

# REGIONAL AND SUBURBAN RAILWAYS

## MARKET ANALYSIS UPDATE



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# 1. EXECUTIVE SUMMARY

The previous Strategic Rail Research Agendas (SRRAs) produced by ERRAC, the European Rail Research Advisory Council, were based on business scenarios targeting a time horizon for 2020. These scenarios have been produced in 2002 and 2007. They are partially outdated and they need to be revised within the current Coordination and Support Action of ERRAC called FOSTER RAIL, by taking also into account the new target date to be considered on the basis on the additional information available: 2050.

The task “Update of the suburban and regional (passenger) rail market analysis” is making an update of the work performed for the first time in 2005 by UITP on behalf of ERRAC (and published in 2006). This task is based on a survey and desk research, and its objective is to get an accurate overview of the importance of regional railway in Europe.

This study presents the results collected in 2014 and 2015. It provides a definition of regional and suburban railways (RSR) and a picture of this business field. This ERRAC suburban and regional railway market study **confirms the critical importance of regional and suburban railways in the EU, which account for 90% of total railway passengers and 50% of passenger-kilometres. Regional and suburban trains carry as much passengers as all metros in Europe and 10 times more passengers than air travel.**

This market is nearly entirely governed by Public Service Obligation contracts between governments (mainly at infra-national level) and operators. The Lion's share of the service production is still in the hands of the large incumbent operators, even in countries where liberalisation is well advanced (Germany, Nordic countries...). The only exceptions are UK and Poland.

It is currently an opening market in several European countries and the current final discussions around the political pillar of the 4th Railway Package will largely determine the course of evolution for the coming decade. It is also a challenging public transport market, notably for ensuring sustainable urban mobility, encouraging modal shift from private car and decongesting transport corridors providing access to major European cities.



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## 4. DESCRIPTION OF THE STUDY

This document is the final report produced within the FOSTER RAIL project, focusing on the “Update of the suburban and regional (passenger) rail market analysis” which had been performed by UITP in 2005-2006 on behalf of ERRAC and led to the ERRAC publication “Suburban and Regional Railways Landscape in Europe” published in November 2006<sup>4</sup>. This deliverable provides an overview of the survey launched in October 2013 to collect information on the main features of the “suburban and regional railway” market. This rail market segment is:

- the most important from the business perspective for the operators, due to the volumes of passengers at stake;
- one of the most promising in terms of potential development and alternative to private car (in line with EC White Paper<sup>5</sup> perspective) for trips of the daily life between suburban areas and city centres (commuter and regional travel);
- one of the most fragile in terms of financial sustainability due to its high dependence on public funding: these services are operated under public service contracts following public service requirements, and they are often replaced by coach or bus services even if such services are less sustainable than rail services; this issue shall become even more challenging in the near future with the wider opening of coach services in EU;
- perhaps the most challenging from a technological point of view: a lot of upgrades and changes will be witnessed in this segment, not least due to the fact that this is the overlapping point between the mainline and urban rail domains
- one of the most fragmented which does not facilitate the data collection with a view towards technical harmonization of the characteristics of such rail systems.

The deliverable presents the core findings in following order:

- Company landscape and profile
- Staff
- Supply data
- Demand data
- Network and infrastructure
- Fleet

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<sup>4</sup> as part of an FP6 research project called ERRAC SSA.

<sup>5</sup> EC White paper 2011: Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system.

# 5. GENERAL METHODOLOGICAL REMARKS

Most information was sourced from desk research. Considerable amount of sources (over 160 reports and websites), both of European/international scope and of national scope were consulted and analysed. The full list of references is available under Section 9.

Primary official source of information were used: official studies and annual reports from operating companies, railway regulators, infrastructure managers, ministries of transport and national statistical offices.

Only the 26 Member States (excl. Malta and Cyprus which do not have railways) and 2 EFTA countries (Norway and Switzerland) were included in the study. Contrary to the previous study, no feedback from candidate countries was available and the decision was taken to concentrate the efforts without them.

Nevertheless, meaningful comparison with 2005 results will be possible as the study had been presented with 4 clusters of countries (EU-15, new Member States, EFTA and EU candidates).

The main methodological challenge was to be able to find the most objective set of criteria to make a distinction among general business data of those representing the segment of regional and suburban railways. In most cases passenger railway business is not singled out in reports. In some case even, there is no distinction between passenger and freight information. Details of the figure sources are available under Section 9. Methodological assumptions by countries are available upon request. Expert opinion and multiple scenario construction had to be widely used.





# 6. RESULTS AND ANALYSIS

Regional and suburban railways are not very well, nor consistently, defined in all countries. In larger countries, large national railway tend to reflect the distinction long-distance / regional services (DB Regio / DB Fernverkehr; SNCF Transilien / TER; RENFE Cercanías y regionales...). However, in most countries railway operation is not organised in different subsidiaries or business units and activities are reported “en bloc” without clear distinction. Smaller railway companies operate and run services on the basis of contracts with regional entities and are therefore easy to allocate to regional and suburban services.

In order to clarify the situation, the Regional and Suburban Railway Committee of UITP discussed, and proposed an update of the definition of this market segment which was adopted in October 2014:

*Regional and Suburban Railways are passenger services in and around conurbations and regions.*

- *Such services are mostly organised along Public Service Obligation (PSO) arrangements, generally contracted by an infra-national government level (Region, Land, Province, Canton, Voivodeship...)*
- *The services typically feature the following characteristics:*
  - *Average distance between stations : 1-25 km*
  - *Commercial speed : 40-60 km/h*
  - *Typical one-way passenger trip time : <1 hour*
  - *A high proportion of staffless stations : >50%*
  - *Regional railways can run (partially) on single track*

European available statistics through e.g. Eurostat or CER do generally little justice to the specific segment of regional and suburban railways: they cover mainline railways and large national companies. This report will provide a clearer and more detailed depiction of this fragmented market of regional railways.

## 6.1 COMPANY PROFILE AND RELATIONSHIP WITH AUTHORITIES

### 6.1.1 Number of Suburban and Regional Rail Operating Companies in Europe

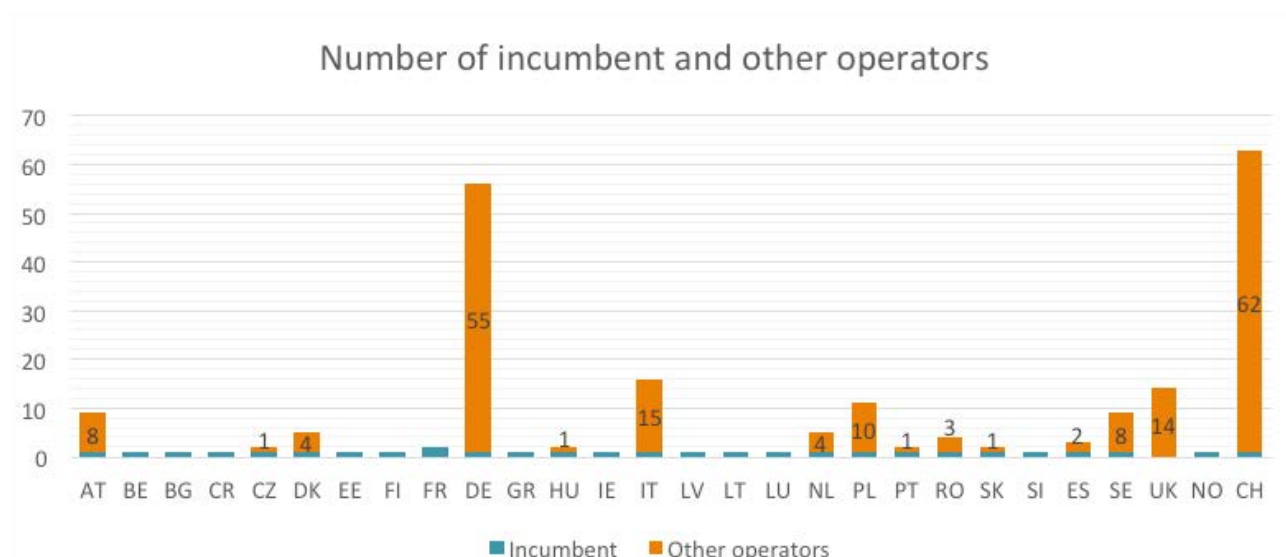
There are currently 217 passenger railway companies in the 28 European countries surveyed (26 Member States, excl. Malta and Cyprus, and EFTA countries Norway and Switzerland). This reflects a stable situation since the previous 2005 study (220).

In countries where many companies active in regional railways are wholly owned by the same railway operator, they had been counted as one company. This is the case for Deutsche Bahn (24 companies reporting to the business unit “Personenverkehr/DB Regio”), SNCF (20 regional “TER” + Ile de France), RENFE (15 regional divisions and 11 “Cercanías” divisions), etc. In the UK however, the basic reference unit was the franchise, even though a company can operate several franchises (e.g. First Group or National Express Group).

A more detailed observation revealed that over 80% of this significant number is largely resulting from the sum of companies in only 7 countries: Germany (56), Italy (16), UK (14), Switzerland (63), Poland (11), Sweden (9) and Austria (9). Some of these countries have a long tradition of decentralisation/ federalism or late centralisation. The remaining 21 countries account for just 39 companies, with 12 countries still featuring one single rail service supplier (at least for regional and suburban passenger services).

## 6.1.2 Incumbents versus Other Operators

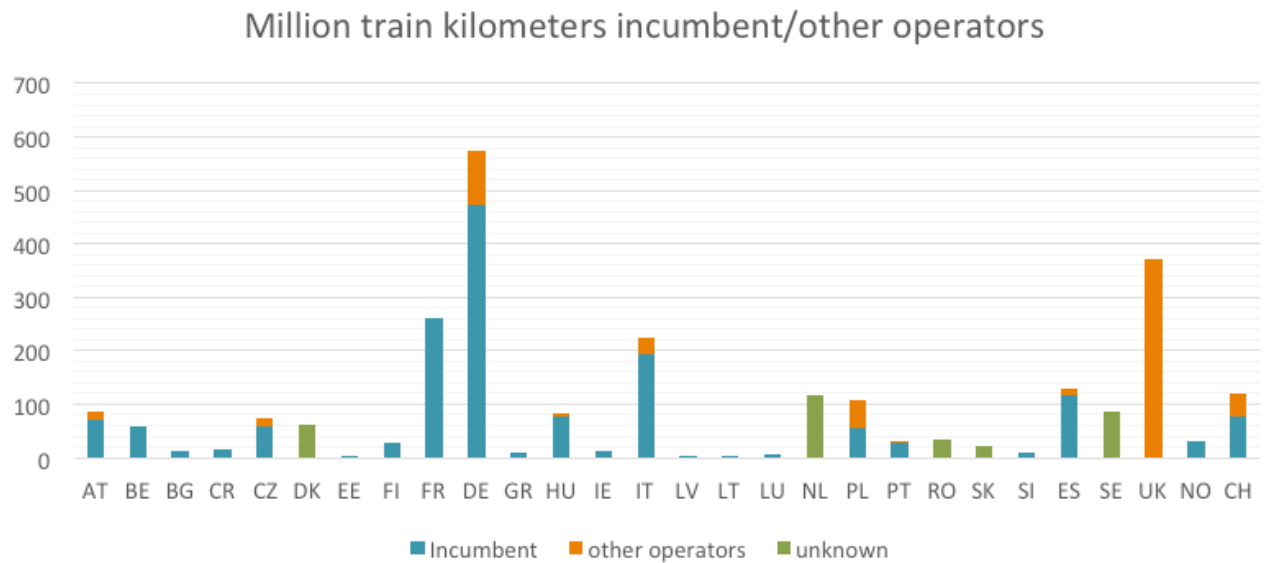
For a clear terminology, ‘other operators’ is used instead of the more widely used ‘new entrants’ to avoid confusion about the nature of the non-incumbent companies. For instance, many rail companies in Switzerland or Germany have existed for decades, and companies like FGC and Euskotren in Spain are not quite new entrants. For the incumbent companies, only state-owned companies (in the sense of owned by the central government) are counted, not those owned by infra-national/regional public entities. In France, this results in RATP<sup>6</sup> also being considered as incumbent.



**CHART 1.** Number of incumbent and other operators

In about slightly more than half of the countries included in the survey, regional and/or suburban rail passenger services are provided by more than one railway operator. At the time of FOSTER RAIL proposal preparation stage (2012), a number of countries were preparing for a rail services restructuring including introduction of regional railways and therefore an increased number of railway undertakings was expected. However the slower than expected pace of progress of the 4th Railway Package was not conducive to faster reforms and there is on-going, but very slow change towards the establishment of a more competitive environment in the passenger rail services sector.

<sup>6</sup> The main public operator in the Paris – Ile-de-France region.



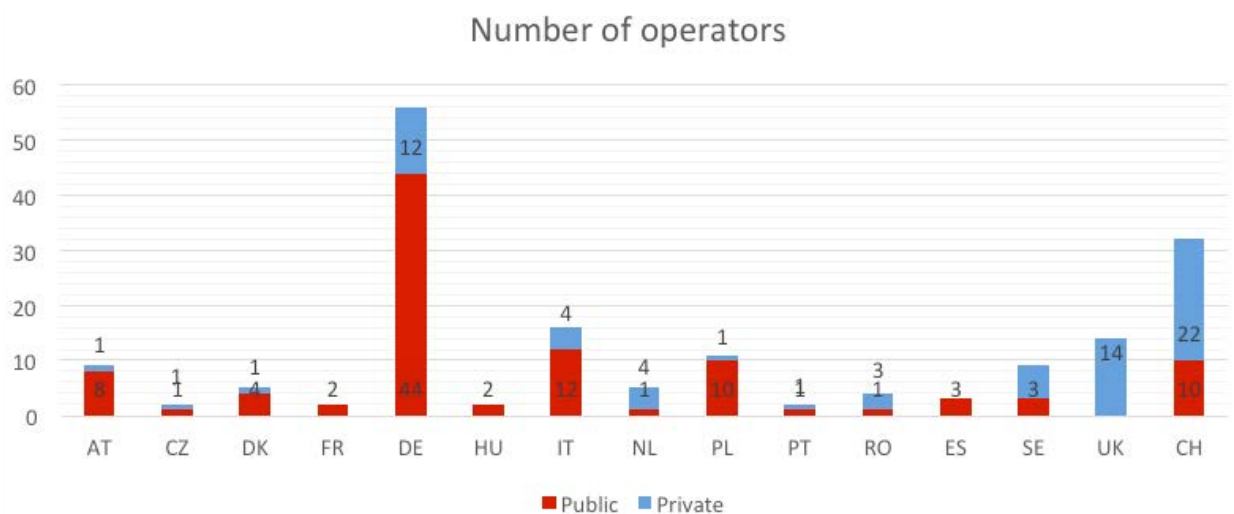
**CHART 2.** Million train kilometres incumbent/other operators

In the multiple operator countries, the lion's share of rail service production (expressed in train-km) is still provided by the incumbent, as chart 2 illustrates (62% of total production). Except for the UK, where there are no longer any incumbent, Poland -and Switzerland to a lesser extent- are the only countries with significant proportion of the production ensured by "other operators".

### 6.1.3 Ownership of the Assets of the Company

Most passenger railway operators are publicly owned (145/217), meaning that their shareholders is either the national government (defined above as "incumbent companies") or one or various sub-national government(s). However, the distinction public vs. private is blurred, as a number of operators generally described as "private" are subsidiaries of larger public companies (e.g. Arriva belonging to DB, Keolis with SNCF as majority shareholder, etc.). Except in UK, truly privately run railway services are rarer, certainly than in freight operation.

For Switzerland, a number of operators could not clearly be determined as public or private.



**CHART 3.** Number of public/private operators

## 6.1.4 Public Service Contract:

(Definition: Contract with public service requirements and subsidies paid to the operators to offset relevant operation deficit. This contract can be awarded directly (DA) by negotiation or following an open call for tenders (CFT). In some occurrence, an operator may deliver the service on behalf of another operator who has the contract (sub-contracting – SC)

Regional and Suburban railway services are mainly governed by so-called public service obligation (PSO) contracts between a government (mostly at regional level) or an awarding public body – the “competent authority” – and the operator. An attempt was made to verify this from available data. As it would be very time consuming and difficult to run through dozens of contractual agreements in all surveyed countries, an attempt was made to qualify regional and suburban railways service as PSO or not.

Table1 compares the percentage of total train-km per country which is governed by PSO according to European Rail Market Monitoring System (RMMS) report with the proportion of train-km of regional and suburban railways.

Except for Austria and Italy, the percentage of PSO train kilometres is consistently higher than the percentage of regional/suburban train kilometres. This confirms the expectations that, as a dominating pattern in most countries, nearly all regional trains run exclusively under public service contract.



**TABLE 1.** Comparison between the percentage of PSO and regional train-km

	%PSO TKM (RMMS)	%REGIONAL TKM
AT	66,0%	87,6%
BE	100,0%	78,6%
BG	85,0%	62,8%
CZ	88,0%	60,9%
DK	96,0%	84,1%
EE	100,0%	100,0%
FI	90,0%	56,7%
FR	64,0%	62,2%
DE	82,0%	80,1%
GR	100,0%	84,7%
HU	98,0%	90,7%
IE	100,0%	60,2%
IT	62,0%	82,7%
LV	90,0%	68,4%
LT	91,0%	71,8%
LU	100,0%	100,0%
NL	100,0%	80,2%
PL	91,0%	80,5%
RO	88,0%	62,7%
SK	97,0%	70,9%
SI	100,0%	100,0%
ES	96,0%	71,4%
UK	97,0%	70,0%
NO	73,0%	78,5%

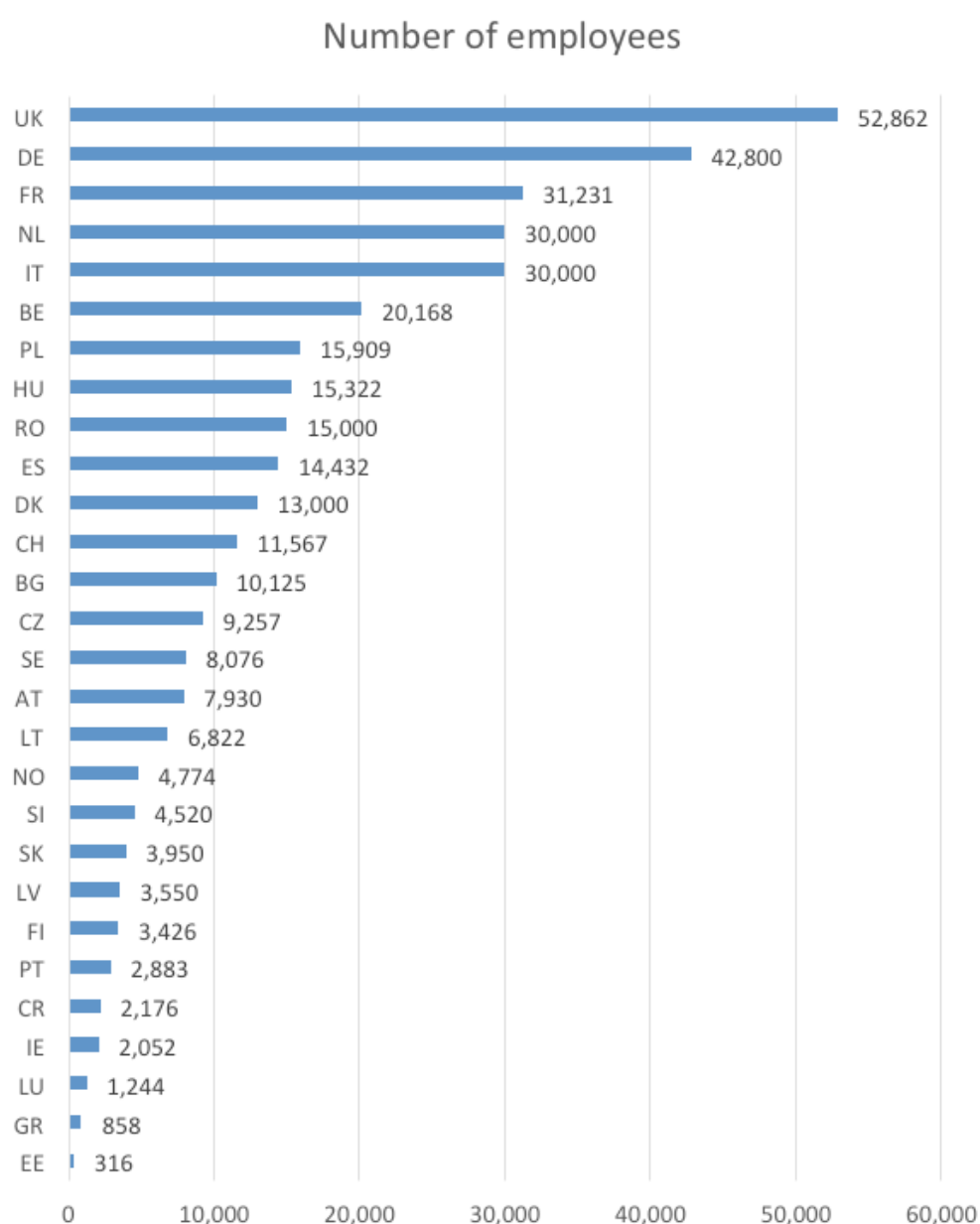
## 6.2 STAFF

(Definition: The number of full time equivalent staff employed for the operation of the passenger railway service (excl. staff devoted to infrastructure duties))

Regional and Suburban passenger railway operators in Europe employ roughly 364 000 staff, quite stable with 2005 figures. This made up roughly a third of the 1,2 million people employed in the rail sector in these countries. However, it excludes personnel involved in infrastructure activities or in the rest of the supply chain.

More than 85% of the staff are employed in the large national/incumbent companies.

In some countries, information on the proportion of staff working for regional and suburban railways were not available. Detailed investigation and bi-lateral exchange helped clarifying the figures. However, it is not excluded that the figures feature some degree of heterogeneity and should be taken with caution.



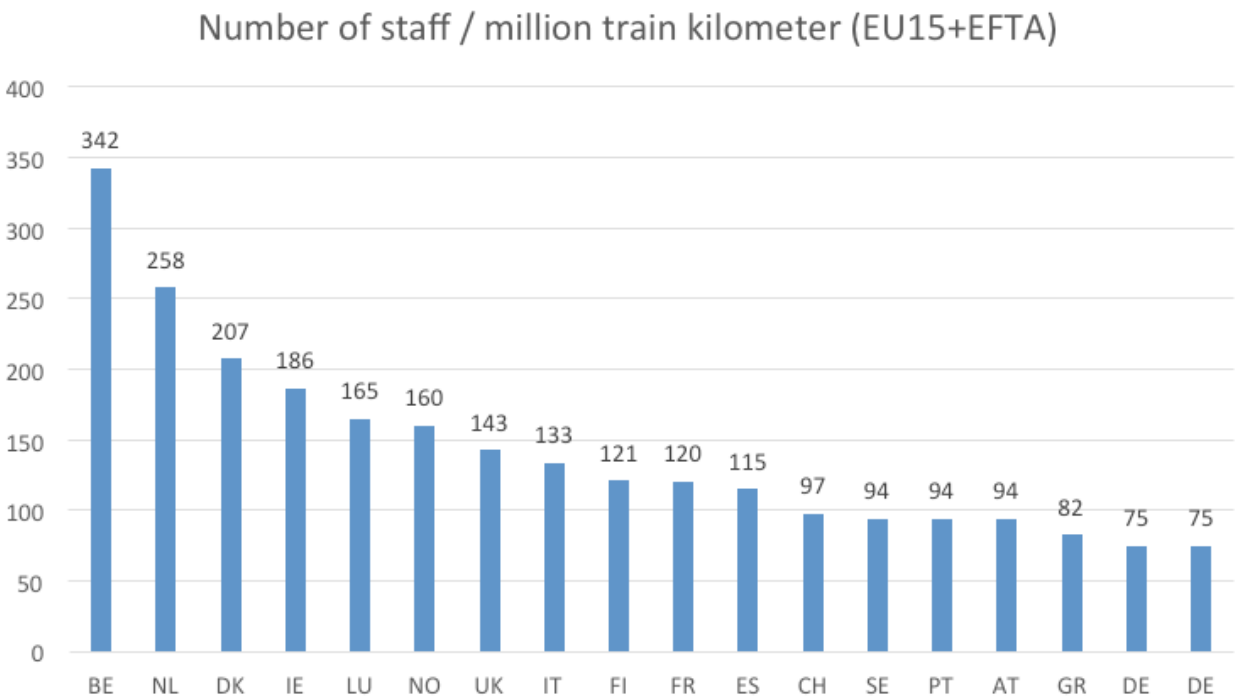
**CHART 4.** Number of employees



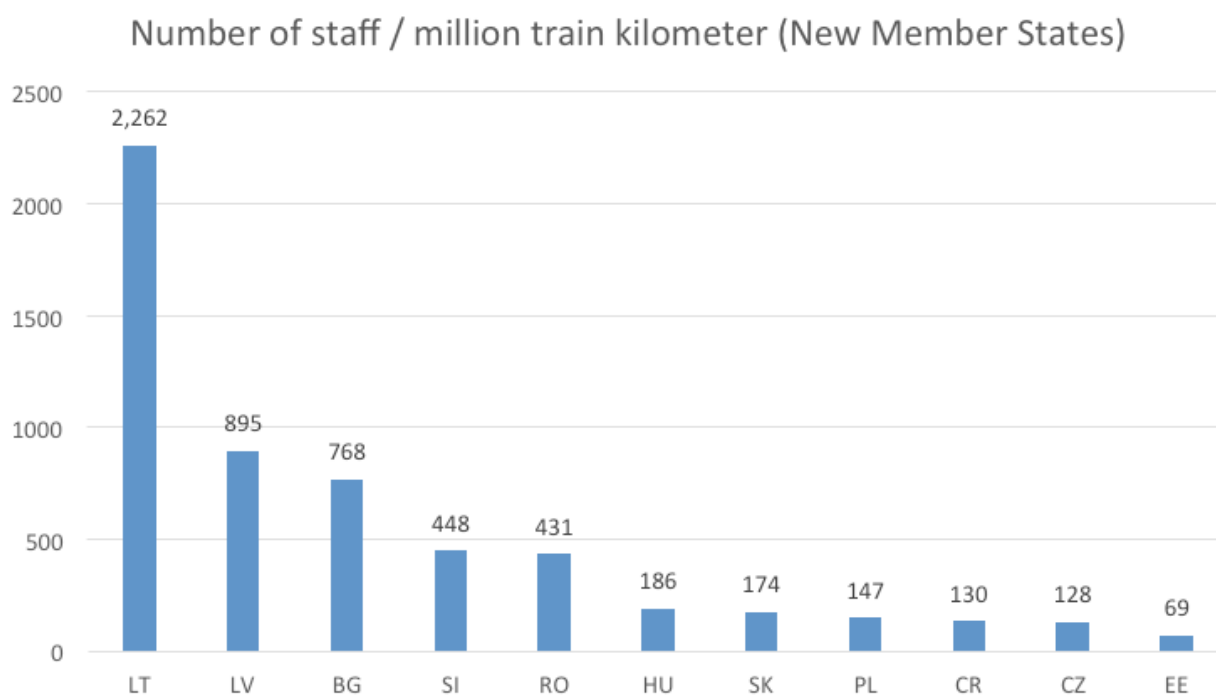
An attempt was made to generate productivity ratios from the collected data. The detailed interpretation of the following charts 4, 5 and 6 should be taken with great care, as data collection was “best possible”, but could not be double-checked or audited. We cannot exclude that data for some countries include staff categories that should not be included. In some countries with integrated operation and infrastructure management, it was not easily possible to distinguish staff attribution. Another reason to explain productivity gaps is the use of sub-contracting and out-sourcing for certain duties like cleaning and maintenance, or even security tasks. Belgium is least performing railways and this was confirmed by independent benchmarking commissioned by the company itself and acknowledged in Belgian media by the SNCB CEO.

Productivity ratio for new Member States were displayed in different charts as some of these countries are still in transition phase and their inclusion in the general chart would decrease its lisibility. Please note that some of these countries are well within the productivity ranges prevailing in EU15 and EFTA.

For staff per million tkm, the total European average is 132. In EU15 + EFTA, it is 120.

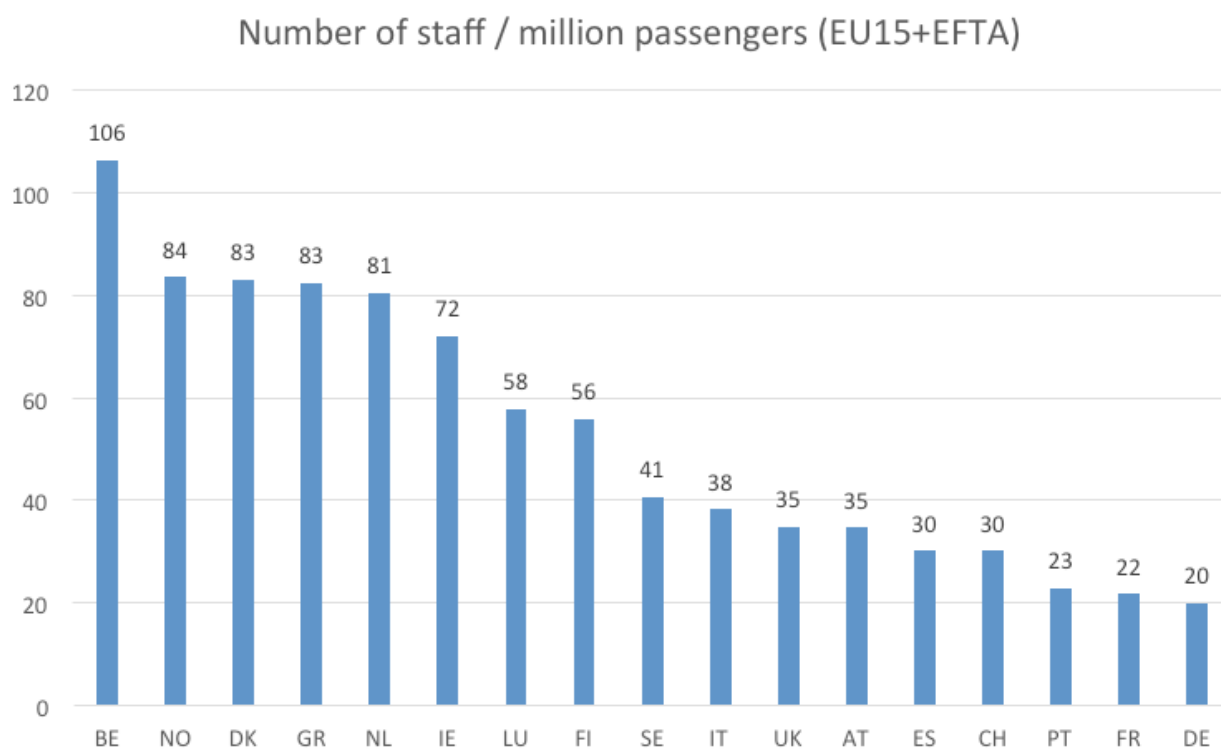


**CHART 5.** Number of staff per million train kilometer (EU15+EFTA)



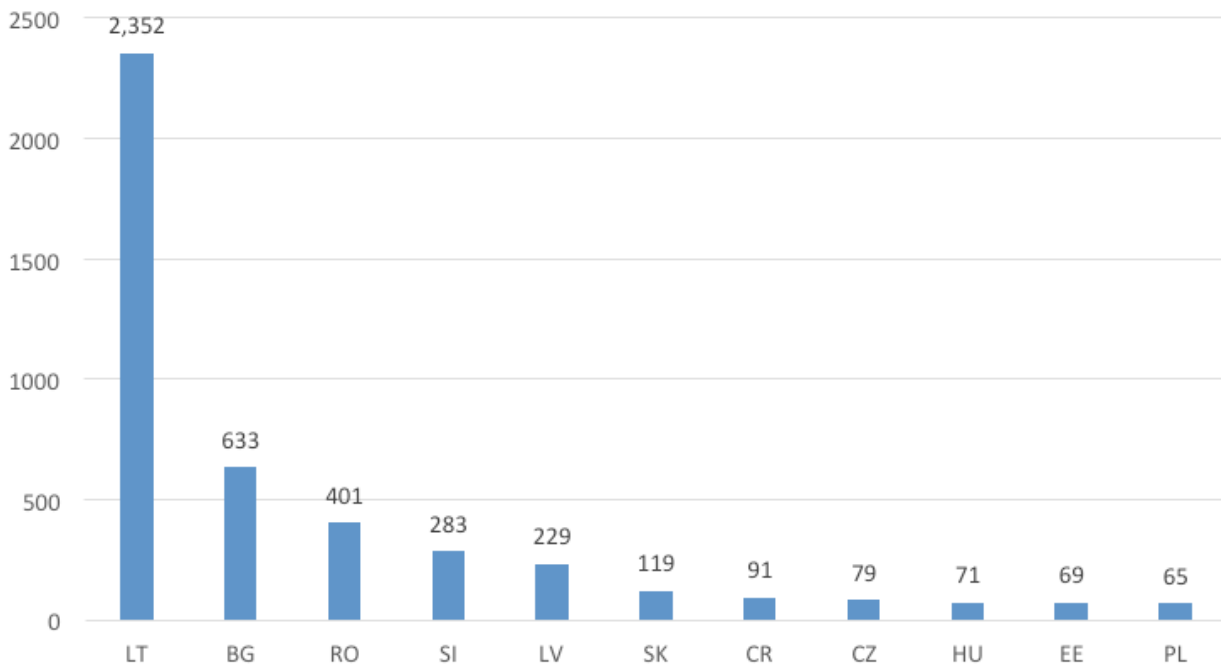
**CHART 5 BIS.** Number of staff per million train kilometer (New Member States)

For staff per million passengers, the total European average is 42. In EU15 + EFTA, it is 34.9.



**CHART 6.** Number of staff per million passengers (EU15+EFTA)

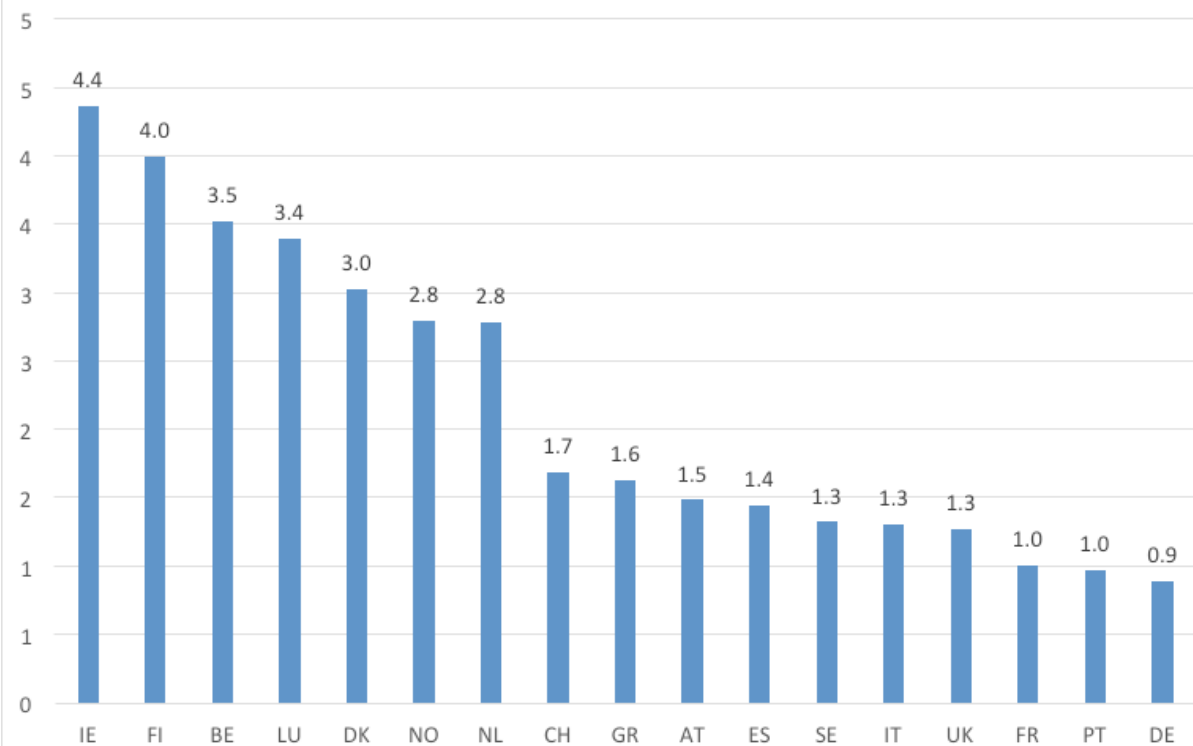
Number of staff / million passengers (New Member States)



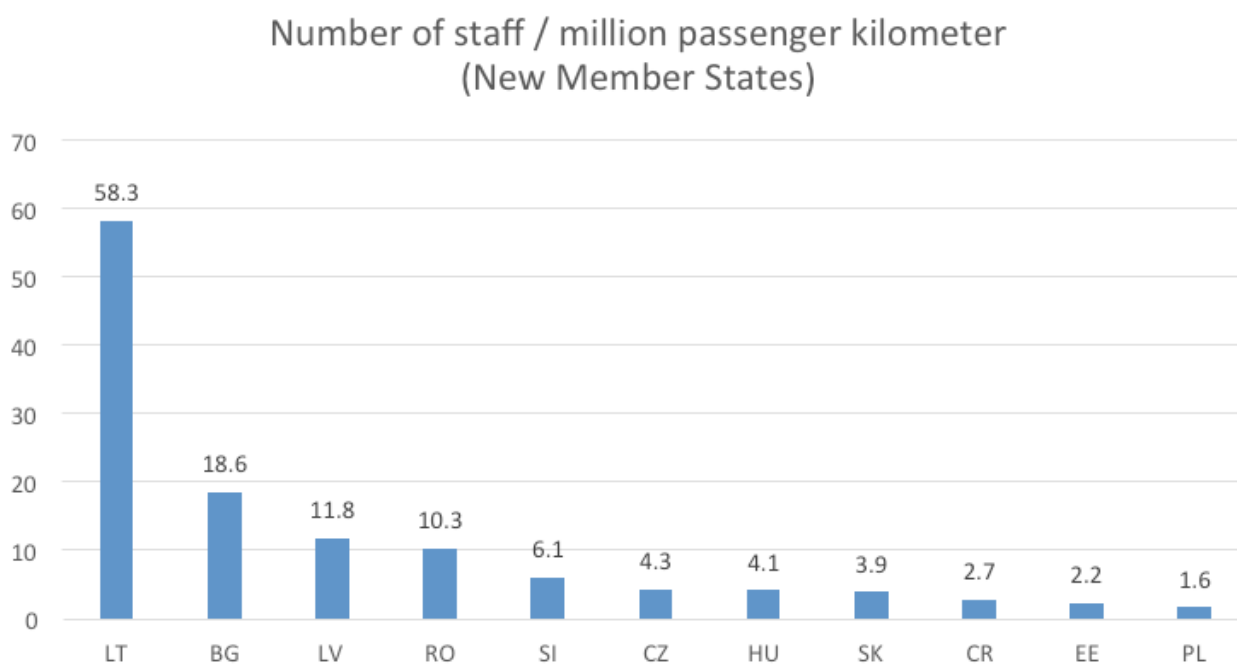
**CHART 6 BIS.** Number of staff per million passengers (New Member States)

For staff per million passenger-km, the total European average is 1.7. In EU15 + EFTA, it is 1.43.

Number of staff / million passenger kilometer (EU15+EFTA)



**CHART 7.** Number of staff per million passenger kilometer (EU15 + EFTA)



**CHART 7 BIS.** Number of staff per million passenger kilometer (NMS)

## 6.3 SUPPLY DATA

- Annual train kilometres**

*(Definition: n.a. the unit train-km was selected as the only one systematically available and was therefore used, even though it might not be the ideal accounting unit).*

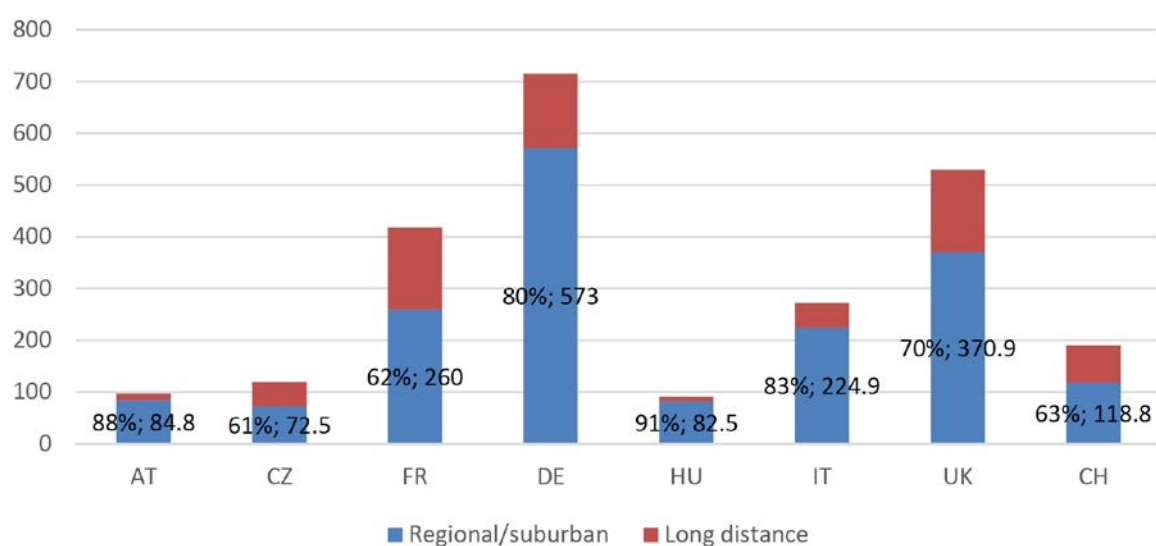
In 2006, the study aimed at getting figures expressed in vehicle-km in order to provide accurate and comparable data. Indeed, a train can consist of between 2-12 carriages and even multiple units can be of various length and composition. It proved to be impossible to draw a comprehensive picture of this parameter on European level, for lack of consistency of the data collected.

For the update, the available data was enquired and it turned out that train-km information was in general available. Even though this unit is not the ideal one, it was decided to keep it to be able at least to draw some analysis.

The next challenge was to isolate the production which is or can be specifically regarded as delivered for the sake of regional and suburban services. For some regional companies, the integrality of production was considered as regional and suburban services.

For the larger (incumbent) companies serving the whole national territory, only a few companies provide sufficient level of detailed information to be able to discriminate exactly the part of regional and suburban services: For Austria, Czech republic, France, Germany, Hungary, Italy, the UK and Switzerland, specific train performance figures were available for regional/suburban and long distance trains.

## Regional/long distance train kilometres (million)

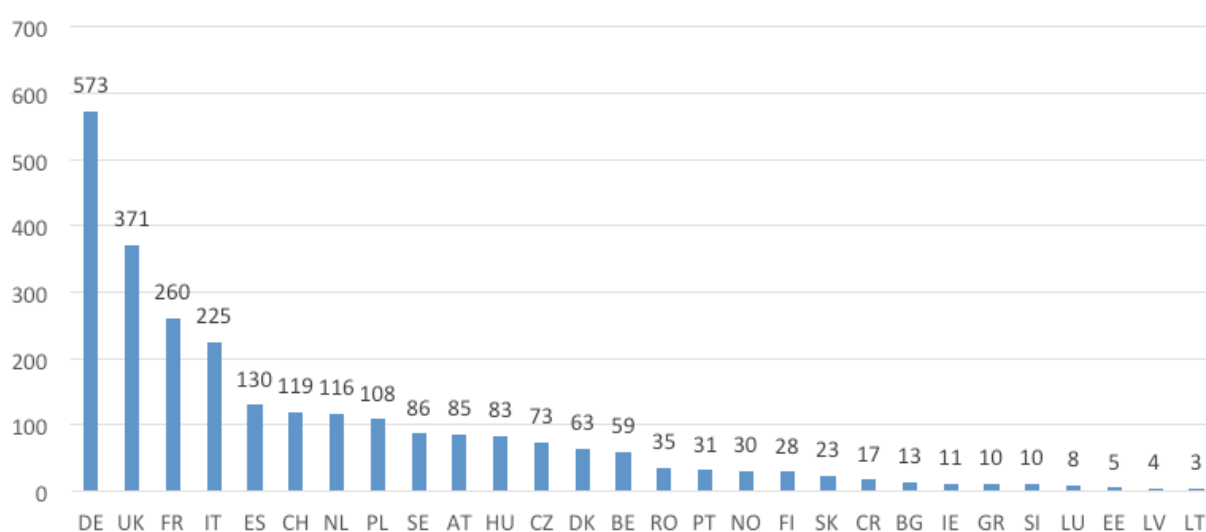


**CHART 8:** Regional/long distance train kilometres (million)

In these countries, the percentage of regional train kilometres varies from 61% (Czech Republic) to 91% (Hungary). On average the percentage is 73.5%.

For the other countries, the regional train kilometre figures have been estimated: a ratio was applied to the domestic passenger train-km. Country specific ratios were derived in the following way: It was assumed that there should be some proportional relationship between the volume of demand expressed in passenger-km and the volume of supply expressed in passenger train-km. 8 countries (Germany, France, UK, Italy, Hungary, Czech Republic, ...) report specific supply data for regional and suburban railways. Specific demand data for all member states are specifically available and reported to the RMMS. The proportion of regional and suburban services in both supply and demand variables from these 8 countries (of which all main larger countries) were plotted together and a trend line was derived and helped to “guestimate” the ratio of train-km which can be reasonable considered as the regional and suburban production for each specific country on the basis of passenger-km (provided by RMMS).

## Train kilometres (million)

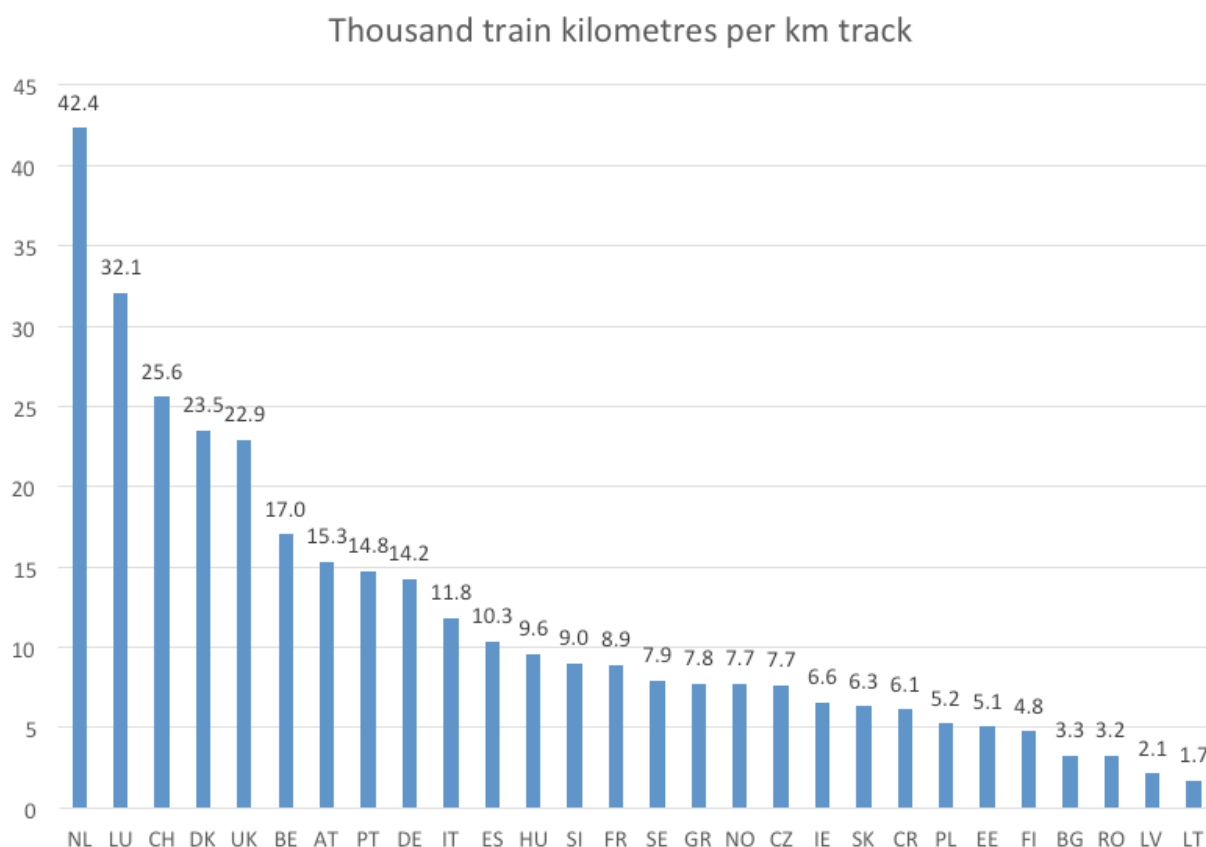


**CHART 9.** Million train kilometres for Regional and Suburban Services



As a result, it is estimated that European operators produce collectively 2 576 million train-kilometres per year for services qualified as suburban and regional.

Unsurprisingly, the largest countries, Germany, the UK, France and Italy have the highest train performances of the 28 surveyed countries (more than half of the total train kilometre). These four countries account for more than half (55%) of all train-km production of Europe. The Baltic states rank lowest.



**CHART 10.** Thousand train kilometres per km track

The busiest networks in terms of train-kilometres per unit of network length can be found in the Netherlands, Luxembourg, Denmark, Switzerland, and the UK.

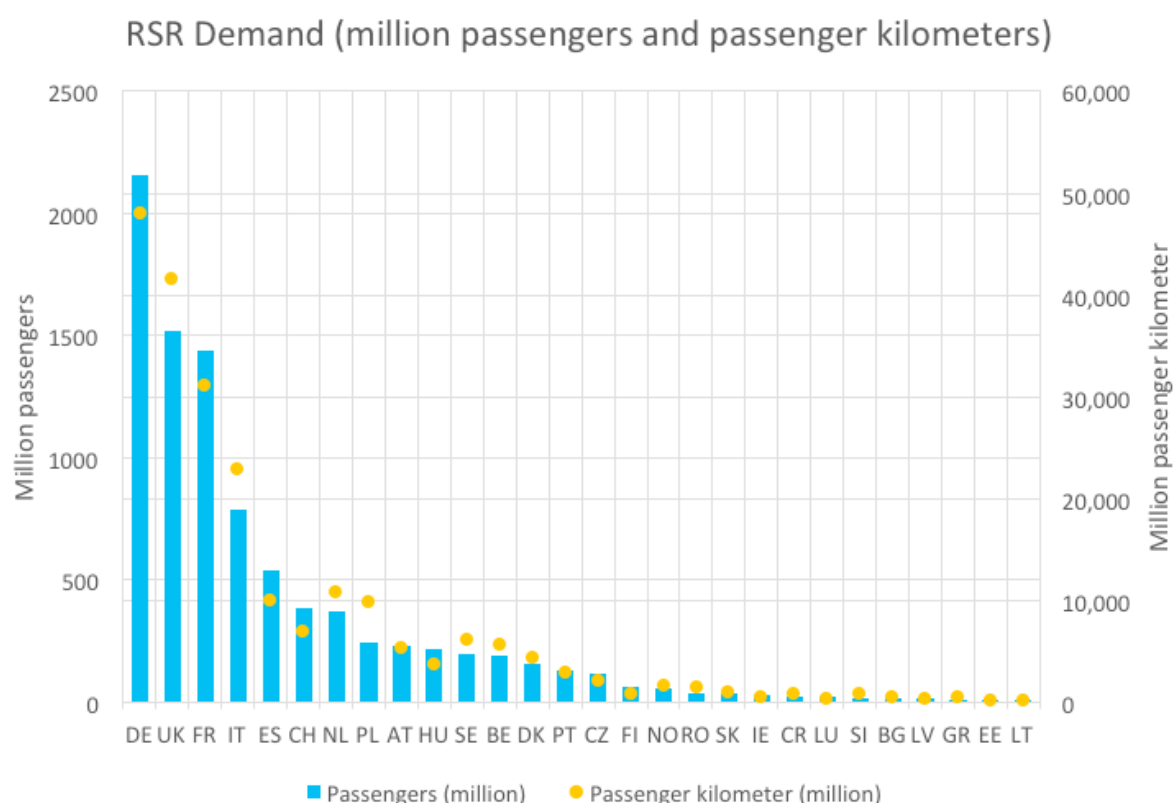
## 6.4 DEMAND DATA

### 6.4.1 Annual Number of Passengers Carried (Mio):

The total number of Regional and Suburban Rail passengers carried in 2006 was more than 6 800 million. In nearly 10 years, demand has increased by 31% to reach 8,9 billion journeys. This figure comes from robust growth in most countries (France +15%, Germany +23%, Belgium +44% and very remarkably UK +98%). This growth can be explained by several factors with detailed case studies. However, it can be stated that these countries are characterised either by a robust resilient economies where travel demand was not negatively affected by downturn (DE); voluntaristic policies to boost railway demand (BE, FR), investment programmes in asset modernisation (UK).

Few exceptions to this pattern are without surprises Southern countries affected by the economic downturn and the sharp increase of unemployment: Spain -15%; Portugal-12%. This confirms -if needed- one of the primary function of this railway segment: to bring commuter to work and back home.

The passengers on regional or suburban trips represented by far the biggest part of all rail trips in Europe: they accounted for about 89% out of the total number of rail passengers and 50% of the total number of passenger kilometers per year<sup>7</sup>.



**CHART 11.** RSR Demand (million passengers and passenger kilometers)

A more detailed presentation of the yearly number of passengers transported ranked Germany first, with about 2 160 million passengers, or nearly one quarter of the total, followed by the UK with 1 520 million (17%), and France with 1 440 million passengers (16%).

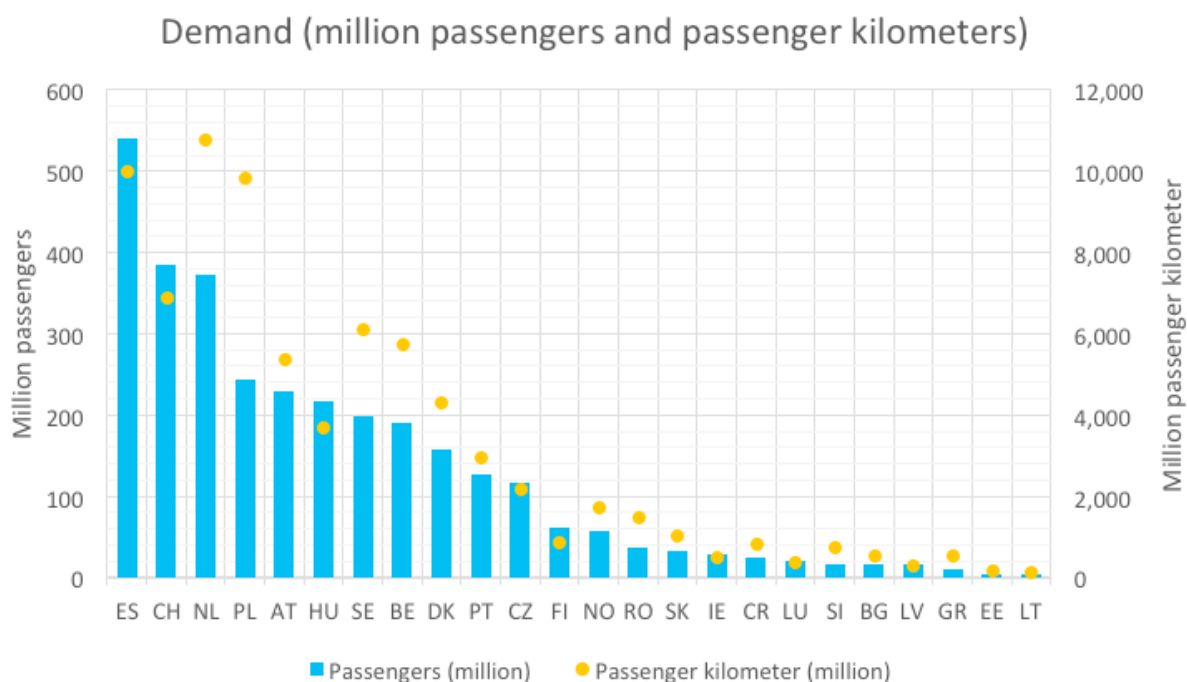
## 6.4.2 Comparisons with Other Modes

This figure of 8 900 million yearly passengers is the **equivalent** of patronage on all 45 European metro networks in 2013<sup>8</sup>. In 2013, the total number of passengers travelling by Light Rail and trams in the European Union was 7 688 million. In 2014 the total number of passengers travelling by air in EU-28 was of approx. 880 mil, according to Eurostat<sup>9</sup>, i.e. **regional and suburban railways carry 10 times more passengers than airlines** in the EU.

<sup>7</sup> Comparison with UIC statistics (metro and light rail not included)

<sup>8</sup> UITP, statistics brief – world metro figures, October 2014

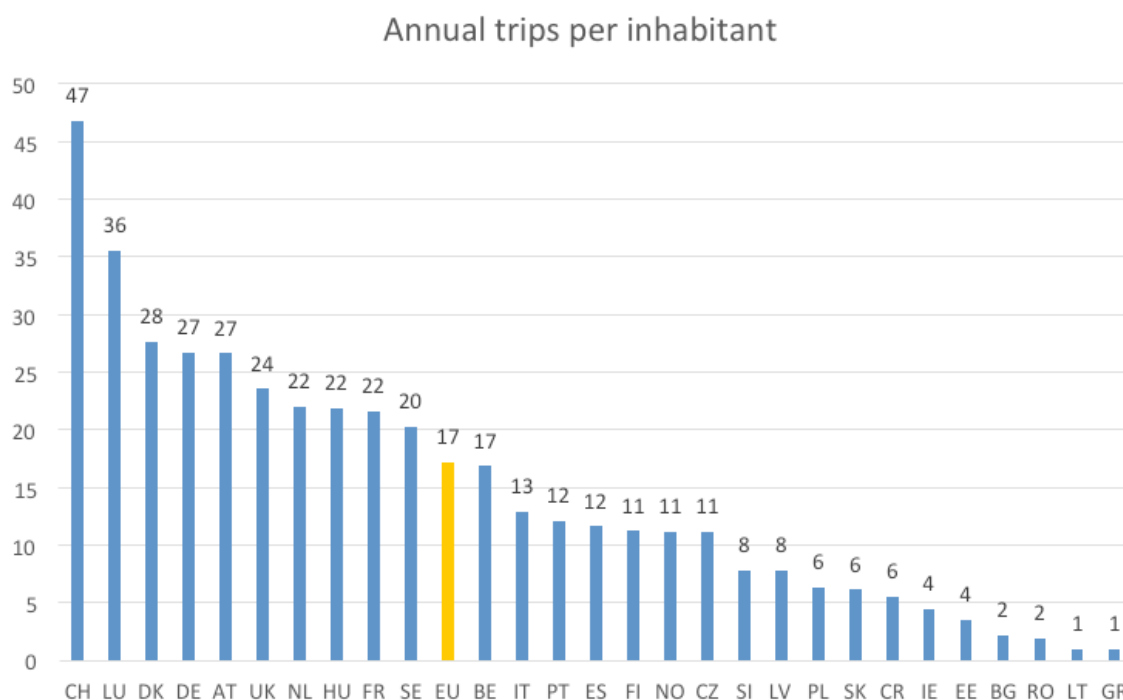
<sup>9</sup> [http://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger\\_transport\\_statistics#Air\\_passengers](http://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger_transport_statistics#Air_passengers)



**CHART 12.** RSR Demand without 4 largest countries

It is worth noting that the commuter and regional rail services around Paris (Transilien / RER operated by SNCF and part of RER operated by RATP) accounted for 1 200 million trips yearly, i.e. 83 % of the total of France. The same applies for Greater London with 1 100 million trips yearly, i.e. 70 % of the total of UK. Other countries are less centralised e.g. powerful S-Bahn systems are available in 15 German larger cities, as well as 15 Cercanias systems in Spain.

Taking the population into account, the biggest “consumer” of rail services is by far Switzerland, followed by Luxembourg and Denmark. The European average is 17 trips per inhabitant.

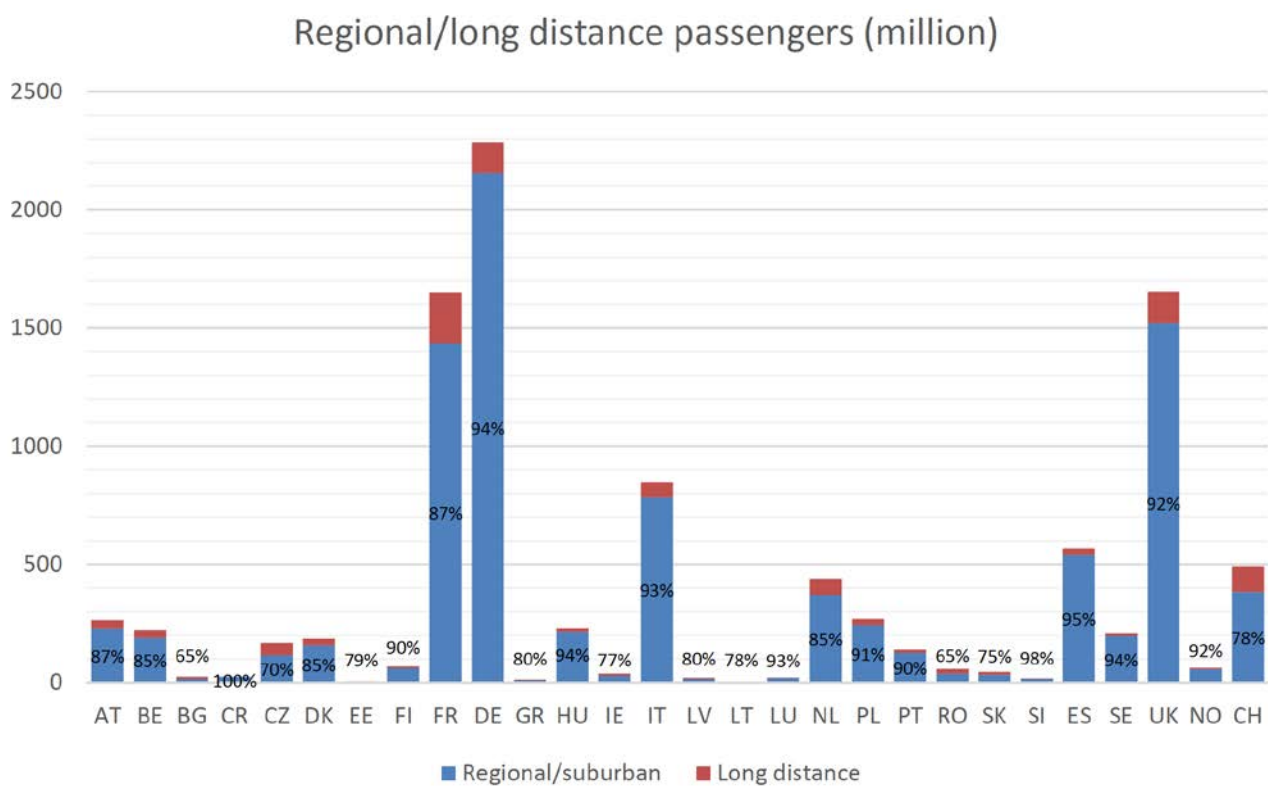


**CHART 13.** Annual trips per inhabitant

Compared to data available in the previous study in 2005, this situation reflects:

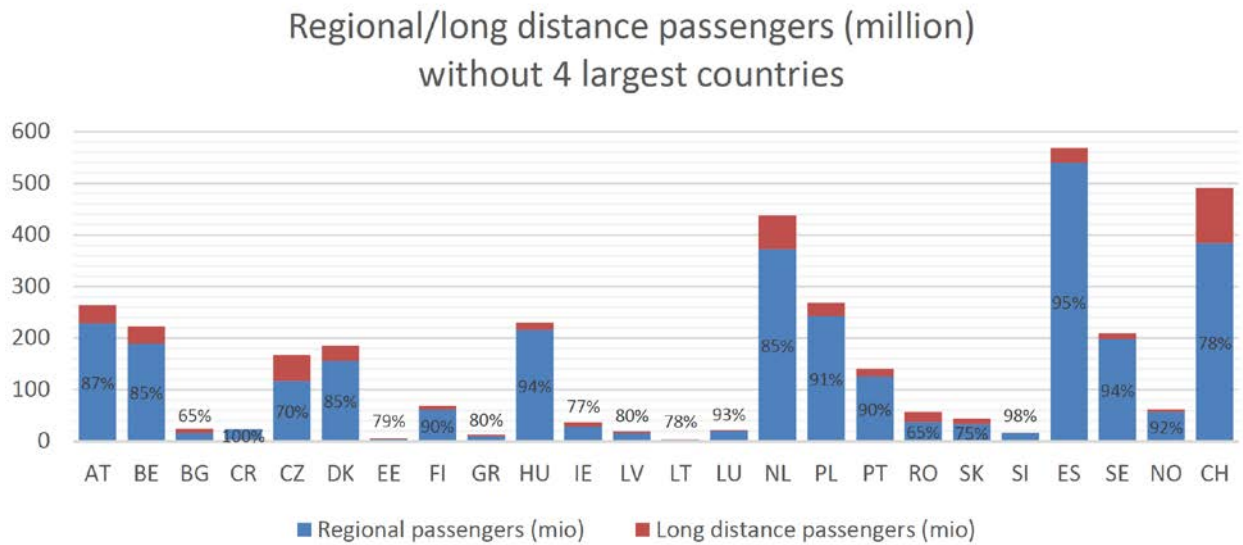
- Stability : France, Switzerland, Austria, Hungary, Italy, Finland, Slovenia
- Increase: Luxemburg (36 vs. 27), Denmark (28 vs. 19), Germany (27 vs. 21), UK (24 vs. 12), Belgium (17 vs. 13)
- Decrease: Portugal (12 vs. 14), Spain (12 vs. 13), Czech Republic (11 vs; 14), Latvia (8 vs. 10)

Comparisons with official Eurostats private motorisation rate (# cars per 1000 inhabitants) provides no clear and obvious correlation between popularity of railways and car ownership. On the contrary, countries with the lowest motorisation rates (<400 cars per 1 000 inhab.) are also among those with low railway usage: Romania (224 cars), Bulgaria (385 cars), Slovakia (337 cars) and Latvia (305 cars). In reverse, countries with above average/high car ownership (> 500 cars per 1000 inhab.) also scores among the most frequent train users: Switzerland (529 cars), Luxemburg 621 cars), Germany (539 cars), Austria (542 cars).



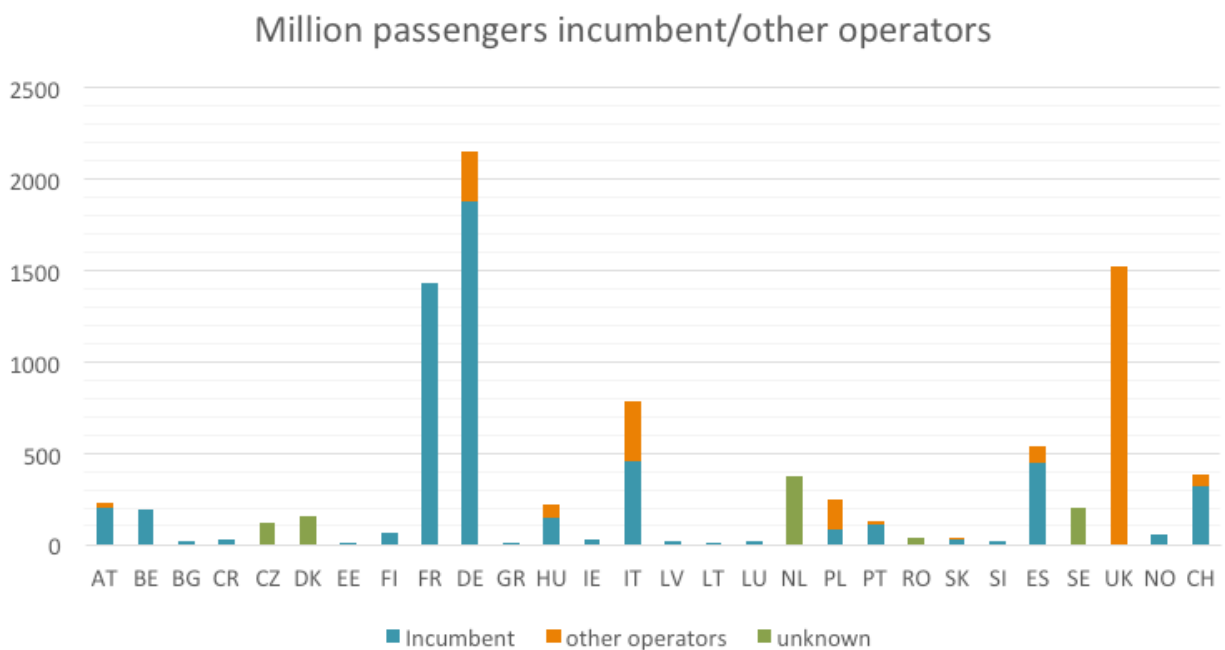
**CHART 14.** Regional/long distance passenger (million)

The percentage of regional/suburban rail passengers from the total varies between 65% (Bulgaria and Romania) and Slovenia (98%), with an average of 89%. For the 4 countries with the largest passenger numbers, Germany, the UK, France and Italy, the average is slightly higher (91,6%).



**CHART 15.** Regional/long distance passengers without 4 largest countries

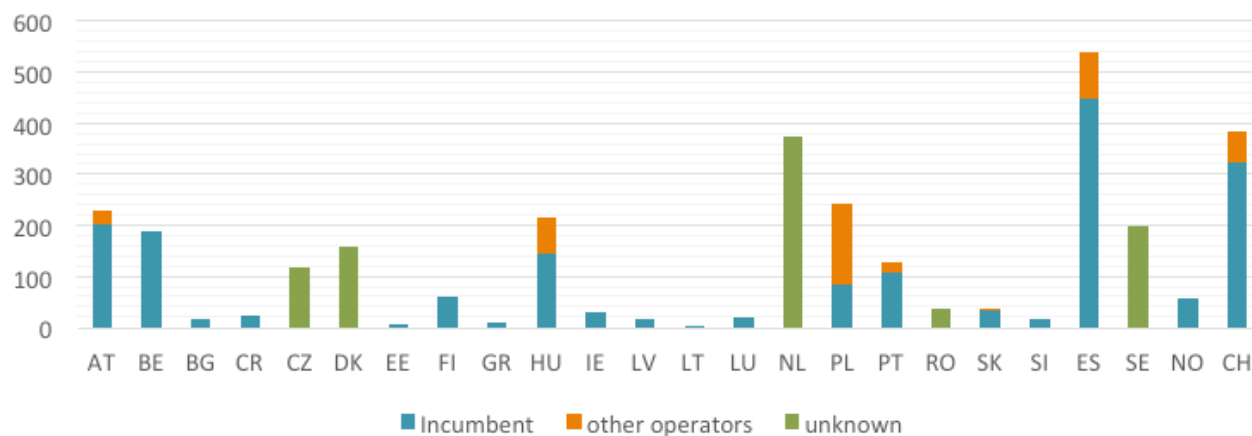
Out of the 16 countries where more than one regional train operator is active, at least 9 countries have an incumbent rail operator with the highest passenger share (5 countries unknown, France does not have non-incumbent operators, and the UK does not have an incumbent operator). Only in Poland, the non-incumbent operators have a higher share than the incumbent (Przewozy Regionalne), but many of these operators are direct descendants of the former incumbent operator PKP.



**CHART 16.** Million passengers incumbent/other operators



Million passengers incumbent/other operators  
without 4 largest countries

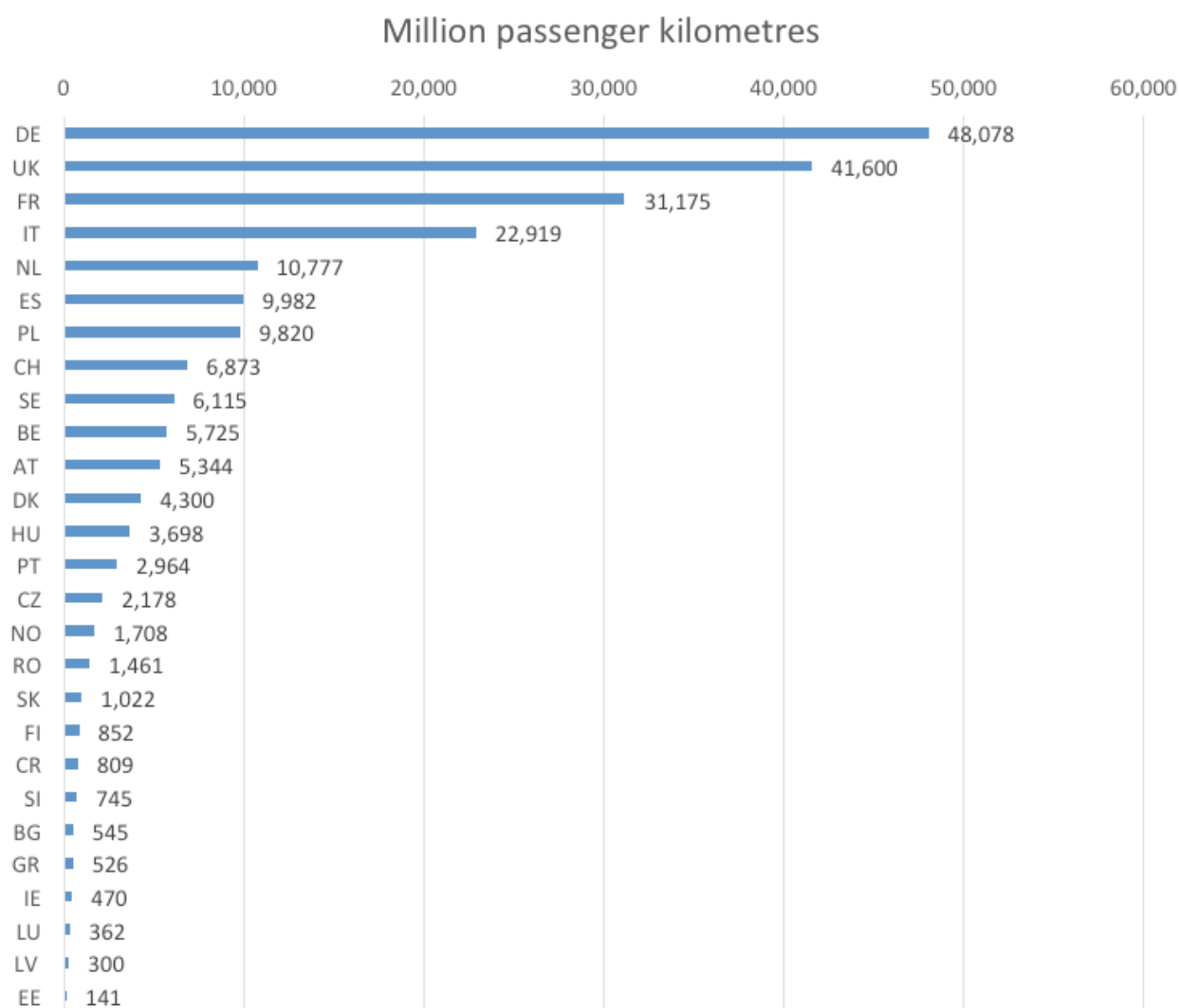


**CHART 17.** Million passengers incumbent/other operators without 4 largest countries

### 6.4.3 Annual RSR Passenger Km (Mio)

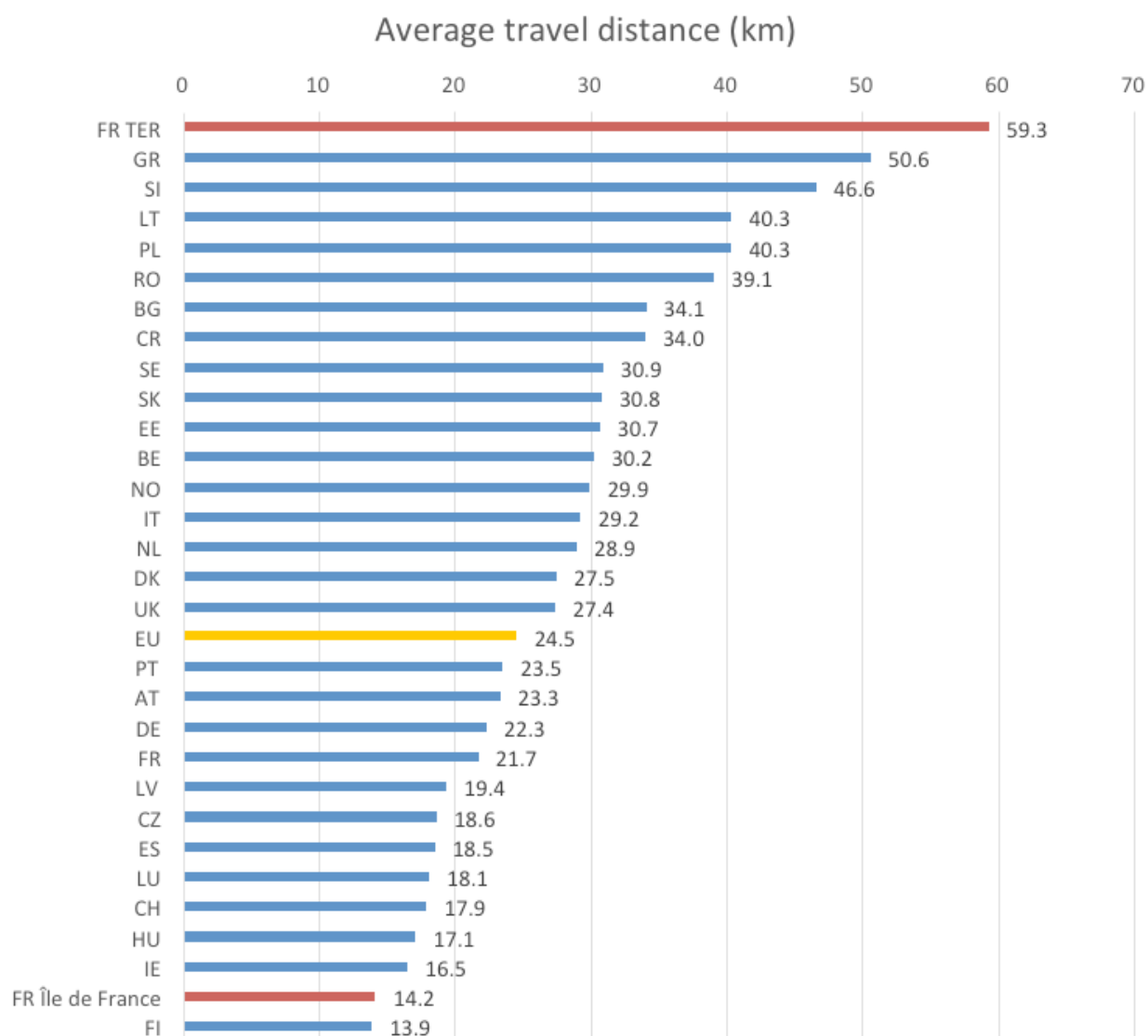
The total number of annual passenger kilometers in Europe is about 220 600 million, i.e. a 13,7% increase compared to the 2006 study. This represents 50 % of the total 444 500 million passenger km in Europe (EU28 + EFTA); It is worth noting that with 109 800 million passenger km, High Speed Trains represents 25% of performance expressed in passenger km whilst it is only a small percentage of the passenger numbers (<2%).





**CHART 18.** Million passenger kilometers

The four largest countries (Germany, the UK, France and Italy) make up for about 65% of the passenger kilometers performed in all the 28 countries, while 13 countries make up for less than 5% of total passenger kilometers.

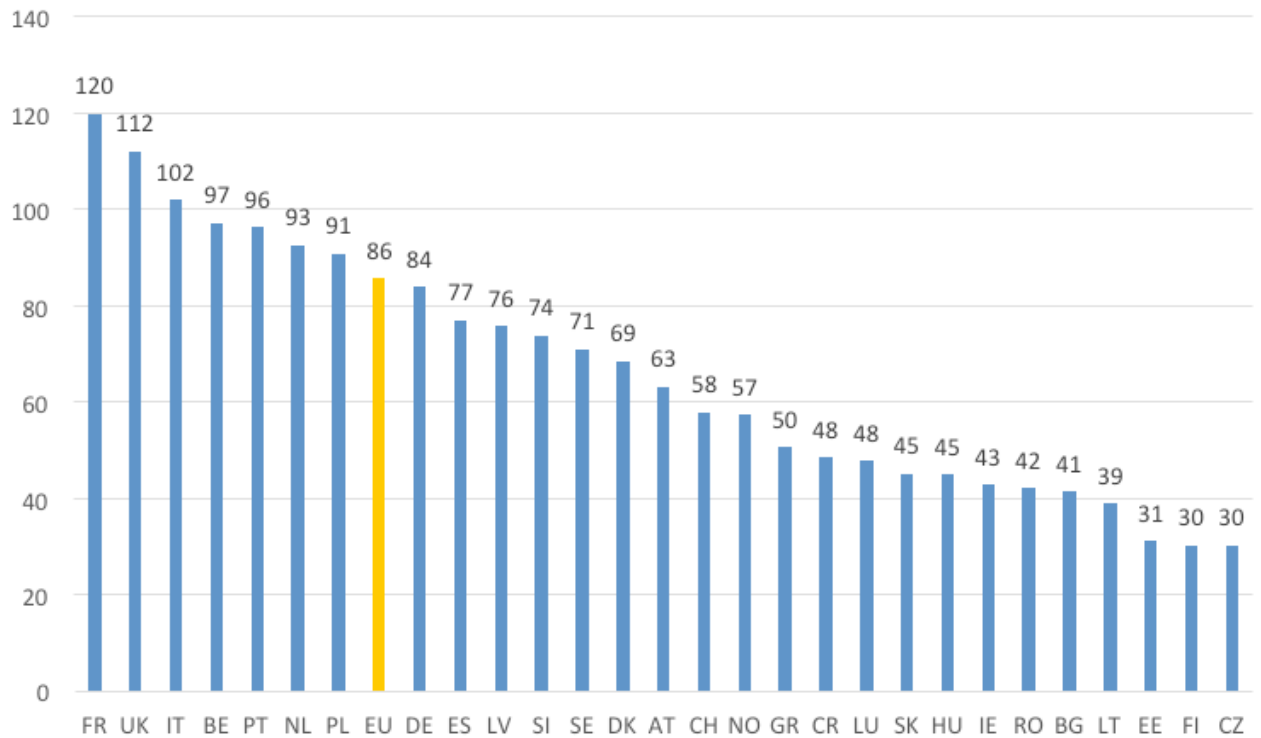


**CHART 19.** Average travel distance (km)

The aggregated average distance travelled was 24.5 km in EU countries and 19,5 km in EFTA. More than half of the countries (16/28) feature an average distance of 20 to 40 km. 8 countries have an average of less than 20 km and 5 of more than 40 km. When the average distance diminishes and the usage density increases, the services can be categorised as typically commuter rail service versus regional rail services, thereby depicting two market sub-segments in this business field. For France, the distinction is made between commuter RER and Transilien services around Paris and regional TER services in the rest of the country. The different characteristics of these services are clearly visible in the average travel distance of their passengers.

This information is consistent with the results of the previous 2005 study: the average distance travelled in EU 15 was 25.2 km and 17.3 in EFTA.

## Average number of passengers per train

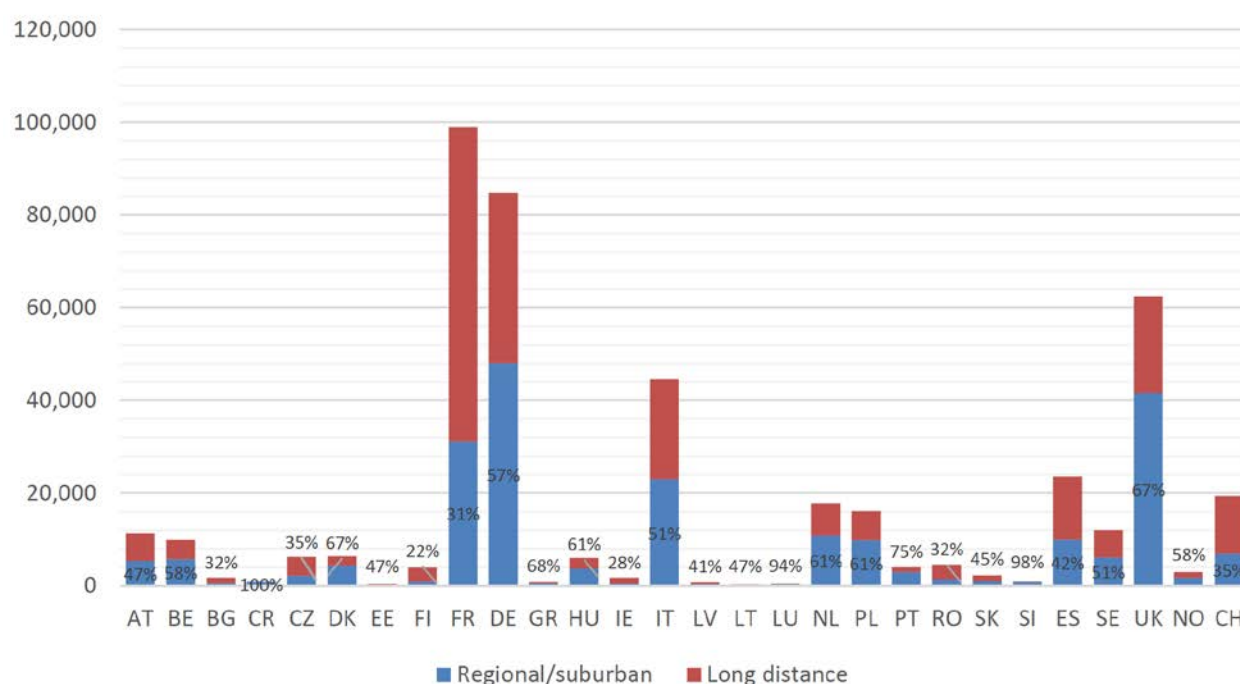


**CHART 20.** Average number of passengers per train

The average number of passengers per train is obtained by dividing the number of passenger-kilometres by the number of train-kilometres produced in the various European countries. It should be remembered that most/all services of regional and suburban railways are governed by PSO contracts. It means that railway operators are not free to determine themselves the level of production and to “cherry pick” the most profitable routes and time slots. Among PSO provisions, service levels are mandated by the organising authority in charge and include also provisions for services in very early morning and late evening hours as well as in off-peak hours. As an element of comparison, urban public transport by bus and tram is generally considered successful with an average occupancy rate of 20-30%. This ratio, if applied to the figures of chart 22, translates in average train capacity ranging between 450-300 places, which is perfectly in line with field reality.

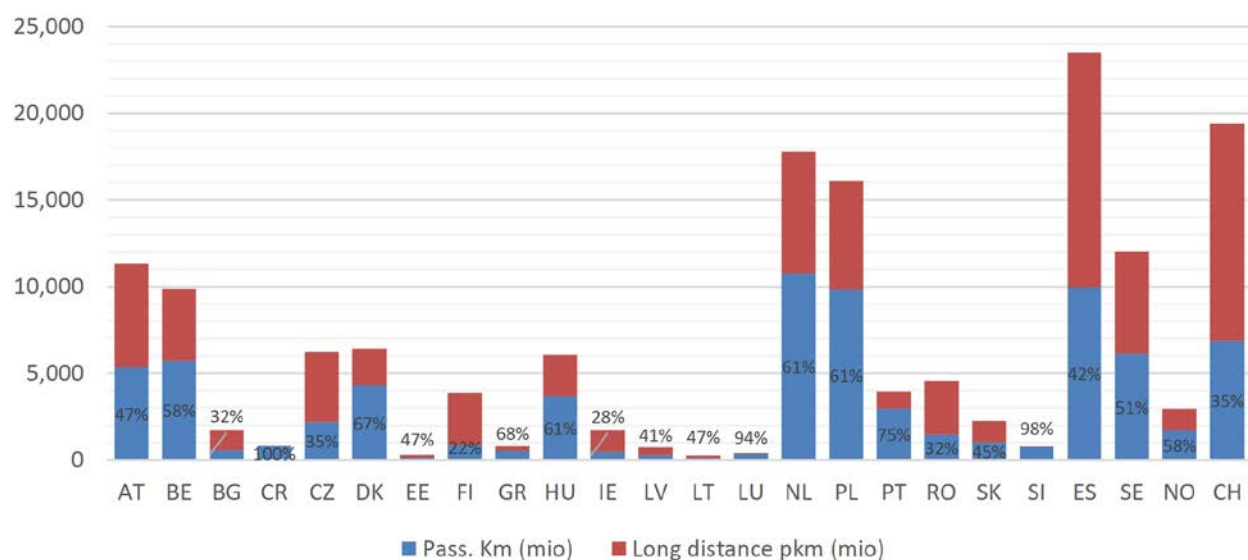


## Regional/long distance passenger kilometres (million)



**CHART 21.** Regional/long distance passenger kilometers (million)

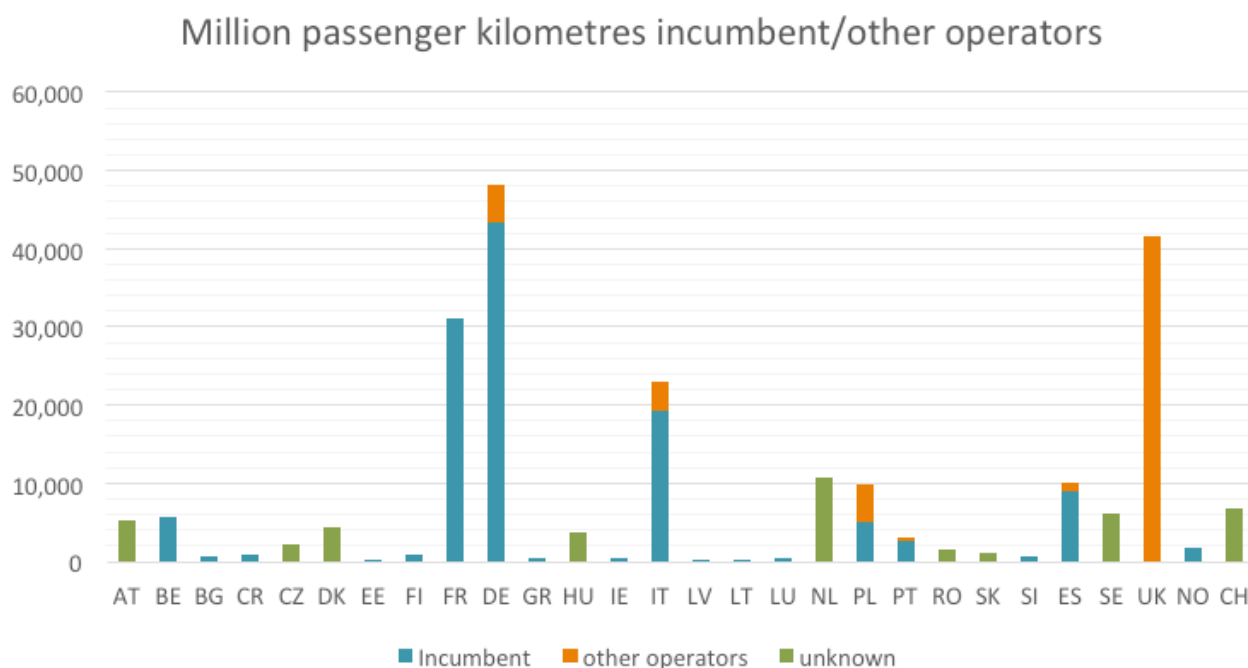
## Regional/suburban share in passenger kilometers (million) without 4 largest countries



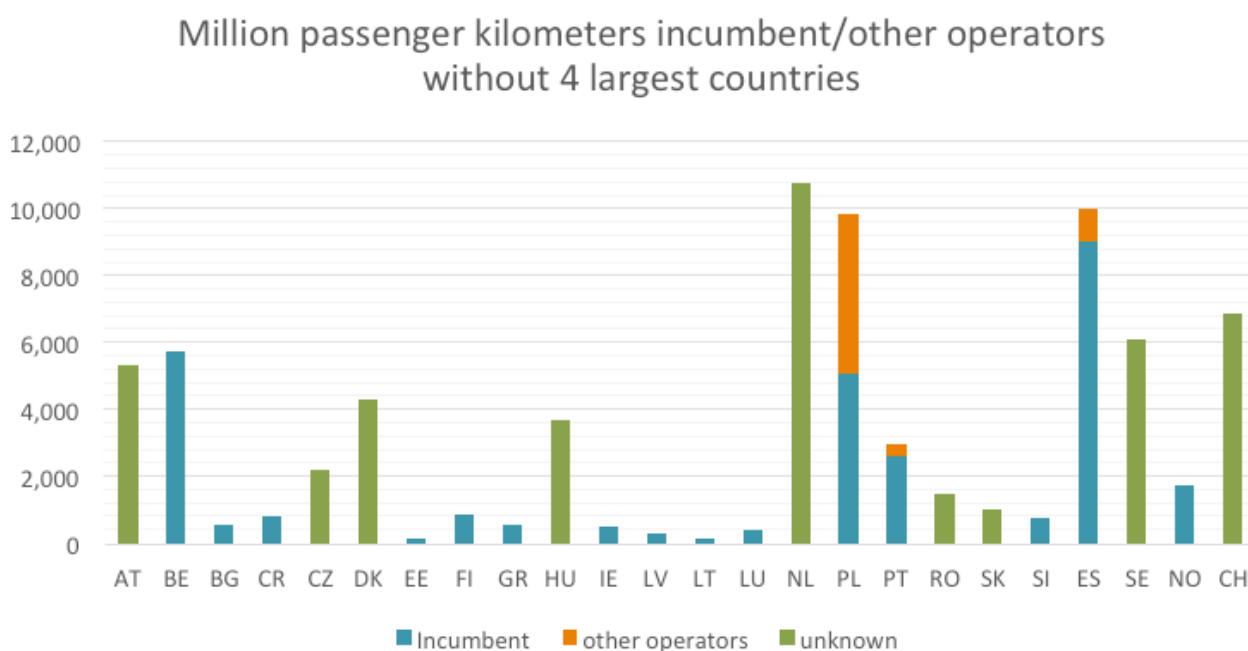
**CHART 22.** Regional/long distance passenger kilometers without 4 largest countries

The percentage of regional and suburban passenger-kilometre varies between 22% for the stretched-out network of Finland and 98% for Slovenia. In total, the average is 50% for regional passenger kilometers, which also applies to the average for the four largest countries.





**CHART 23.** Million passenger kilometers incumbent/other operators



**CHART 24.** Million passenger kilometers incumbent/other operators without 4 largest countries

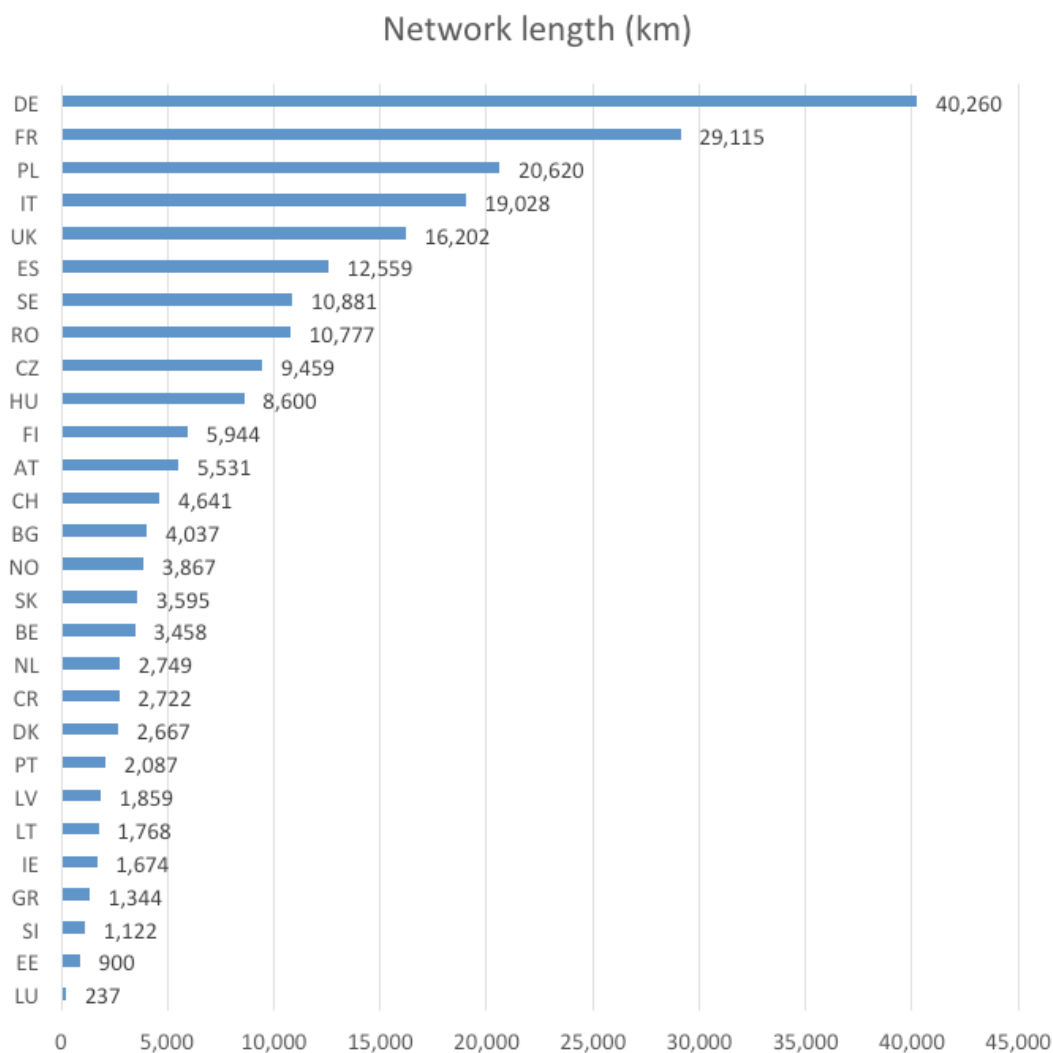
A majority in regional passenger kilometers for all of the surveyed countries are covered by incumbent operators, except for the UK where there is no incumbent operator (9 countries unknown).

## 6.5 NETWORK DATA

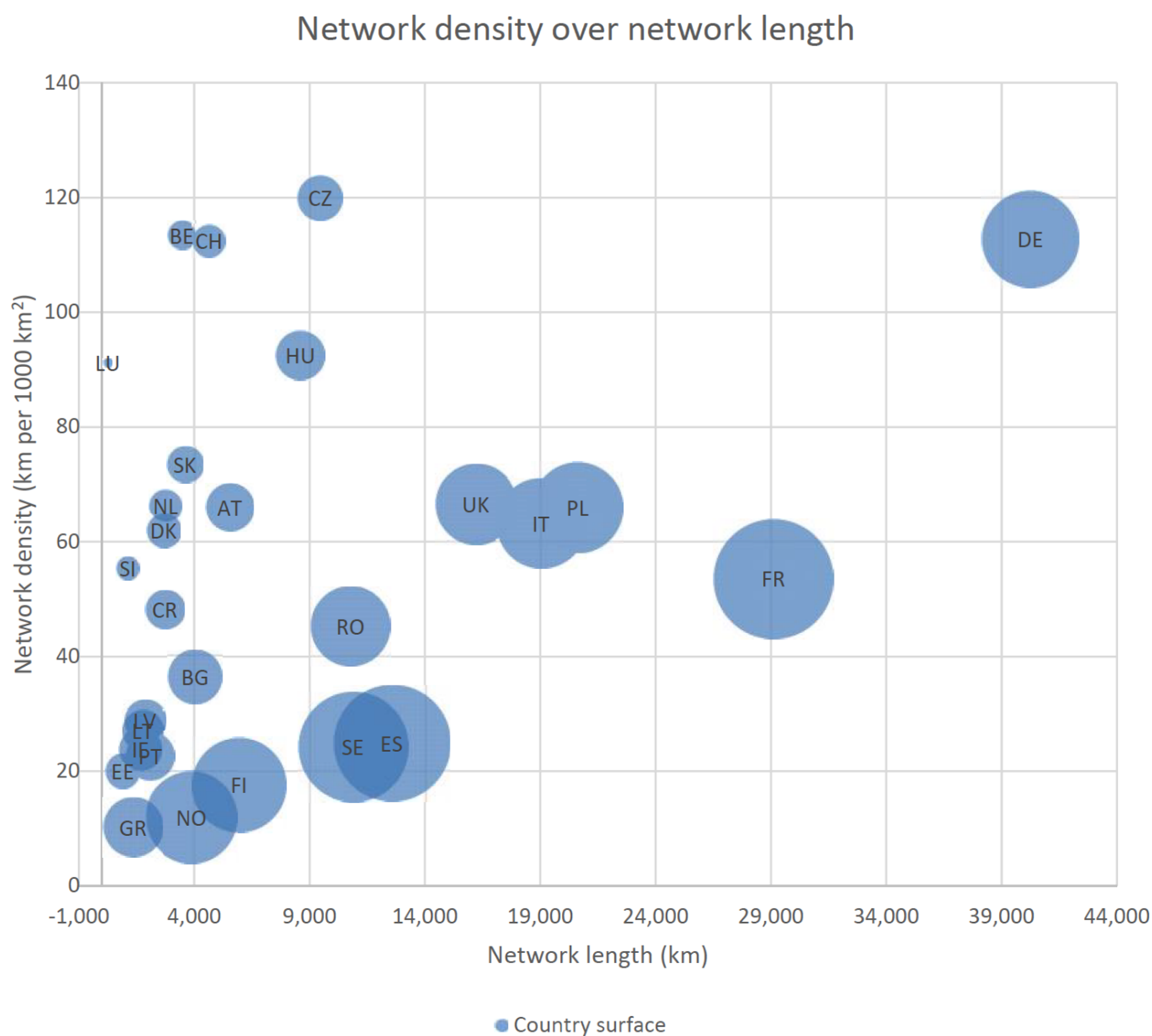
### 6.5.1 Passenger Network Length (km):

(Definition: The length of physical infrastructure is taken, irrelevant of the fact that one or several line(s) are using the same alignment over a certain distance). Nominal track length is counted once for single, double, triple or quadruple track arrangements.

The total track length is approximately 230 000 kilometres, of which -surprisingly- 125 000 km of single track lines (54%). This takes into account not only the interoperable infrastructure owned by the national infrastructure manager, but also the local track infrastructure owned by smaller infrastructure managers or directly by the operators in a number of countries such as Germany, Switzerland, Austria, Spain, Italy. This type of infrastructure is mostly non-interoperable, either physically (e.g. separated and narrow gauge) or functionally. For most countries, the complete network length is accounted for. Only dedicated high speed rail lines and a few dedicated freight lines were subtracted from the total. In reality however, large sections of track may not be relevantly used for regional and suburban services, especially in large countries with very concentrated human settlements like all three Nordic countries.

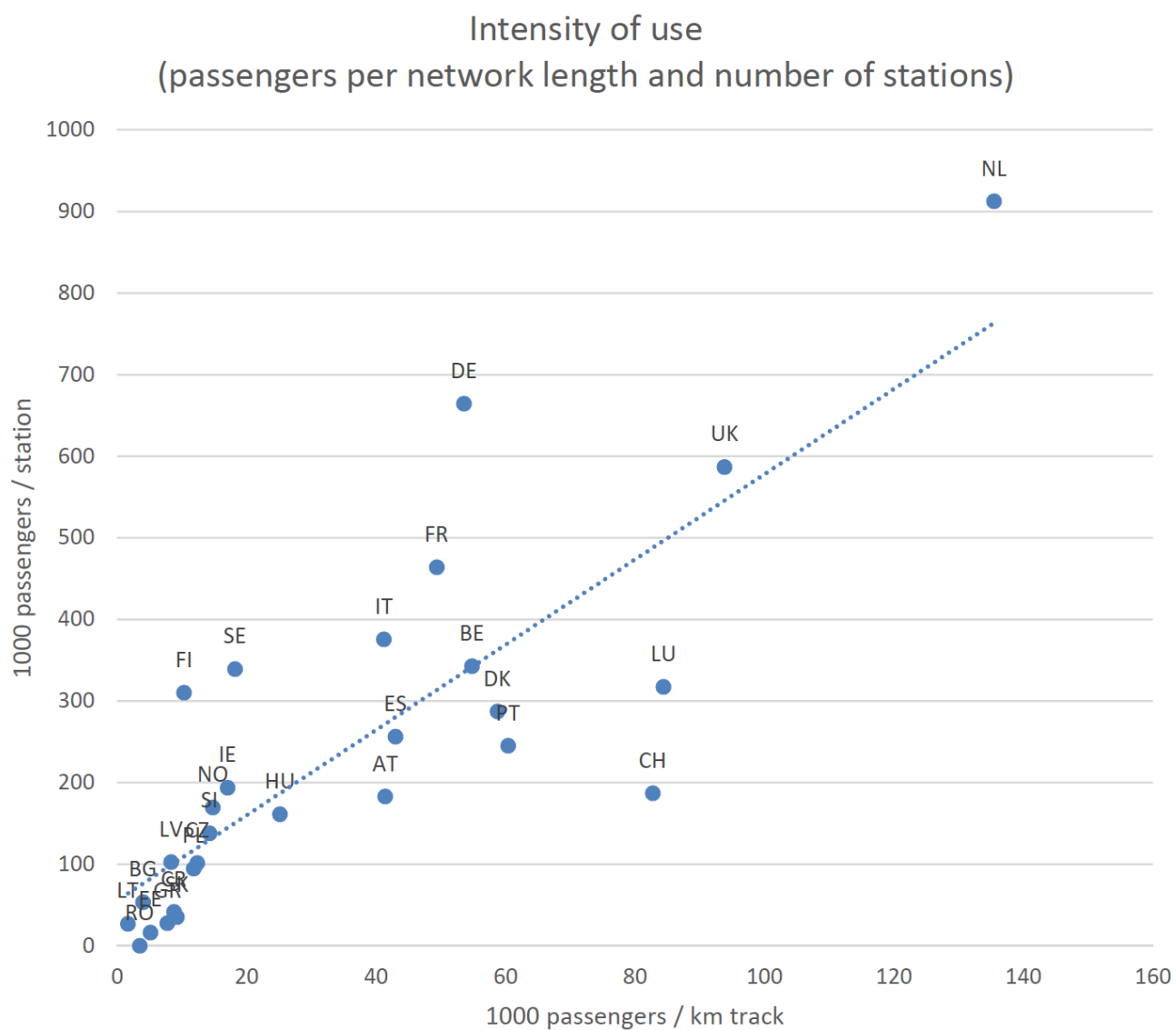


**CHART 25.** Network length (km)



**CHART 26.** Network density over network length

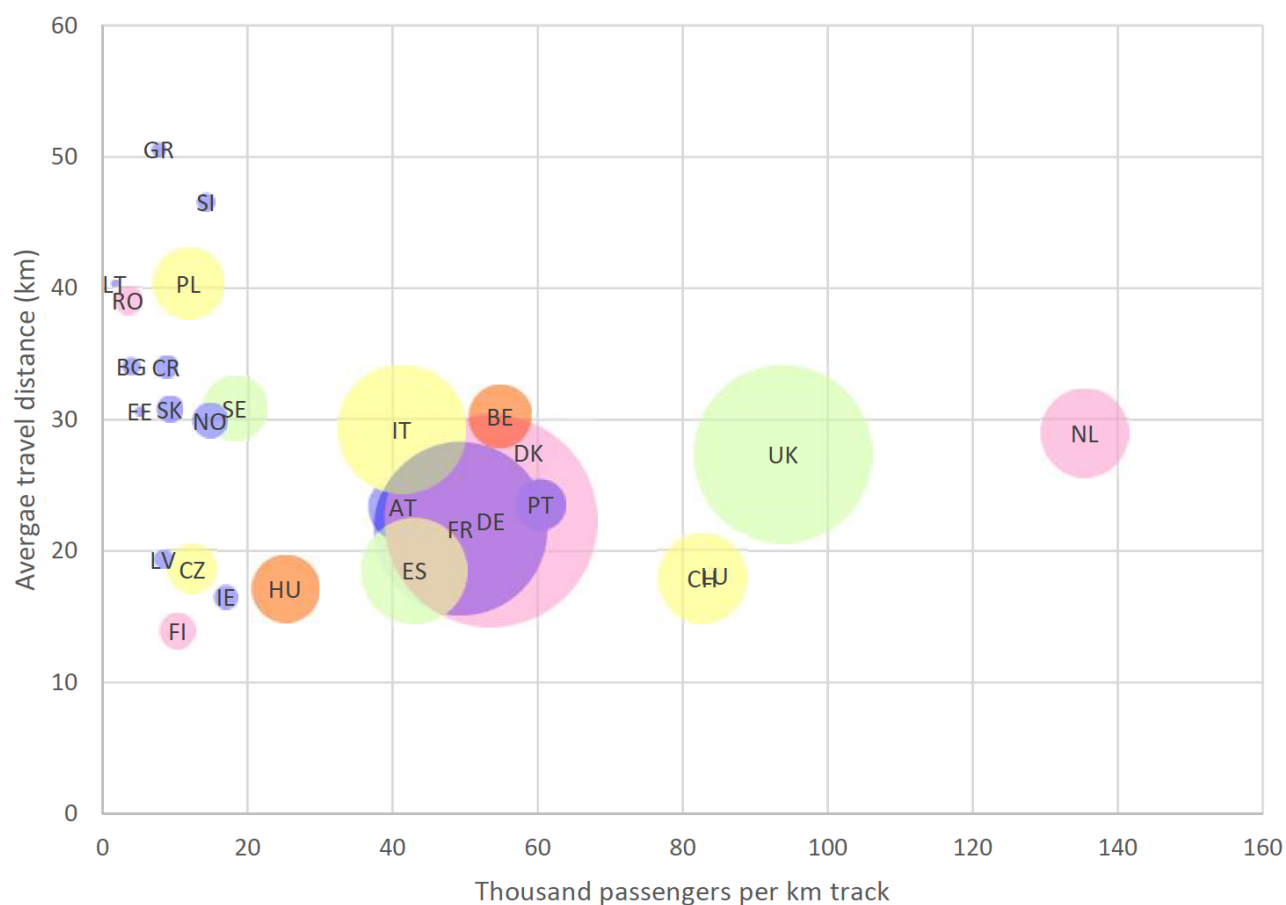
The densest networks (comparison of the track length in km with the total territory in km<sup>2</sup>) were to be found in (decreasing order) Czech Republic, Belgium, Germany, Switzerland and Hungary. The least dense networks were the Greek, the Norwegian and the Finnish, preceded by Estonia, Spain and Portugal.



**CHART 27.** Intensity of use

In terms of passengers per track length and per number of stations, the Netherlands clearly have the busiest rail network (this also true in terms of train kilometres per track length).

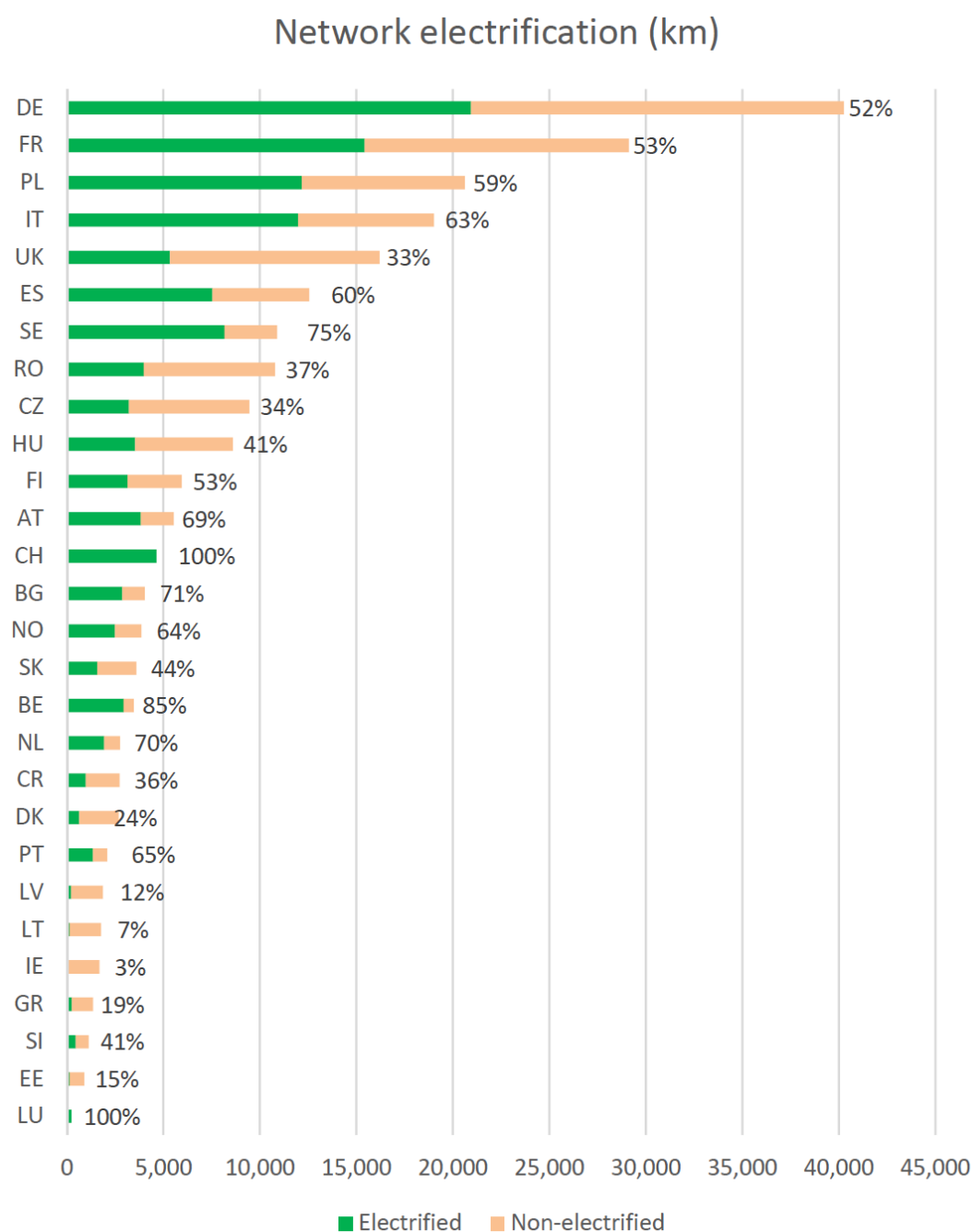
## Passenger volume on average travel distance over network usage



**CHART 28.** Average travel distance over network usage

### 6.5.2 Electrified vs Non-Electrified Infrastructure

The average percentage of electrification on railways in the surveyed countries is 53%, as reported by RMMS. The source does not allow to specify precisely which type of infrastructures is electrified and not. Interestingly enough, this proportion also matches the proportion of single track from the total network length. Although it cannot be assumed that all single track lines are non-electrified, it is believed that single track lines would be dominantly non-electrified.



**CHART 29.** Network electrification (km)

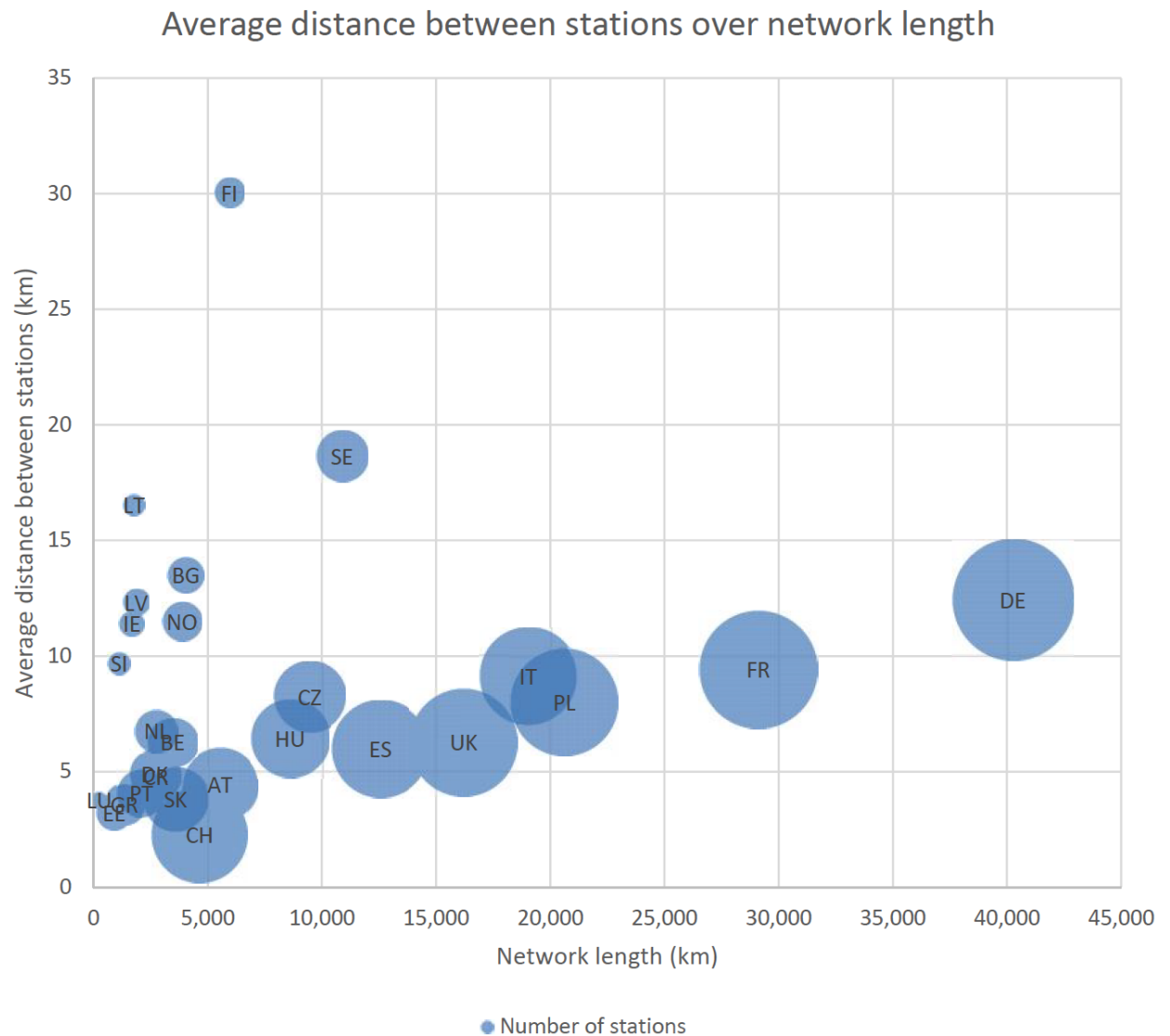
### 6.5.3 Ownership of Infrastructure:

*(Definition: In Europe, most railways infrastructure lies with the national infrastructure manager (NIM). However, some regional lines may deviate from this model, with the infrastructure owned by the operator (O) or in other hands (else)*

The 2006 survey showed that only a very limited part of infrastructure lies in the hands of actors different from the National Infrastructure Managers established by Directive 91/440/EEC. In 2014 countries which had failed to entrust their infrastructure to a dedicated infrastructure manager have complied with EC rules. As a consequence, only 8% of the infrastructure still belong to third entities: Switzerland (2 598 km, i.e. 46% of the entire infrastructure), Germany (1 955 km of *nich-bundeseigene Eisenbahnen*), Austria (535km); Italy and Spain.

## 6.5.4 Number of Stations/Stops Served:

There are 27 693 stations or stops in Europe, translating in an average distance between stations/stops of 8,2 km. This reflects well the local character of most railway infrastructure (dedicated high speed lines were removed from the survey). There is a slight difference between EU-27 (25 303 stations/stops and 8,7 km) and EFTA (2 390 stations/stops and 3,6 km, resulting from the extremely dense station network in Switzerland).



**CHART 30.** Average distance between stations/stops over network length

Finland and Sweden have the highest average distance between stations, but this is due to their stretched-out networks in areas with low inhabitant densities. For instance, when only the Helsinki metropolitan area is considered, the average distance between stations shrinks to 3,9 km. For all surveyed countries, the average distance is 8 km.

## 6.6 ROLLING STOCK DATA

- Rolling stock type

(Type and number of units per type: Unmotorised carriages (Single deck and Double deck) and Motorised carriages (Diesel multiple units - DMU and Electrical multiple units – EMU))

Rolling stock is counted as the number of coaches. For multiple units, an assumption was made of 3 coaches per multiple unit on average. There are 116 214 railway coaches operated in Europe.

Rolling stock (number of coaches and multiple units)

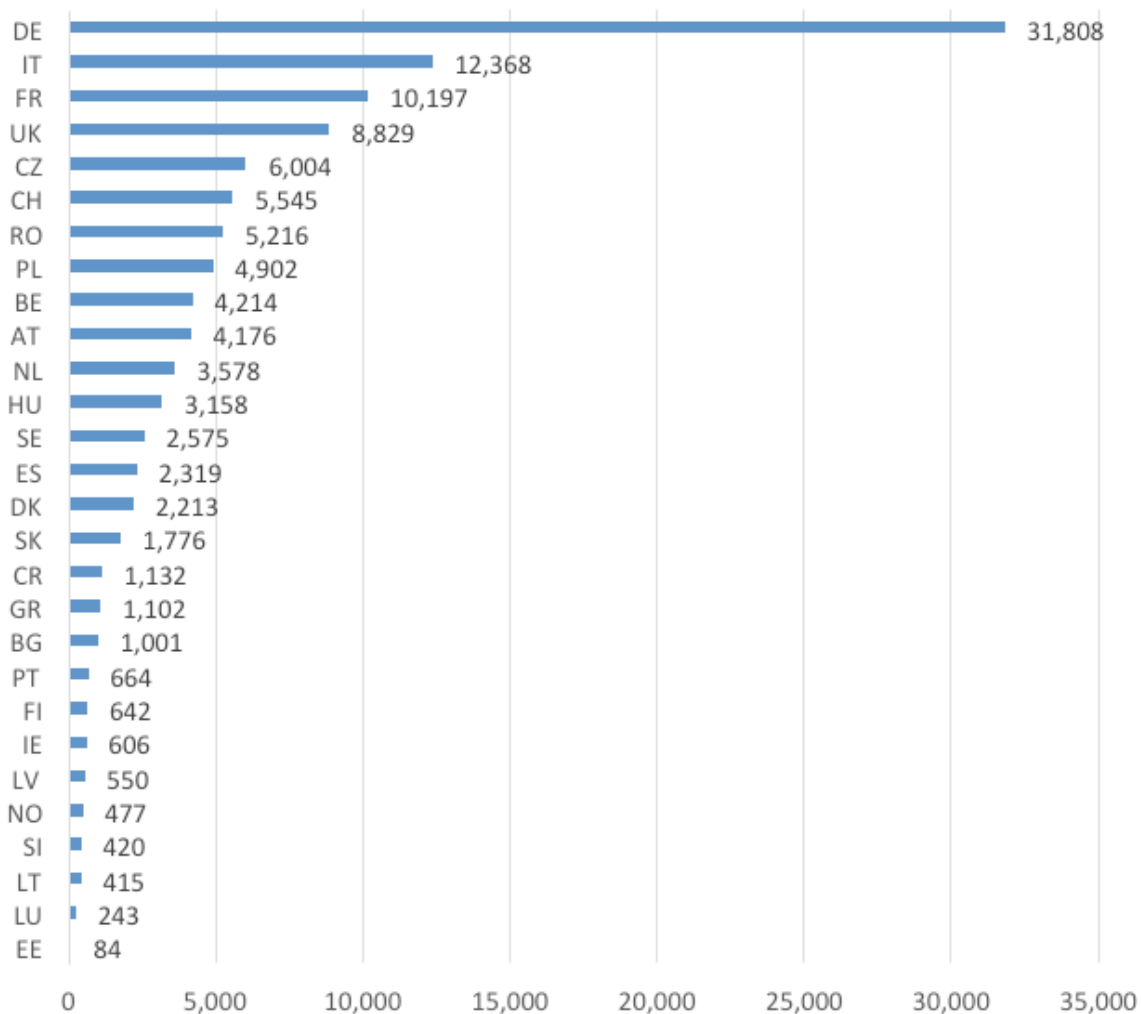
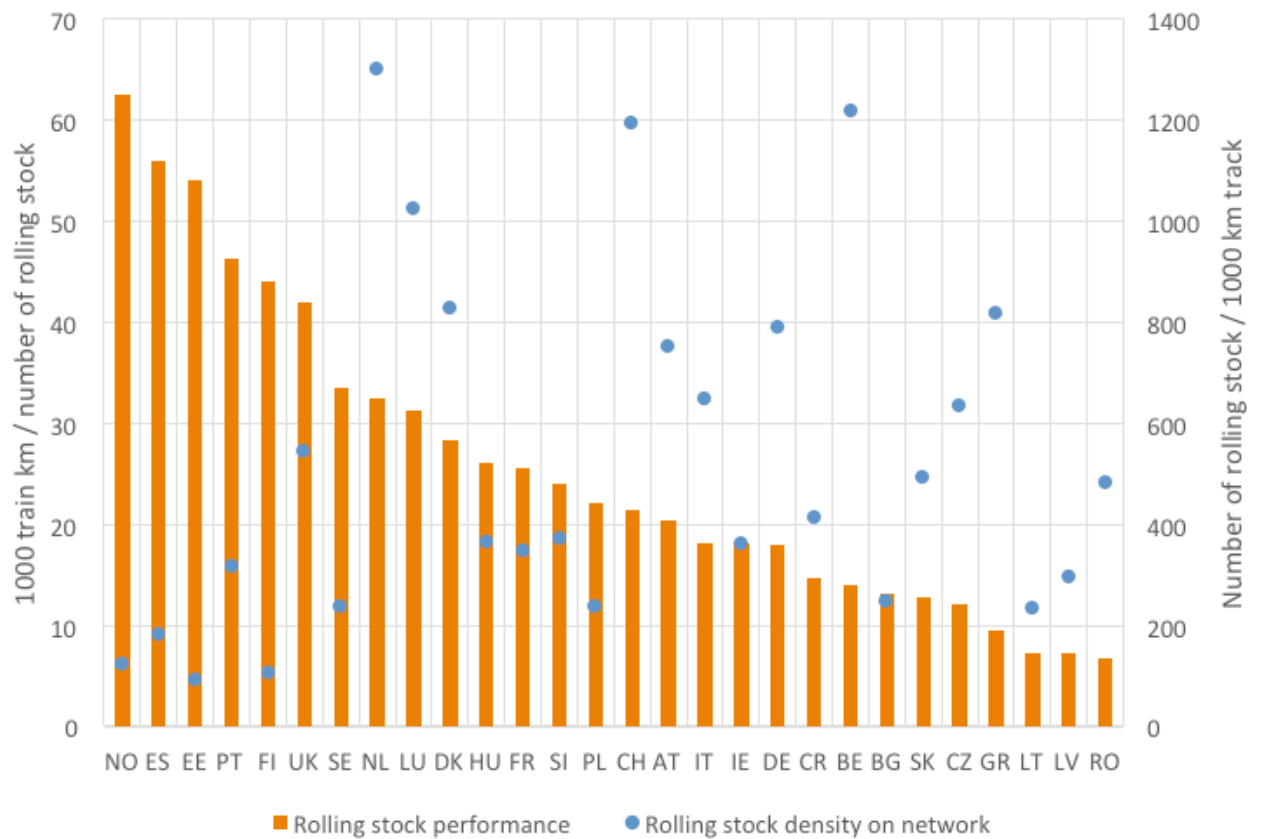


CHART 31. RSR Rolling stock

Looking at the type of rolling stock, by far prevailing were the EMUs (49% of the total fleet), followed by loc-hauled coaches (29%) and the DMUs (21%). These figures are very different from the 2006 (39% for single deck coaches and 24% for EMUs) study, mainly due to methodology changes. In 2006, single coaches, locomotives and multiple units had been counted as “1” despite the fact that the carrying capacity was not uniform. This was the reason to introduce the change of approach. If we had applied the 2006 counting methodology, the results would have been 55% for (single and double deck) coaches, 31% for EMUs and 14% for DMUs, more in line with the 2006 figures.



## Rolling stock performance and density on network

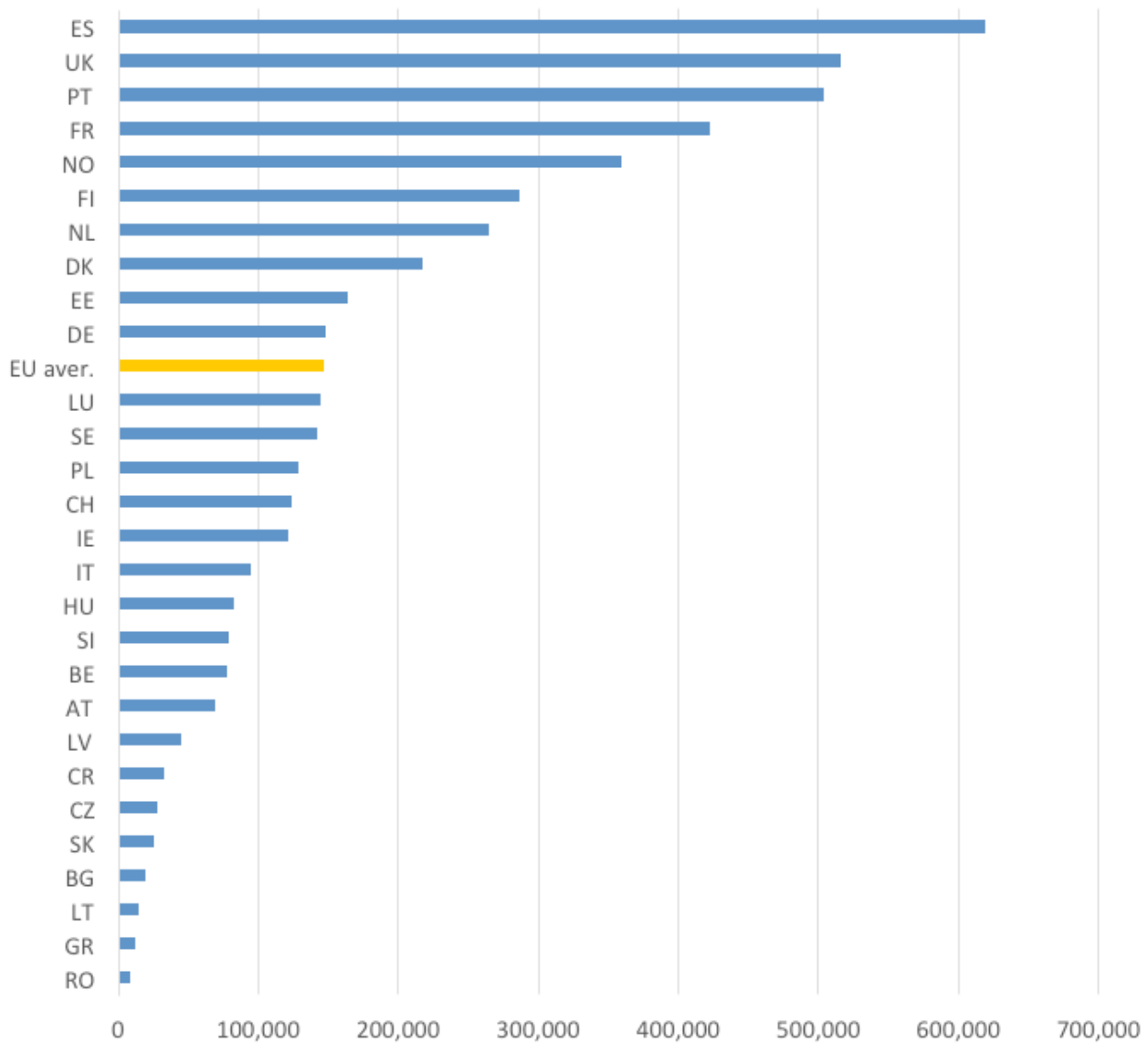


**CHART 32.** Rolling stock performance and density on network

Rolling stock performance should be interpreted with caution as it compares train kilometers to number of rolling stock coaches!



## Fleet static productivity



**CHART 33.** Rolling stock static productivity: yearly number of passenger per rolling stock unit

In order to depict the use intensity of the moving assets, the ratio of “number of passengers per coach” was generated. It shows, independently from company operating strategies, how intensively the fleet is being used.

**The survey intended also to ask deeper questions on the business environment and the impact of the financial and economic crisis on railways in Europe:**

**Questions were the following:**

- o Did the economic crisis (2008-2013) affect your operations?  
If yes, please detail (e.g. in % of train x km, or km of line closure, or % of services cancelled... over a period you need to specify in comparison with a base year you need to specify as well).
- o Did the economic crisis (2008-2013) affect your level of demand (number of passengers)?  
If yes, please give details of the order of magnitude in % ..., over a period you need to specify in comparison with a base year you need to specify as well.
- o Future evolution of the patronage (number of passengers) :  
G- Growth; F-Flat; D-Decrease  
Please give details of the order of magnitude in %:  
Please specify the starting year and period(s) considered (e.g. 5, 10, 20 years):

Unfortunately, as the study had to be performed from desk and literature research instead of from survey feedback, information were only very scarcely available. Comparison of data between the 2006 and the present survey help us draw some conclusions:

On the demand side: overall demand for railway services has increased significantly both in terms of passenger-km (+14 %) and above all in terms of patronage (+ 25 %).

The supply side cannot be assessed as the 2006 survey had not provided precise supply data

Fleet information seems to indicate a stable situation. However, for methodological reasons, it is difficult to compare (train vs. coach figures). In addition, available fleet information tends to provide an inflated picture of the reality of the fleet in operation. In some countries, fleet of loco-hauled coaches is very high and it is suspected that a large proportion of them are no longer in regular services. Anyone familiar with some stabling yards in many countries will probably be in agreement with this statement.

Looking at the network and track length in particular, the survey indicate a growth of 45 000 km (+24%). This would come as a surprise to many readers. Here again, caution must be taken: track length data stem from infrastructure manager reports or from Member States' network statement and include all infrastructure. It was decided to keep the data as such and not to apply ratio to assess the "useful length" for regional and suburban services, as had been done in the 2006 survey. This approach has been deemed as too arbitrary. Therefore comparison should not led to the conclusion of network growth.



## 7. RESEARCH ASPECTS

The importance of this market and operational segment can also be seen from another perspective. Numerous EU rail stakeholders are involved in various research activities that try to address different challenges pertaining to RSR in order to enhance its performance and competitiveness. A number of EU-funded FP7 research projects that touch upon such issues are still on-going or have just finished.

One is precisely FOSTER RAIL, the project that has supported UITP and its partners from ERRAC not only to present this updated set of statistics, but also to identify the strategic research topics that need to be addressed for the years to come. These, together with the topics relevant for the other rail segments, have been translated into the Strategic Rail Research and Innovation Agenda (SRRIA). At the moment of printing, based on the main topics identified by this document, the ERRAC/FOSTER RAIL partners are developing a set of roadmaps in order to outline the implementation of these research priorities.

Another very important project is the Next Generation Train Control (NGTC), whose main aim is to try to bring the CBTC (urban rail) and ETCS/ERTMS (mainline rail) signalling systems to a significant convergence. Other topics addressed are the Moving Block Principles and the IP-based radio communication systems. All will ensure superior operations for the RSR, and better links with the urban rail and mainline rail flows. The most obvious benefits of such development would be increase in line capacity by reducing headways between trains without compromising on safety parameters. The passenger growth figures found in this deliverable (+30% of passengers in 10 years) calls for capacity increase. Achieving this through improved signalling will obviously be a much more affordable solution than investment in new infrastructures. Other FP7 projects which can be counted as contributing to the future RSR developments are: NODES (interchanges), MERLIN (energy), etc.

Concerning the present and the near future research, the focus is now on the Shift2Rail Joint Undertaking (S2R JU). This is the first European rail joint technology initiative to seek focused research and innovation (R&I) and market-driven solutions by accelerating the integration of new and advanced technologies into innovative rail product solutions<sup>10</sup>. Its declared aim is to promote the competitiveness of the European Rail Industry and to try and meet the changing EU transport needs in order to contribute to the completion of the Single European Railway Area (SERA). Specifically mentioned are two other crucial points:

- The need to create more capacity to cope with growing passenger and freight mobility demand. Therefore the capacity increase (and the future needs) outlined by S2R meets the data results outlined by this study.
- The modal shift, to attract the users to rail services. For the EU passenger this would translate into more travel options, more comfort, and improved punctuality. Such a goal would help consolidate the RSR sector, which is constantly facing the challenge of competition from the road sector. For the freight forwarder/shippers this will mean that rail freight will become more cost effective, punctual and traceable as a shipment option. It is another important aspect, since the infrastructure is often shared between passengers and rail, and these developments need not prejudice the interests and performances of one side to the detriment of the other.

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<sup>10</sup> <http://www.shift2rail.org/>

S2R is divided into a number of Innovation Programmes (IPs), which address the major research arenas, and could have a great impact on the RSR:

- IP1 Cost-efficient and reliable trains, including high capacity trains and high speed trains;
- IP2 Advanced Traffic Management and Control Systems;
- IP3 Cost Efficient and Reliable High Capacity Infrastructure;
- IP4 IT Solutions for Attractive Railway Services;
- IP5 Technologies for Sustainable & Attractive European Rail Freight.

While S2R is indeed the main instrument for research for the next years, the H2020 programme will offer other channels that can address the different challenges related to RSR. The ERRAC partners are working so as to ensure that future research project will include rail topics in a transversal yet comprehensive manner, thus bridging the differences in approach and perceptions between rail and other domains. It must be mentioned that within the H2020 projects, the work started in FOSTER RAIL will be continued through another EU project, SETRIS. The project will not only deepen and further structure the research roadmaps, but will also offer a partnership between the rail stakeholders and those coming from other sectors: road, freight, air, etc. It will thus ensure a better approach not only for the RSR segment, but for all stakeholders at the land (public) transport level.

## 8. CONCLUSIONS

This second edition of the ERRAC suburban and regional railway market study confirms the critical importance of regional and suburban railways in Europe which account for 90% of total railway passengers in Europe and 50% of passenger-kilometres. Regional and suburban trains carry as much passengers as all metros in Europe and 10 times more passengers than air travel.

This market is nearly entirely governed by Public Service Obligation contracts between governments (mainly at infra-national level) and operators. The Lion's share of the service production is still in the hands of the large incumbent operators, even in countries where liberalisation is well advanced (Germany, Nordic countries...). The only exceptions are UK and Poland.

It is currently an opening market in several European countries and the current final discussions around the political pillar of the 4th Railway Package will largely determine the course of evolution for the coming decade. It is also a challenging public transport market, notably for ensuring sustainable urban mobility, encouraging modal shift from private car and decongesting transport corridors providing access to major European cities and notably the "nodes" of the Trans European networks (TEN-T). Notwithstanding of the 4th Railway Package evolutions, this rail segment is and will remain an important source for the local and regional economy since (the vast majority of) these jobs and services cannot be delocalized.

Moreover, in the context of the COP21 climate talks and the EU efforts to lead the, the data presented shows the invaluable source that the rail sector in general and in particular the RSR segment holds for mitigating climate change on the medium- and long-term.

Taking into account all the positive, long-term implications, a last conclusion can be drawn from this study: both EU and Member-States policy-makers should regard the RSR segment as a source of regional/local development and growth. Instead of ignoring it or even preparing to significantly reduce it, as it is the case in some Eastern-European countries such as Romania, policy-makers should design long-term policies and funding in order for this rail segment to achieve its true potential, as it is already the case in some EU countries.



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Fosterrail Survey Irish Railways filled in By Cal Carmichael

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Jernbaneverket – On Track 2013  
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# 10. LIST OF ACRONYMS

Full name	
CBTC	Communications-based train control
CER	Community of European Railways
CFT	Call for Tenders
COP21	Paris Climate Change Conference (December 2015)
DA	Direct Award
DMU	Diesel Multiple Unit
DB	Deutsche Bahn (German national rail operator)
EC	European Commission
EFTA	European Free Trade Association
EMU	Electric Multiple Unit
ERA	European Railway Agency
ERRAC	European Railway Research Advisory Council
ERTMS	European Rail Traffic Management System

<b>ETCS</b>	European Train Control System
<b>EU</b>	European Union
<b>EUROSTAT</b>	EC Directorate-General for Statistics
<b>FP</b>	Framework Programme (of the European Commission)
<b>IP</b>	Innovation Programme
<b>JU</b>	Joint Undertaking
<b>MERLIN</b>	Sustainable and intelligent Management of Energy for smarter RailWay systems in Europe: an INtegrated optimisation approach – EU FP7 project
<b>NIM</b>	National Infrastructure Manager
<b>NGTC</b>	Next Generation Train Control
<b>NMS</b>	(EU) New Member States
<b>PSO</b>	Public Service Obligation
<b>R&amp;I</b>	Research and Innovation
<b>RATP</b>	Régie Autonome des Transports Parisiens (Paris public transport operator)
<b>RENFE</b>	Red Nacional de los Ferrocarriles Españoles (Spanish national rail operator)
<b>RER</b>	Réseau Express Régional (Parisian regional and suburban rail)
<b>RMMS</b>	European Rail Market Monitoring System
<b>S2R (JU)</b>	Shift2Rail Joint Undertaking
<b>SERA</b>	Single European Railway Area
<b>SC</b>	Sub-Contracting
<b>SNCB/ NMBS</b>	Société Nationale des Chemins de fer Belges/Nationale Maatschappij der Belgische Spoorwegen – Belgian national rail operator
<b>SNCF</b>	Société Nationale des Chemins de fer Français (French national rail operator)
<b>SRRA</b>	Strategic Rail Research Agenda
<b>SRRIA</b>	Strategic Rail Research and Innovation Agenda
<b>TER</b>	Transport express régional (French regional train services)
<b>UIC</b>	International Union of Railways
<b>UITP</b>	International Union of Public Transports

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