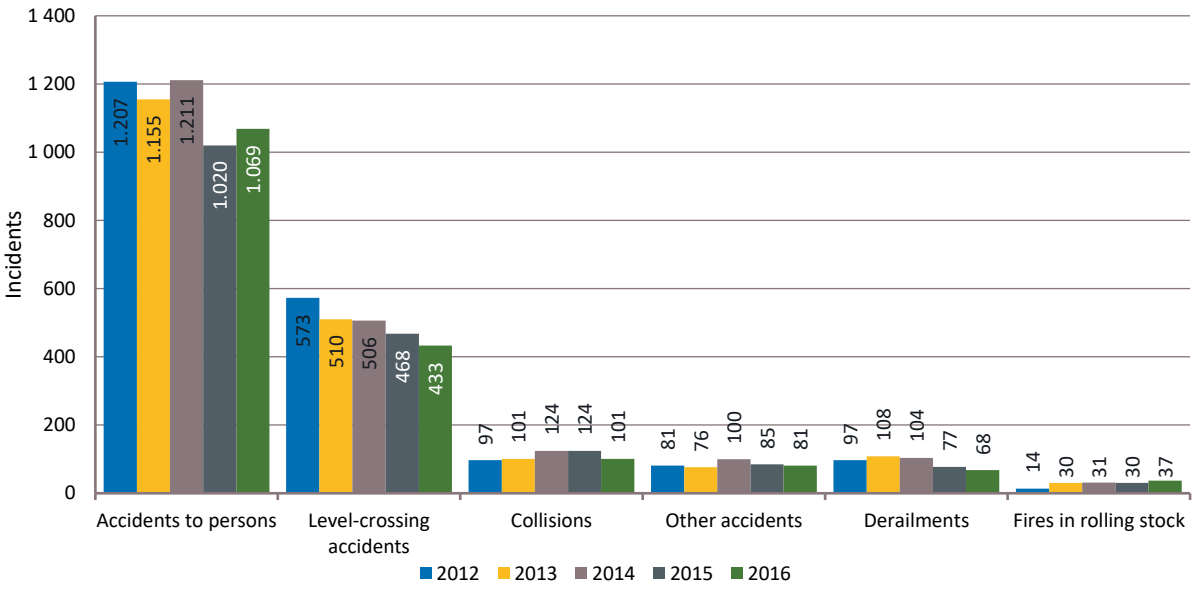
Source: ERA, "Report on Railway Safety and Interoperability in the EU", 2018.

There were 964 fatalities in 2016 in Europe: the majority of which of level crossing users (255 people) and unauthorised persons (600 people). The number of employee and passenger fatalities was 32 and 44, respectively. Continuous improvements in technology, systems and railway procedures have contributed to a trend decline in all three indicators over the period shown. Technologies such as ERTMS are expected to reduce accidents and casualties further as they are installed across more of the network.

Significant rail accidents by type of accident

Figure 109 subdivides the significant rail accidents shown in Figure 108 by type over the period 2012 to 2016.

Figure 109: Significant rail accidents by type of accident, 2012-2016



Source: ERA, "Report on Railway Safety and Interoperability in the EU", 2018.

Only a relatively small proportion of accidents relate to collisions, derailments or fires. Around 60% of significant accidents were accidents to persons caused by rolling stock in motion. Around 25% of significant accidents took place at level crossings, where they are commonly caused by intrusion of pedestrians or road vehicles onto the railway. Accidents at level crossings declined consistently throughout the period.

Box 19: The Safety Culture Twinning Programme

The Multi Annual Work Programme 2014 under the Connecting Europe Facility-CEF gave the Commission the opportunity to launch a Programme Support Action (PSA) implemented by means of a grant to support a twinning programme for management staff of rail infrastructure managers with safety responsibility. The objective of this PSA was to assist European rail infrastructure managers in sharing knowledge and best practice across railways to support new approaches to safety management.

The Twinning Programme was undertaken by a consortium of twelve EU infrastructure managers in 2017, with a final conference held in Birmingham in December to share the learnings of the exchange visits also with non-participants organisations (https://safety.networkrail.co.uk/safety/industry-groups/european-safety-culture-twinning-programme/). The members of the consortium were grouped according to matching criteria with a view to maximising the benefit and learning to be gained from experiencing the safety culture in each other's organisation. By working collaboratively for a period of time in a twin host organisation, participants were able to share information, challenges, good practice and innovation in safety processes, systems and culture.

Experiences and learnings focused on one or more of the following topics:

- safety management and behaviours;
- development of common principles for management of railway safety;
- occurrence reporting;
- transition towards a more mature safety culture; and
- implementation of safety culture and management, both within organisations and cross-border.

As participants pointed out, '*Different organisations must approach promotion of safety and a safety culture in different ways. There is no one path to success. However, there is a shared understanding that rules alone do not make railways safe. Success requires an embedded culture where every member of staff feels personally responsible, and more importantly, personally empowered, to promote safe working practices*'.

Source: EC, Twinning programme participants.

5.5 Satisfaction with rail services

5.5.1 Satisfaction with passenger services

In 2018 DG MOVE commissioned a Eurobarometer on Europeans' satisfaction with passenger rail services[91]. This survey follows a previous survey on this topic (Flash 382a) carried out in 2013[92], and covers the following areas:

- satisfaction with rail services including buying tickets and train stations;
- the importance of rail services, including getting information and handling complaints;

[91] Flash Eurobarometer 463 "Europeans' satisfaction with passenger rail services", September 2018, (http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/flash/surveyky/2172).

[92] Flash Eurobarometer 382a "Europeans' satisfaction with rail services", (http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/Survey/getSurveyDetail/instruments/FLASH/surveyKy/1111/p/2).

- satisfaction with the availability and reliability of trains and seats;
- satisfaction with the services on trains and their maintenance;
- satisfaction with various aspects of accessibility including the accessibility of stations and carriages, and assistance for persons with a disability or mobility issue; and
- the reasons for not travelling by train.

Rail travel is used most often for leisure activities (35% of rail travellers) or for going on holiday (23%).

Satisfaction with frequency, punctuality and reliability of trains is increasing, but there is still room for improvement. Two thirds of respondents (66%) are satisfied with the frequency of trains – an increase of seven percentage points since 2013. Despite an increase of four points since 2013, less than six in ten respondents are satisfied with the punctuality and reliability of railway travel (59%).

Satisfaction with other aspects of rail services has also increased since 2013, but problems with complaint-handling remain: only a minority (38%) are satisfied with easy and accessible complaint-handling mechanisms.

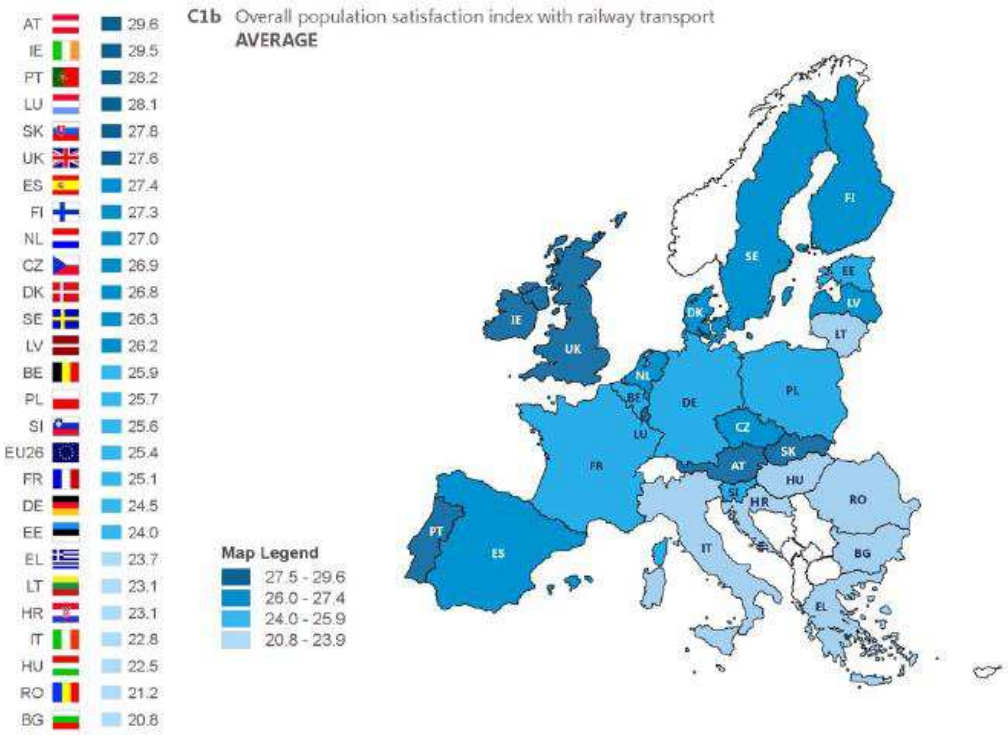
The respondents' views were also sought on the importance of additional services such as provision of information, cleanliness and ease of buying tickets. More than nine in ten respondents considered that the cleanliness and good maintenance of stations (94%), the provision of information about timetables and platforms (92%) or the ease of buying tickets (92%) were important.

Satisfaction with the accessibility of rail services for persons with reduced mobility is still problematic, but improving. Over half of all respondents (53%) are satisfied with the accessibility of stations or platforms – an increase of seven points since 2013. Less than half (41%) are satisfied with the assistance by railway or station staff for persons with disabilities or reduced mobility – an increase of four points since 2013.

Finally, when respondents identified specific reasons for not travelling by train, difficulties getting to the station was the most common reason reported by 16% of respondents, while 12% mentioned the inaccessibility of stations or platforms, and 10% mentioned the lack of pre-journey information about stations and accessible services. Fewer than one respondent in ten mentioned a lack of assistance by train or station staff (9%), inaccessibility of railway carriages (8%) or a lack of information (7%).

An overall satisfaction with railway transport index was created to rank together respondents' replies on satisfaction with rail services (getting information, getting tickets, complaint handlings and stations) and rail travel (frequency, punctuality, reliability, services and maintenance on the train). Respondents in Austria (29.6), Ireland (29.5), Portugal (28.2) and Luxembourg (28.1) have the highest overall railway satisfaction index, while those in Bulgaria (20.8), Romania (21.2) and Hungary (22.5) have the lowest.

Figure 110: Overall population satisfaction index with railway transport, 2018



Source: Flash Eurobarometer 463 on Europeans' satisfaction with passenger rail services, 2018.

Concerning comparison with other services, including transport services, DG JUST is publishing every two years the Consumer Markets Scoreboard (CMS)[93]. The CMS tracks the performance of over 40 markets (15 goods and 25 services markets), including railways, as assessed by consumers with recent purchasing experience. Findings from the CMS show that the railway market is a low performing services market, ranking only 21st of the 25 services markets considered. However, the overall Market Performance Indicator (MPI) score for the market for "Train services" has increased by 0.6 points from 2015 to 2017. In addition, the proportion of consumers who experienced problems has decreased since 2015, whilst remaining higher than average.

Furthermore, European consumers can seek advice and assistance from their national European Consumer Centre when they have an issue about a railway journey with a railway company from another Member State. Analysis of data from the European Consumer Centre[94] network collected in 2018 suggests that the most common reason rail passengers seek advice or assistance is because of delay (29%), followed by issues related to payment or terms and conditions of service (27.5%), and cancellations (22%).

5.5.2 Satisfaction with Rail Freight Corridors' services

As of today there is no regular quantitative survey of customers' satisfaction with rail freight services at EU level. Nevertheless, a wealth of qualitative information is provided by shippers as regards their requirements on transport and logistics services and by railway undertakings as regards their needs

[93] The 2018 edition of the CMS is available at https://ec.europa.eu/info/publications/consumer-markets-scoreboard_en , whilst the market reports from the Market Monitoring Survey, which constitutes the main statistical source for the CMS, are available here (see page 100 for the section on railways): https://ec.europa.eu/info/sites/info/files/mms2017_final_report_-_part_ii.pdf

[94] https://ec.europa.eu/info/live-work-travel-eu/consumers/resolve-your-consumer-complaint/european-consumer-centres-network_en#documents

for using rail infrastructure. This section provides a synthesis of such evidence the European Commission received from various sources such as position papers, open public consultation or contributions to discussions on international rail freight during conferences or workshops.

There seems to be a certain consensus on three priorities as regards customer satisfaction.

First, the issue of reliability is frequently raised as the single most important challenge rail freight faces today.

On-time delivery is essential for shippers as delays can have significant negative impacts on their operations and business. Rail is generally not perceived to be on par in this regard with its main competitor, road transport.

The lack of interoperability as well as operational issues are reported as particularly affecting reliability. The Rastatt incident is a good illustration of it: in August 2017, due to an incident during major engineering works, the Rhine valley line was interrupted, completely stopping traffic on one of the busiest rail freight corridors in Europe for seven weeks. The impacts of the event were compounded by the fact that the diversion of traffic to parallel lines in other Member States was not fully effective due to interoperability barriers. Disruptions of this scale are relatively rare but smaller, more frequent disruptions can have significant impacts as well. Customers emphasise the need to strengthen the resilience of the rail network based on appropriate divisionary routes, effective contingency management and, more generally, through a significant boost to operational flexibility stemming from a better interoperability of the European rail system.

In addition, a particular challenge perceived by customers is the phenomenon of cascading delays, in which a relatively limited initial delay leads to a much more significant delay at destination due to the inability of the rail system to address unplanned situations in a flexible manner.

Second, a closely related customer requirement is the provision of reliable shipment information, as a 100% punctuality cannot be expected in practice, even with substantial progress in terms of reliability. Providing shippers with tracking and tracing information and the estimated time of arrival is therefore an industry standard in logistics. However, rail customers state that they often do not receive such information for rail transport services, or that the quality of the information is not sufficient. This is particularly the case for intermodal transport involving rail legs where the complexity of operational arrangements (involving railway undertakings, terminals, intermodal operators, forwarders) creates challenges of technical, contractual and commercial nature.

Third, flexibility is another key area in which rail transport faces challenges according to shippers and railway undertakings. This is one of the key factors limiting the competitiveness of rail compared to road.

A lack of flexibility in operations and traffic management is considered by customers as one underlying cause for the perceived lack of reliability of rail freight services.

Another aspect of flexibility concerns the planning of rail freight transport. A key concern from the customer's perspective is the time needed to launch new transport services. Shippers expect a response time similar to road transport, where new services can generally be started within some days. For new rail services, according to customers the response time is of the order of months. This is partly due to the quite rigid rail timetabling procedures, but other factors may play a role as well.

In addition to these three key areas, customer satisfaction with rail freight services obviously depends on a number of other factors, such as transport costs, transit times and the availability of capacity. Here, the assessment by customers seems to vary significantly according to the specific requirements of different market segments and the region considered.

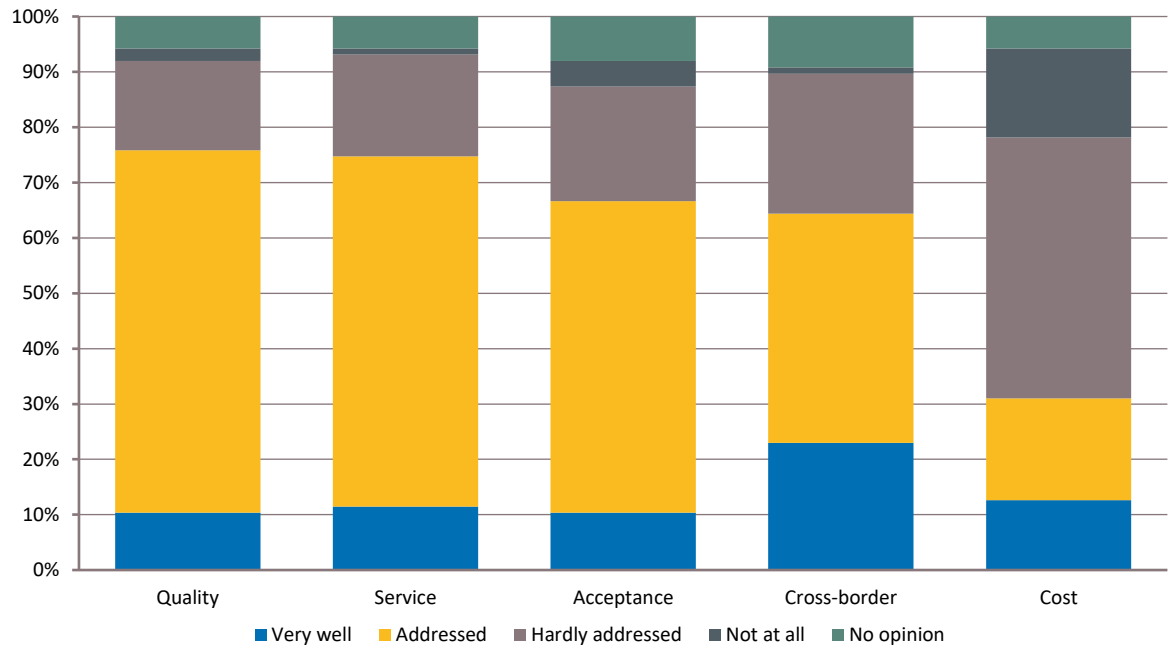
It is important to note that all the factors mentioned are closely interrelated.

For example, satisfaction with the cost of rail freight services involving high volumes and covering long distances between major freight hubs appears to be relatively high. The situation is more challenging for the transport of smaller volumes over shorter distances, particularly if complex last-mile operations are involved like with single wagonload. Likewise, transit times of rail services are considered too long in some market segments but do not seem to be a major concern in others. Regarding the availability of rail freight capacities, key issues raised by customers include a lack of links between rail and other modes (such as terminals and other last mile infrastructure), insufficient parameters of rail infrastructure, limiting notably intermodal services due to insufficient loading gauges, and a clear general national political tendency to favour passenger over freight transport, both in terms of operations and investments.

In the framework of the open public stakeholder consultation on Regulation (EU) 913/2010, concerning the Rail Freight Corridors, carried out in 2016, the contribution of RFCs to key challenges which rail freight faces were assessed by stakeholders. These involve quality, i.e. reliability and punctuality of the services, the cost of rail services, the introduction of new and innovative transport services, the acceptance of rail freight on a political and societal level, as well as the improvement of cross-border operations.

As Figure 111 shows, stakeholders are generally positive about the contribution of RFCs to improve rail freight services. Most stakeholders consider that RFCs address, or even address very well, most issues. The key exception concerns the cost challenge.

Figure 111: Stakeholders' assessment of RFCs' contribution to key rail freight challenges, 2016



Source: EC analysis of open public stakeholder consultation on Regulation (EU) 913/2010, 2016.

In conclusion, the satisfaction of the end-customers and railway undertakings can be described as mixed. The reliability, flexibility and quality of the rail freight services, as well as a smooth exchange of information, are the most important factors for end-customers for modal choice. All these are closely interrelated to the cost challenge rail freight is facing. However, the level of satisfaction varies substantially depending on the market segment considered. The evolution of such satisfaction would therefore need to be measured in a more systematic way in the future.

6. Performance of the railways

Given the monopolistic or semi-monopolistic nature of railways, there is broad acceptance that closer monitoring and managing of the performance of the sector would lead to efficiency improvements. However, the railway business is complex and multi-dimensional, and direct unconditional comparison between national systems is mostly meaningless. In addition, the variables influencing the different areas of rail performance are often beyond the control of a railway operator or infrastructure manager, depending on geopolitical factors, political priorities, past investment or viability of alternatives offered by other modes. For instance, performance in terms of cost per kilometre of a specific railway undertaking depends on many factors such as the scale of operations, mix between passenger/freight/high-speed/conventional/long-distance/commuter traffic as well as wage levels, maintenance backlogs and existing industrial agreements[95]. In addition, prices for passenger operations are often regulated or administered, and public policy plays a key role in setting investment priorities and specifying passenger sector outputs[96].

Therefore, this chapter does not aim to compare the performance of individual national railways, but provides instead an overview of major trends at EU level accompanied with snapshots of selected indicators (some of which have become available in RMMS only since 2015) at the national level. For deeper analysis and meaningful conclusions, longer time series and systematic analysis of contextual factors would be necessary.

6.1 Performance measured by main inputs and outputs

The main inputs to rail system besides funding and revenues are rolling stock and employees.

Box 20: Monitoring financial performance

Financial data, such as total costs and financial inputs (revenues, financing, subsidies) of the rail sector, are scarce and fragmented. Within the RMMS framework, since 2008 data have been collected on infrastructure investment and PSO compensation.

According to the new reporting framework established by the RMMS Regulation, Member States have to report also the revenues of the railway undertakings and main infrastructure managers. Acquiring the revenue data has proved being challenging, in particular for the freight railway undertakings in the conditions of open markets. Therefore, there were many gaps in the reported data during the first reporting year 2015. In 2016, the situation improved, but some problems remain.

Still, no data is collected on the costs of railway undertakings and infrastructure managers apart from maintenance costs.

Therefore, in this report no analysis of financial performance is provided. Below you can find a 2016 snapshot, which could serve as a basis for more advanced analysis in the future, when data availability has improved.

[95] European Transport Regulation Observer, May 2016, http://cadmus.eui.eu/bitstream/handle/1814/41844/FSR_Observer-2016-2.pdf?sequence=1&isAllowed=y

[96] A.S.J. Smith and C. Nash — Discussion Paper 2014-22 — © OECD/ITF 2014 5

Financial performance, 2016 nominal values

Financial inputs	
Passenger revenues*	64,5
Commercial fare-box	10,3
PSO fare-box	22,7
Not identified	13,3
PSO subsidy	18,3
Freight revenues**	24,1
Infrastructure subsidies	31,4
National	29,1
EU	2,3

Outputs	
Total volume (million train-kilometre)	4.134,6
Passenger volume (million passenger-kilometre)	450,0
Freight volume (million tonne-kilometre)	419,5
Length of track (thousand kilometre)	220,6

Financial input/output ratios	
Passenger revenues and subsidies per passenger-kilometre (EUR)	143,4
Freight revenues per tonne-kilometre (EUR)	57,5
Infrastructure subsidies per track kilometre (kEUR)	142,5

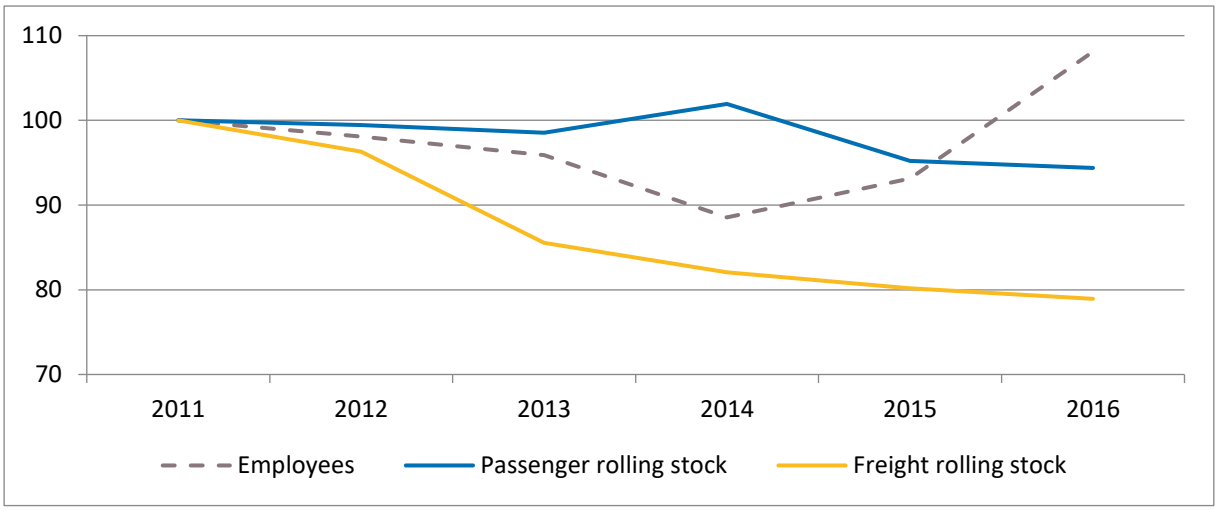
* *estimates for FR and NL*

** *estimates for FR and CZ*

Source: RMMS, 2018

Freight rolling stock fleet sizes (vehicles) appear to have been in decline since 2011. This may be due to changes in the characteristics of freight rolling stock, for example larger freight wagons, or economic effects such as asset disposal or stabling. Given that freight volumes still increase, it indicates productivity improvements. Passenger rolling stock fleet size is also declining but in a lower pace. Employment in the sector has been increasing quite significantly since 2014.

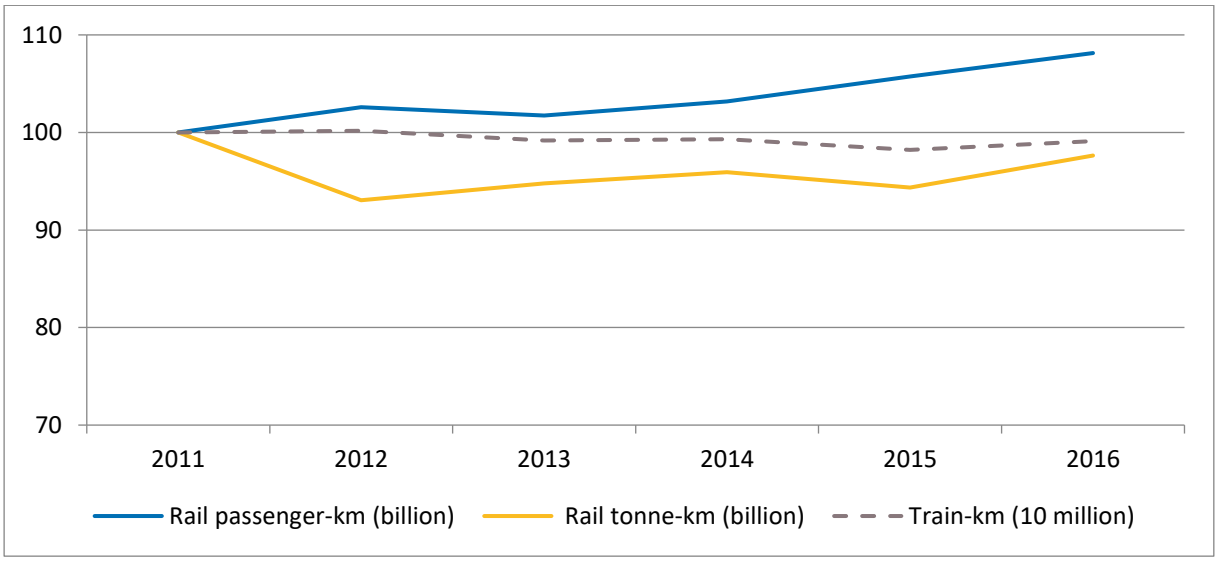
Figure 112: Trends in input indicators, 2011=100



Source: RMMS 2018, Statistical Pocketbook 2018.

Rail passenger outputs in terms of total train-kilometres (including both passenger and freight train movements) remained essentially stagnant. Rail freight outputs measured in tonne-kilometres have not reached yet the levels of 2011, while passenger output measured in passenger-kilometres has been constantly increasing since 2011.

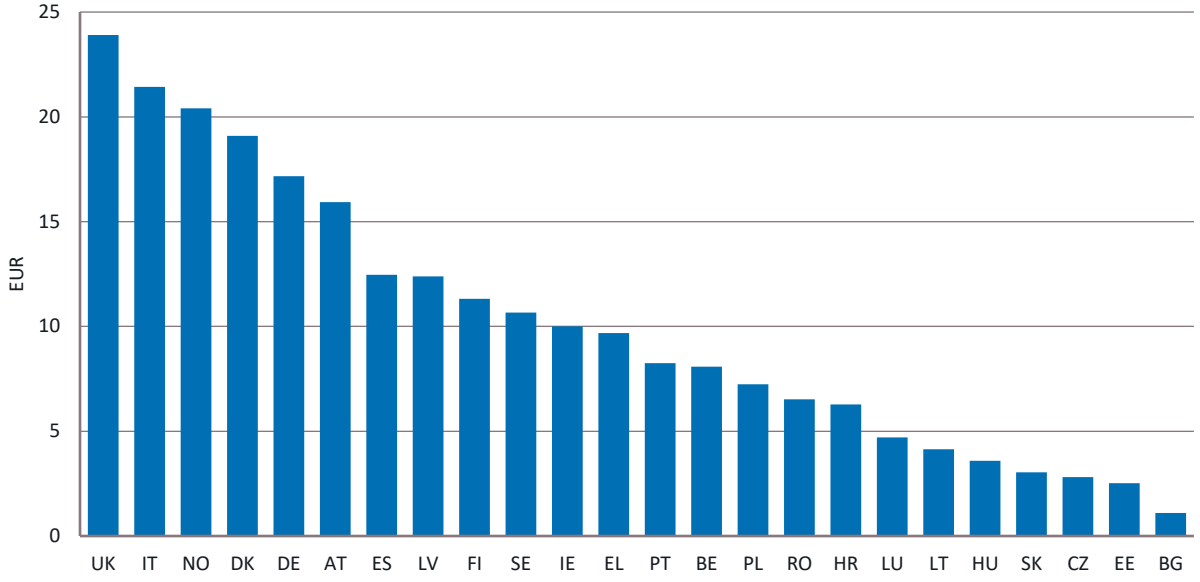
Figure 113: Trends in output indicators, 2011=100



Source: RMMS 2018, Statistical Pocketbook 2018.

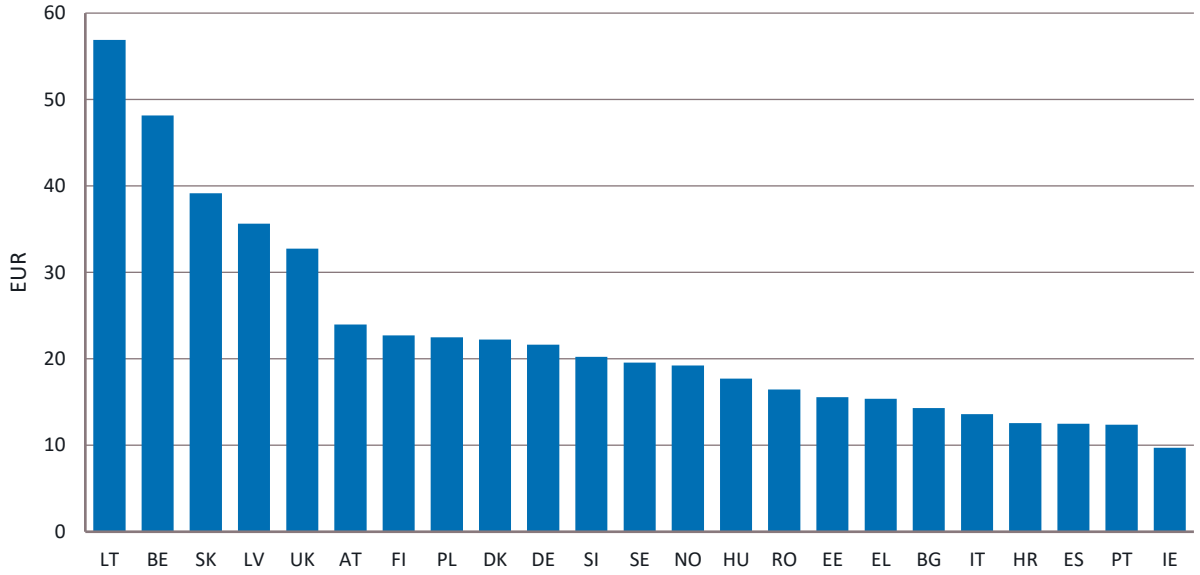
Figure 114 and Figure 115 show the financial performance of the rail sector, as measured by the revenues (including PSO compensation) per train-kilometre from passenger and freight activities, indicating striking differences

Figure 114: Average passenger revenue per passenger train-kilometre, 2016



Source: RMMS 2018. No data for FR, NL, SI.

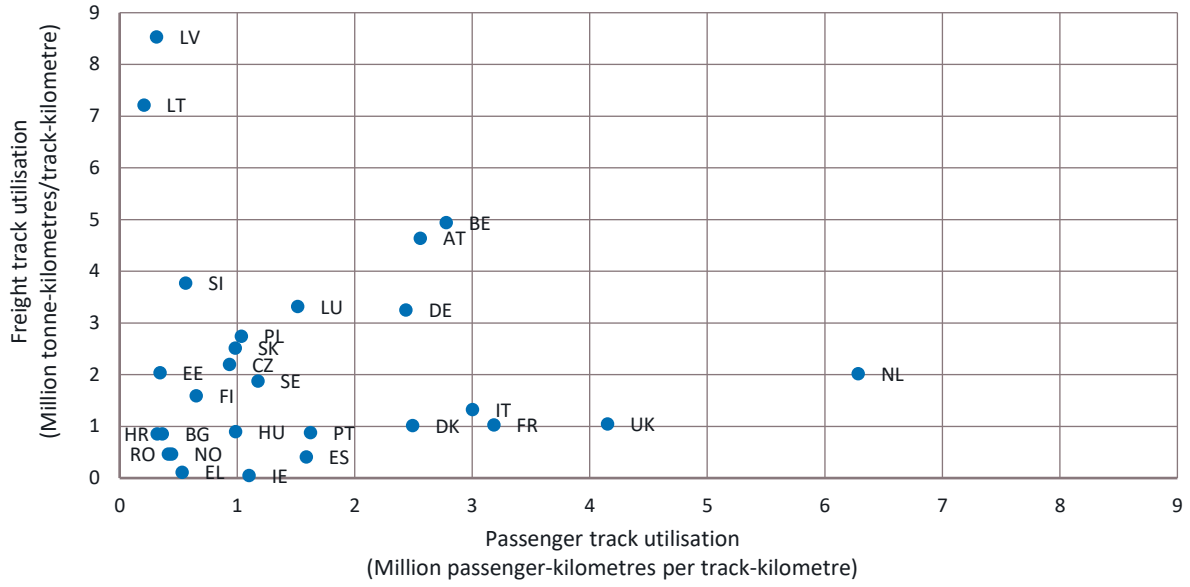
Figure 115: Average freight revenue per freight train-kilometre, 2016



Source: RMMS, 2018. No data for CZ, FR, LU, NL.

Figure 116 shows that the trade-off between freight and passenger track utilisation. Latvia and Lithuania record the highest level of freight track utilisation coupled with among the lowest passenger track utilisation. The Netherlands shows the specular utilisation of network, clearly specialised in passenger traffic, other mostly passenger oriented networks are in the United Kingdom, France, Italy and Denmark. Belgium, Austria and Germany have relatively good performance both in freight and passenger transport.

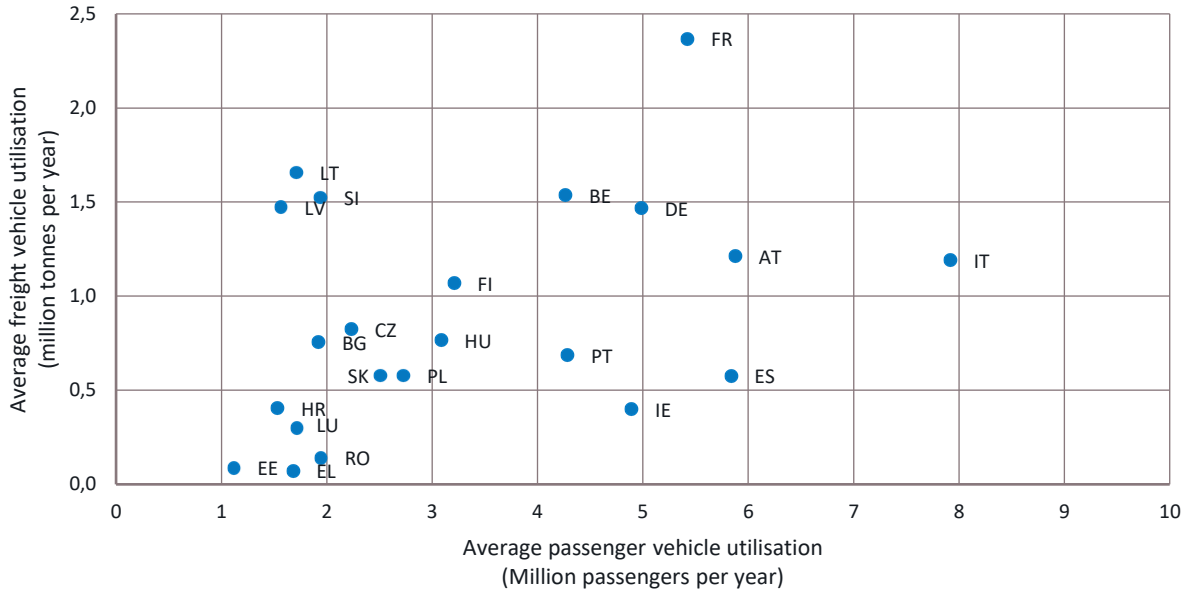
Figure 116: Passenger and freight track utilisation, 2016



Source: RMMS 2018, Eurostat.

The utilisation of passenger and freight vehicles is also another indicator

Figure 117: Passenger and freight vehicle utilisation, 2016



Source: RMMS, 2018. No data for DK, NL, SE, UK, NO.

Further comparing passenger and freight track utilisation with passenger and freight trains utilisation, Baltic States achieve lower passenger and freight train utilisation levels despite recoding among the highest track utilisation for freight. France, Italy and Austria perform relatively well both in terms of passenger and freight train utilisation levels.

6.2 The way forward for performance enhancement

Aiming at the development of a comprehensive performance culture in the sector, rail stakeholders have been working on this topic for many years. Several transnational working groups and fora,

including for instance UIC, RailNetEurope, the TEN-T core network and Rail Freight Corridors, PRIME and RU Dialogue, are currently engaged in discussions on performance enhancement. Also many sectoral reports are available to compare performance in various domains, for instance:

- PRIME KPI and Benchmarking Subgroup published its first Benchmarking report in July 2018[97]
- ERA Railway Safety and Interoperability in the EU 2018[98]
- RailNetEurope has developed and is publishing Key Performance Indicators of rail Freight Corridors99
- IRG Rail has developed a list of indicators for publishing on its website[100]
- BCG's 2017 European Railway Performance Index (RPI)[101]
- ProRail/NS international benchmark 2011-2015[102]

97 https://webgate.ec.europa.eu/multisite/primeinfrastructure/content/subgroups_en .

98 https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/railway_safety_and_interoperability_in_eu_2018_en.pdf

99 http://www.rne.eu/rail-freight-corridors/rfc-kpis/

100 https://www.irg-rail.eu/download/5/451/file.file

101 https://www.bcg.com/publications/2017/transportation-travel-tourism-2017-european-railway-performance-index.aspx

102 https://www.prorail.nl/sites/default/files/benchmark.pdf

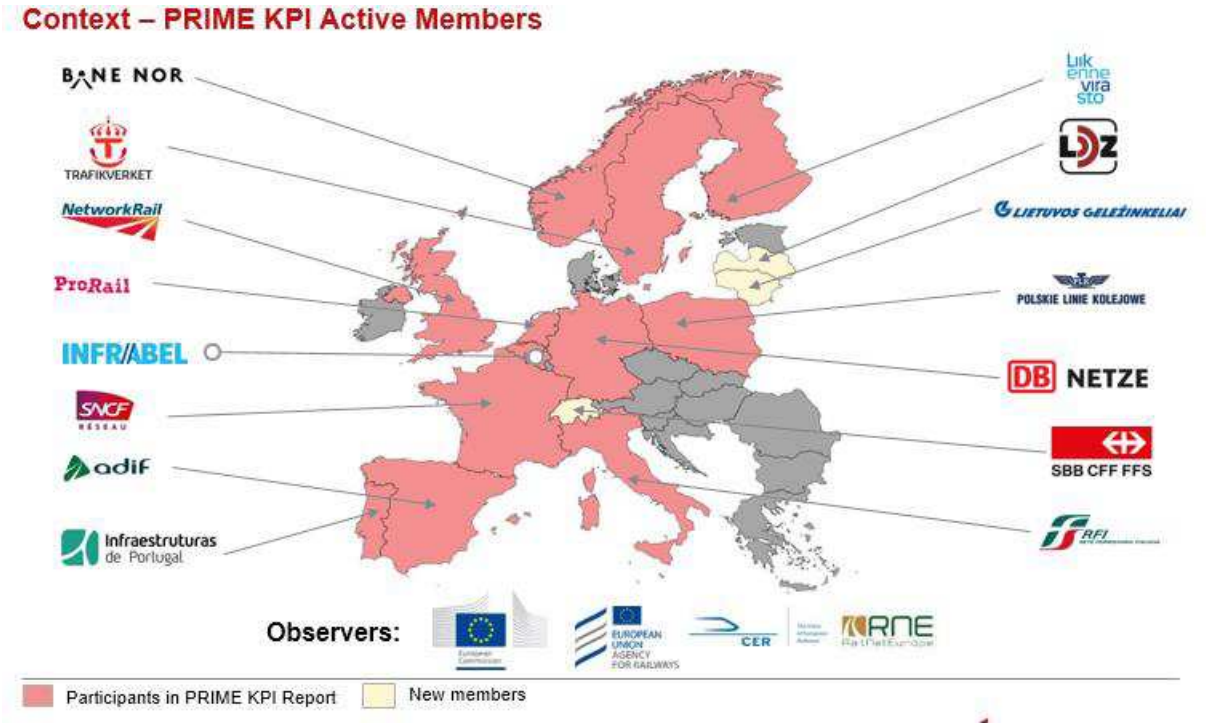
Box 21: PRIME KPI and Benchmarking Subgroup

PRIME was created in 2013 as a cooperation platform between the European Commission and the European Rail Infrastructure Managers, with the view to facilitate the provision of efficient and effective rail services. Exchange of best practices and performance benchmarking are the formal tasks of PRIME (Platform of Rail Infrastructure Managers in Europe) who has since 2017 undertaken the role of the European Network of Infrastructure Managers as foreseen in the 4th Railway Package.

Its KPI subgroup was set up with the goal to monitor and benchmark performance and by doing so to strive for better results. The group has identified a number of objectives and corresponding benefits which can be achieved through a benchmarking comparison of KPIs and exchange of best practices:

- Share information, knowledge and practice between railway infrastructure managers (IMs) and learn from each other in order to improve performance and business development
- Share the results with the public can support engagement with key stakeholders:
    - Data can be used to support negotiations with public authorities and trade unions, and it can also be used for engagement with regulators
    - Provides evidence to monitor whether national or EU policies are working or not
    - Is a communication tool vis-à-vis customers and business partners to indicate trends
- A further important outcome of the PRIME KPI work is a good quality, comparable and easily accessible dataset.

Performance Benchmarking covers several dimensions of rail infrastructure management: punctuality, costs, resilience, sustainable development, safety, etc. Each organisation comes with its own history as well as often different governance and financing models. Therefore, there is no single measure of success that can be imposed, but there is always room for improvement.



After four years of preparatory work, the group delivered its first benchmarking report in July 2018 covering the years 2012-2016 for 12 infrastructure managers. This first report presents in a factual manner the results across 35 indicators. It serves as a starting point for further data sharing and analysis. As indicated in the document, for some indicators, the data of individual infrastructure managers are still not available or deviate from agreed definitions, but the members continue their efforts to improve the comparability of data. The report and KPI definitions, which are documented in a PRIME KPI Catalogue, is available here:

https://webgate.ec.europa.eu/multisite/primeinfrastructure/content/subgroups_en

For the future, the group intends to increase data availability - both KPIs and participants - and provide reports with in 'depth analysis' identifying trends and best practice. The goal is to give information and fruit for thought to stakeholders, researchers, economists and politicians. Above all, the general objective for the project is to deliver insight and inspiration for better decisions on developing a sustainable and competitive infrastructure management which provides high quality services, as expected by operators, passengers and freight companies.

Source: EC, PRIME KPI subgroup

Most of these reports do not cover financial indicators due the lack of comprehensive data.

The Commission is acting as an intermediary between the various initiatives with the aim of harmonising indicators and eliminating overlaps in data collection. It is also working closely with national rail regulatory bodies who are responsible for monitoring developments in rail market in accordance with Directive 2012/34/EU.

7. Conclusions

EU railways continue to grow, with passenger volumes in particular increasing significantly between 2011 and 2016. However, freight volumes remain volatile and led to a loss of modal share in comparison with road transport in 2016. At the same time, rail markets are gradually opening up and safety levels remain high. The industry is gradually becoming more performance-based, innovative and responsive to customer needs.

Rail is an important contributor to EU transport mix, providing clean mobility and a high level of efficiency. While the satisfaction of Europeans with passenger rail services has increased compared to 5 years ago, there is still room for improvement on passenger rights. The negotiations with legislators on the Commission's 2017 proposal to revise Regulation (EC) 1371/2007[103] on rail passengers' rights and obligations are still ongoing.

These developments have occurred against a background of substantial change within the industry, which has been driven by the structural changes initiated by EU legislation more than 20 years ago and concluded by the adoption of the Fourth Railway Package in 2016. Implementation of the package's technical pillar from June 2019 will further improve interoperability between national rail networks. It will also cut red tape for operations beyond one single Member State and strengthening the role of the European Union Agency for Railways. The market pillar completes the opening of domestic markets as of December 2019 and imposes the principle of competitive tendering as the rule for public service contracts in the EU by December 2023 at the latest, with direct award only allowed in exceptional cases.

The Commission has continued to work on implementing measures necessary for effective market functioning. It is now focusing on enforcement, ensuring that both pillars of the package are transposed and implemented correctly and that implementing acts are adopted and complied with.

On the rail freight's struggle to grow modal share, the international nature of these services makes them sensitive to interoperability barriers and cross-border coordination issues. To tackle the situation, the Commission is pursuing an agenda of complementary initiatives and measures. The Commission's long-standing policy of achieving interoperability (including the efficient and coordinated deployment of ERTMS) has been strengthened recently, with the focus on solving practical cross-border operational issues.

The Commission's infrastructure development policy in the form of the Trans-European Transport Network (TEN-T) policy aims to improve infrastructure by addressing bottlenecks and missing links. Under the next financial period, the Commission has proposed to use Connecting Europe Facility 2, Cohesion Fund, European Regional Development Fund and InvestEU financial support to speed up also rail digitalisation. To help the rail industry access finance, the Commission is developing a methodology to assess the green components in rail projects under its action plan on sustainable finance[104].

The rail freight corridors remain a key part of the Commission's policy to boost rail freight. The Rail Freight Regulation[105] and Train Drivers Directive[106] are still being evaluated. To bolster rail freight, in

[103] Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations, OJ L 315, 3.12.2007, p. 14–41.

[104] https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth_en

[105] Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight, OJ L 276, 20.10.2010, p. 22–32

November 2017 the Commission proposed amending Combined Transport Directive 92/106/EC[107] as part of its second mobility package to provide new and more effective support measures for shifting freight from road to rail.

These key policies are accompanied by efforts to tackle the issue of rail noise, to better embed rail in the multimodal transport system by deploying digital technologies and to foster innovation, particularly by way of the activities of the Shift2Rail[108] joint undertaking.

Furthermore, rail cannot be considered in isolation from other modes: its competitiveness also depends on the framework for intermodal competition. This is why the Commission is striving for equal conditions for intermodal competition, such as through the mobility package including the amendment of the Eurovignette Directive[109]. The Commission has also commissioned a comprehensive study on the internalisation of external costs in transport. This will help it to assess the extent to which the 'user pays' and 'polluter pays' principles are implemented in the Member States for all modes of transport.

Reliable monitoring of the rail market remains a priority to be able to follow market developments and to benchmark performance.

106 Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community, OJ L 315, 3.12.2007, p. 51–78

107 Council Directive 92/106/EEC of 7 December 1992 on the establishment of common rules for certain types of combined transport of goods between Member States, OJ L 368, 17.12.1992, p. 38.

108 https://shift2rail.org/

109 https://ec.europa.eu/transport/modes/road/news/2017-05-31-europe-on-the-move_en