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PART 6/16

COMMISSION STAFF WORKING DOCUMENT

Cohesion in Europe towards 2050

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on the 8th Cohesion Report: Cohesion in Europe towards 2050

{COM(2022) 34 final}

Chapter 4 A MORE CONNECTED EUROPE – PART 1

- For journeys between EU cities of up to 500 km, rail has the potential to successfully compete with short haul flights in terms of total travel time, provided that a sufficient rail operating speed can be achieved. Speeds of around 140 km per hour appear to be sufficient for rail to consistently outperform air flights for trips of this distance or less.
- For journeys in the EU of up to 90 minutes, cars are usually a better option than trains. Nevertheless, in most eastern Member States more investment in the road network could still substantially improve accessibility. By rail it tends to take much longer to reach destinations, particularly in rural and border areas, but the total travel time of a rail trip can often be significantly reduced by cycling to and from stations.
- Within metropolitan areas, the ability to reach nearby locations by car is strongly affected by congestion. Fortunately, the majority of the people living in cities in the EU have good access to public transport, though when suitable infrastructure is in place, bicycles can be a much quicker way of reaching nearby destinations than public transport.
- The EU aims to cut road traffic fatalities by at least 50% between 2020 and 2030, reducing them to less than 25 per million inhabitants. There are only a few regions where the rate at present is this low, highlighting the need for a coordinated effort to improve transport infrastructure and user behaviour. By lowering speed limits, many cities now have a fatality rate well below the 2030 target, but road safety needs to improve further to meet the 2050 vision of zero fatalities.
- Broadband connections in the EU show a clear digital divide both between rural and urban areas and between less developed and more developed regions. The provision of digital services and the capacity to operate successfully in a global business environment increasingly rely on fast and effective broadband connections. Unless the gap is closed, the competitiveness of less developed and rural areas is likely to deteriorate, leading to even greater disparities.

Contents

Chapter 4 A MORE CONNECTED EUROPE – PART 1

Mobility of people is an enabler of economic and social life. Well-targeted infrastructure investment and network design are crucial for a transport system that provides accessibility to people and businesses, as well as for reducing regional disparities in connectivity.

Despite the benefits, mobility involves costs to society. These include emissions of greenhouse gas and pollutants, but also accidents and congestion, all of which affect health and wellbeing. The EU transport strategy is currently focused on the transition to sustainable and smart mobility,[1] which involves reducing significantly its greenhouse gas emissions, and *inter alia* requires a decisive shift in modes of transport.

This chapter shows that, in terms of accessibility and connectivity, rail passenger transport in particular has the potential to be a substitute for short-distance flights and road journeys between cities, provided that network design, service frequency, and travel speed are sufficient to make it an attractive alternative.

In the urban environment, congestion poses another important challenge. Here, the potential for more sustainable modes, including public transport and non-motorised means of moving around, is very high due to the concentration of population and shorter journey distances.

This chapter also covers other aspects of a sustainable passenger transport system, including electric vehicle charging infrastructure and road safety. Importantly, an increase in road safety might boost the take-up of non-motorised modes of transport, bicycles in particular, which in turn would further contribute to low-emission mobility.

Finally, the chapter focuses on broadband connections, which, in an increasingly digitalised world, have become an important aspect of connectedness. Good coverage and fast digital connections are important in all areas, especially in remote or sparsely populated ones, where transport networks are less developed and digital connectivity can play an important role in ensuring access to essential services.

4.1 RAIL CAN COMPETE WITH SHORT HAUL FLIGHTS[2]

In 2021, the Commission proposed an action plan to boost long-distance and cross-border passenger rail services. This builds on efforts by Member States to make key connections between cities faster by better managing capacity, coordinating timetabling, creating facilities

[1] COM(2020) 789 Final

[2] The analysis in this section focuses on a comparison of travel times and does not look at other aspects relevant to transport mode choices such as transport prices, comfort and safety.

for sharing rolling stock and improving infrastructure to stimulate new train services, including at night.[3]

Improving high-speed rail[4] services could provide travellers with an alternative to short-haul flights, which would not only reduce CO_2 emissions but also free up scarce airport capacity and avoid maintaining unprofitable air routes. Depending on operating speed, boarding time[5], taxiing time and travel time to reach the airport or station[6], high-speed rail can be a viable alternative to air travel up to distances of 500 km.[7]

High-speed trains account for 31% of total passenger-kilometres by rail in the EU.[8] In France and Spain, it is close to 60%. However, over half of Member States do not yet have any high-speed railway lines at all.

For the 1 356 rail connections between EU cities with 200 000 inhabitants or more, or which are national capitals, and located within 500 km of each other, the speed of the fastest train service[9] is considerably less than that of high-speed rail (Map 4-1 and Figure 4-1). On only 3% of these lines is the speed above 150 km an hour. The proportion is the largest in the south of the EU, where both Italy and Spain have a well-developed high-speed rail network. In the north-west, the number of high-speed connections, which are mainly in France and Germany, is similar but the proportion is smaller. Because of higher population density, the rail network is denser with more short distance connections with lower speeds. Nevertheless, the north-western EU has the largest proportion of rail connections faster than 90 km an hour and only a few pairs of cities without any connection at all. The rail network is less developed in the eastern EU, with no connection between 20% of city-pairs and no connections with speeds above 150 km an hour. Indeed, on most routes the speed is still below 60 km an hour.

[3] EC(2020) Sustainable and smart mobility strategy – Putting European transport on track for the future. COM(2020) 789 final.
[4] A high-speed train, as defined by Eurostat, is "*a train designed to operate at a speed of at least 250 km/h on dedicated high speed lines*", and a tilting high-speed train as "*a train with a tilting system designed to have an operating speed of 200 km/h or above on upgraded high speed line*s".
[5] The time between arrival at the airport or rail station and the actual departure.
[6] Rail stations tend to be located in or very close to urban areas and so to be more accessible than airports.
[7] Some authors consider a viable distance for high-speed rail to be up to 1000 km, or even 2000 km if night trains are considered (see e.g. Rothengatter et al., 2011; Chiara et al, 2017; Sun et al., 2017. htttps://www.hindawi.com/journals/jat/2018/6205714/)
[8] This figure relates to all high-speed trains including tilting trains able to travel at 200 km an hour, which do not necessarily require high-speed infrastructure.
[9] The fastest service available for departure during a weekday in 2019 between 6:00 and 20:00.

Map 4-1: Speed of rail connections between major urban centres in the EU, 2019

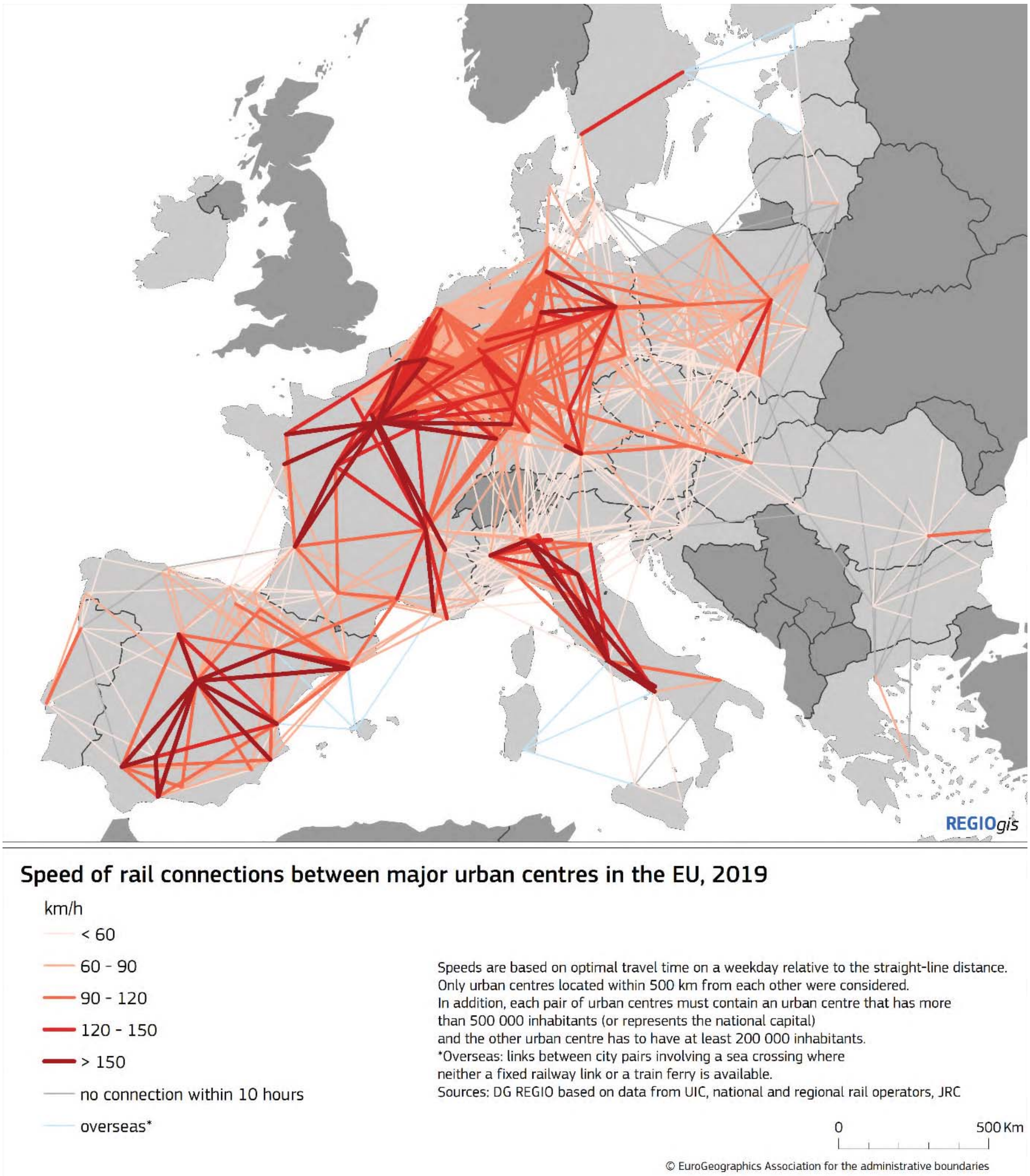
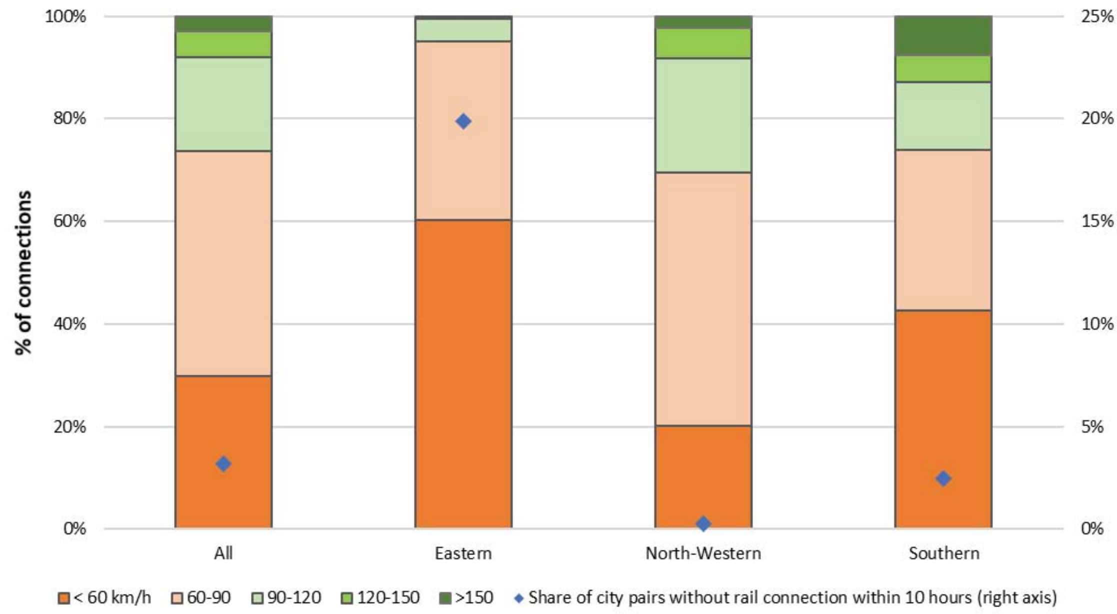


Figure 4-1: Speed of rail connections between urban centres by geographic region, 2019

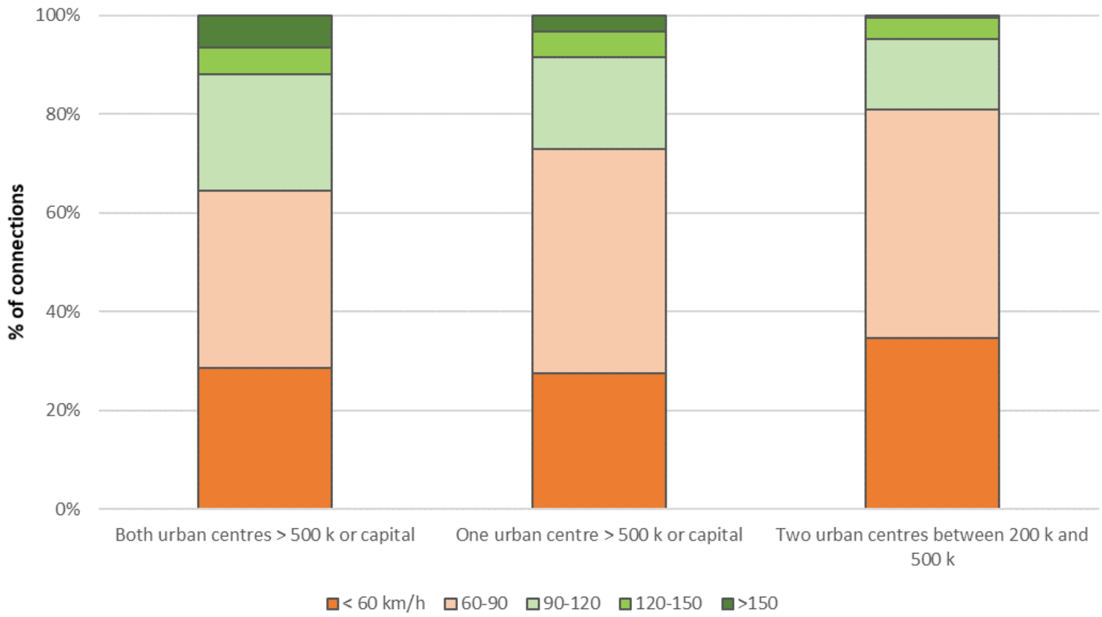


Source: DG REGIO
Note: Only pairs of urban centres located within 500 km from each other are considered. In addition, urban centres has to have at least 200 000 inhabitants.

The share of connections with speeds above 150 km an hour is larger between large urban centres, i.e. with populations of over 500 000, (7%) than between small ones, with populations of 200 000-500 000 (1%) or between large and small centres (3%) (Figure 4-2). There is a similar difference for the share of connections with speeds of over 90 km an hour (36% between large city pairs and 19% between small ones). Despite some progress towards technical inter-operability, rail travel across EU borders is still hindered by many obstacles. The rail network has numerous gaps where the national railways are not properly connected.[10] Over 5% of city pairs in different countries are not connected by rail, against only 0.3% of pairs of cities in the same country (Figure 4-3).[11] Speeds on cross-border connections also tend to be lower than on domestic connections. About 40% of the former have speeds below 60 km an hour compared to 16% of the latter. Moreover, only 0.4% of cross-border connections have speeds of over 150 km an hour.

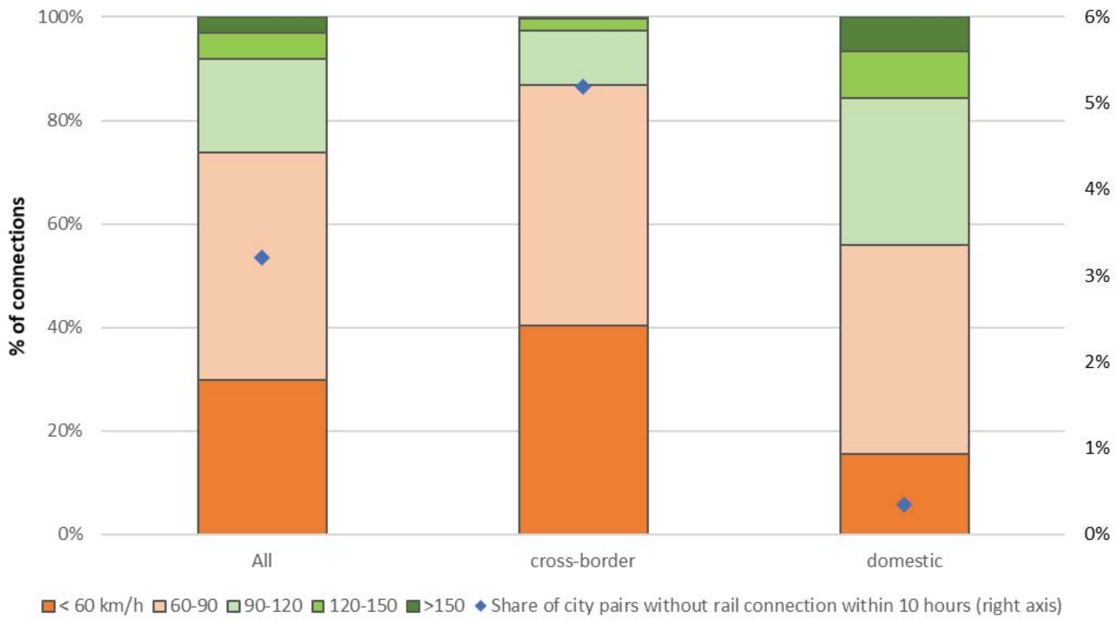
[10] EC(2018) Comprehensive analysis of the existing cross-border rail transport connections and missing links on the internal EU borders
[11] It should be noted that these routes, whether cross-border or domestic, may be served by long-distance bus connections, which could be a reason for there being no rail connection.

Figure 4-2: Speed of rail connections between urban centres by population size, 2019



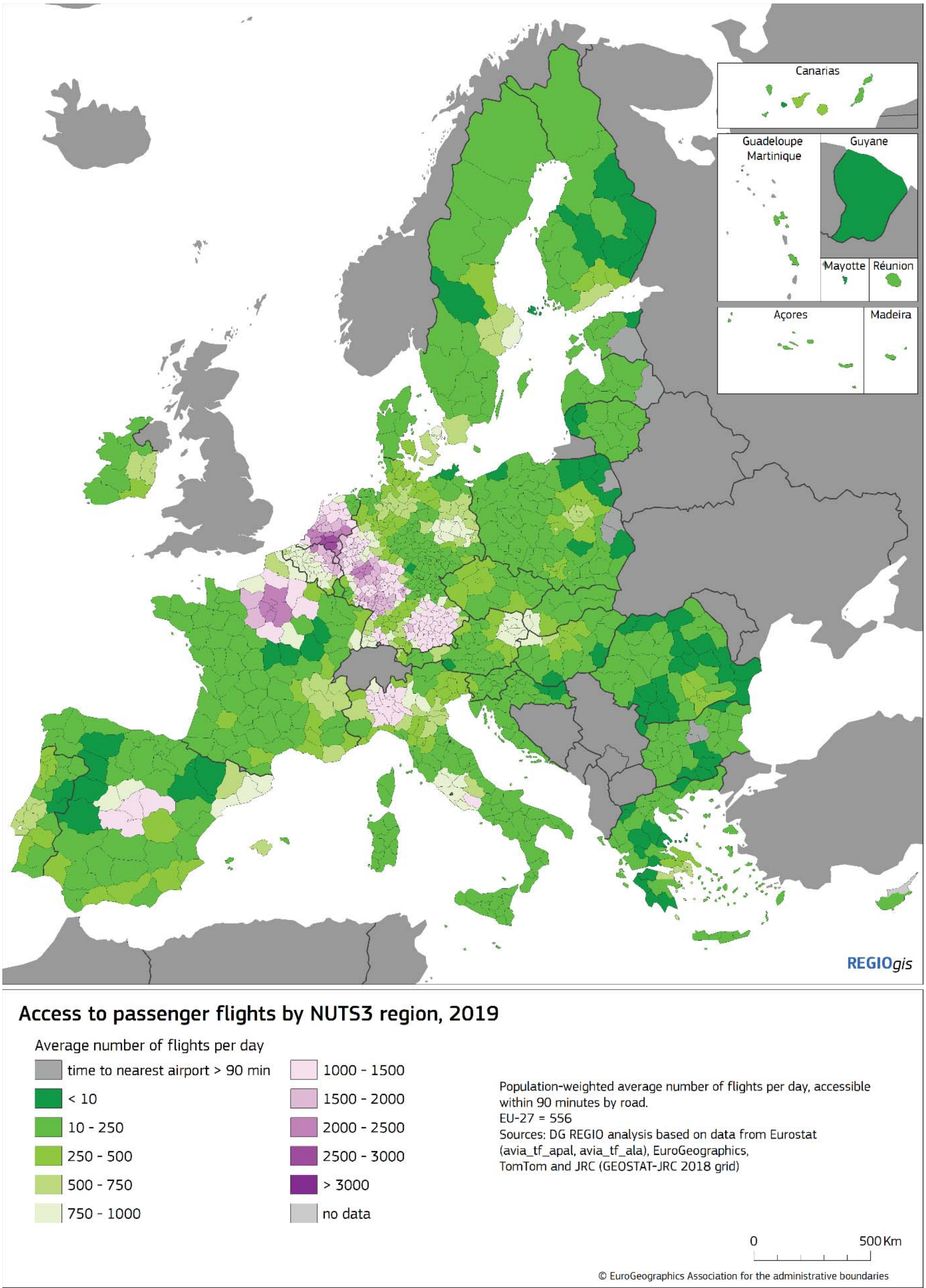
Source: DG REGIO
Note: Only pairs of urban centres located within 500 km from each other are considered. In addition, urban centres has to have at least 200 000 inhabitants.

Figure 4-3: Speed of cross-border and domestic rail connections between urban centres, 2019



Source: DG REGIO
Note: Only pairs of urban centres located within 500 km from each other are considered. In addition, urban centres has to have at least 200 000 inhabitants.

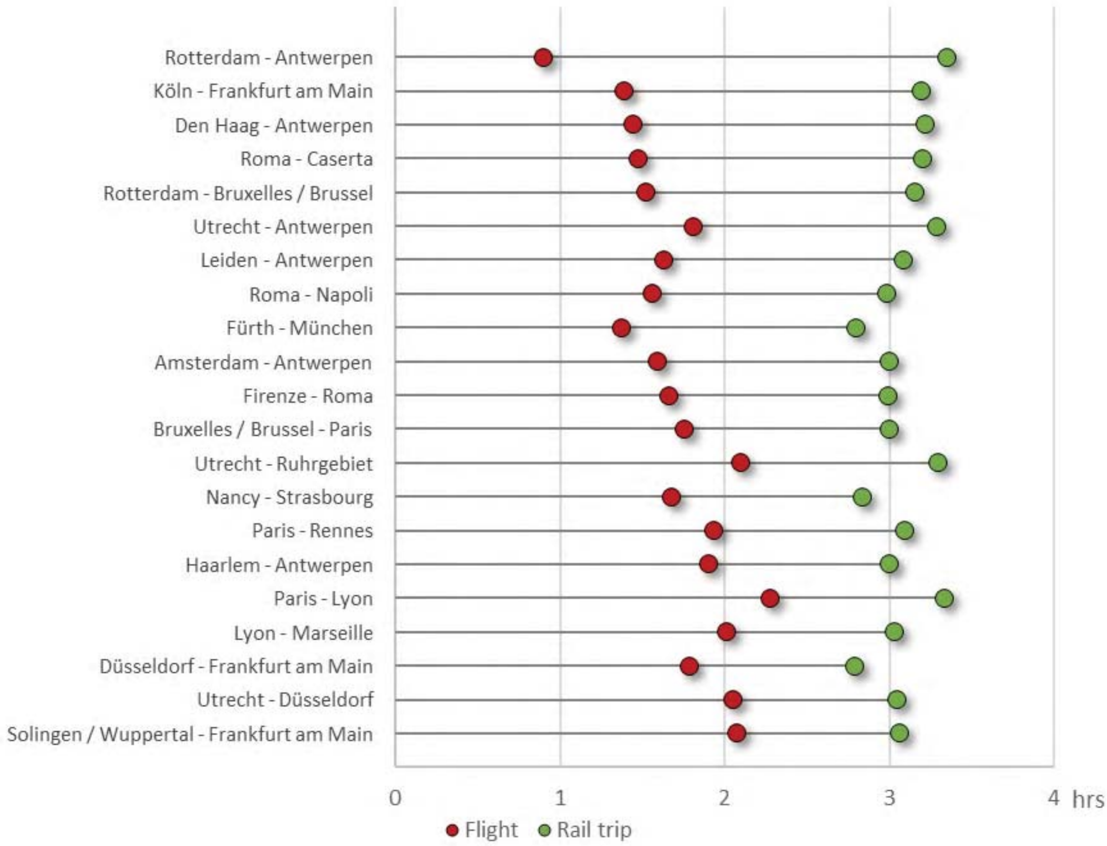
Map 4-2: Access to passenger flights by NUTS3 region, 2019



On average, EU citizens have access to 556 flights within 90 minutes of driving time. However, access to passenger flights is highly uneven across the EU, ranging from a number of regions in the south of the Netherlands, where people have access to over 2,500 flights a day, to regions in eastern Poland, Bulgaria, Estonia and Latvia, where inhabitants have no access to any flights within 90 minutes driving time (Map 4-2). Access to flights is notably greater in regions close to large urban centres, capital cities in particular, where large airports tend to be located.

As indicated above, any realistic comparison of travel by train with travel by air has to take account of differences in the time needed for accessing airports or rail stations, waiting times and actual departure and arrival times[12]. Some 297 connections between EU cities[13] within 500 km of each other are served by both rail and air. On 68 of these routes, the total travel time by rail is shorter than that by air and on 21 of them, the difference is an hour or more (Figure 4-4). The routes concerned are mainly in and between the Netherlands, Belgium, Germany and France but also include three domestic connections in Italy.

Figure 4-4: Total travel time by rail and air on selected routes (hours), 2019



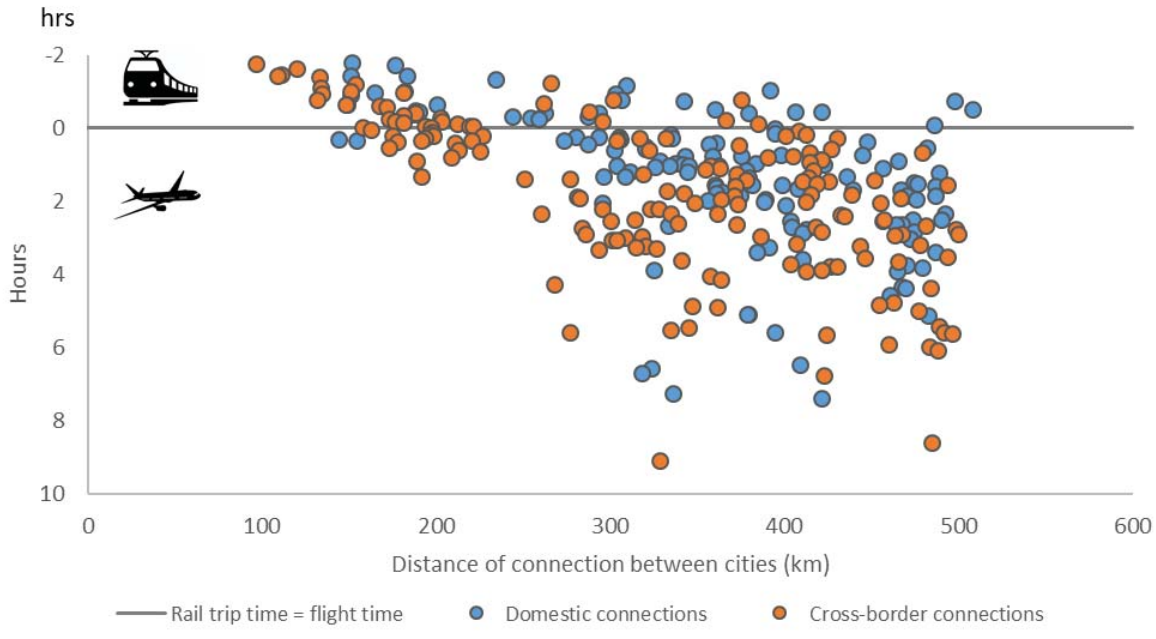
Routes are ranked by the difference in travel time between rail and air
Source: DG REGIO, DG JRC based on SABRE airline data

[12] The assumptions used for the present analysis are as follows. Time before boarding the first train: 15 minutes; check-in and boarding at the departure airport: 60 minutes; taxiing is assumed to be included in the flight time: 30 minutes; transfer time at the arrival airport: 30 minutes. A flight speed of 500 km an hour is assumed. If more than one connection between airports is available linking the same urban centres, the travel time of the connection with the highest number of passengers is taken.
[13] As before, this concerns pairs of urban centres with at least 200 000 inhabitants each or which are capital cities, and are located less than 500 km from each other.

Although planes tend to outperform trains for distances of over 300 kilometres, there are still many routes of this distance where the reverse is the case (Figure 4-5). This indicates that rail has the potential to successfully compete with aviation for relatively long distances, providing a sufficient operating speed can be achieved. For the routes considered here, train speeds of 140 km an hour appear to be sufficient for rail to outperform air (

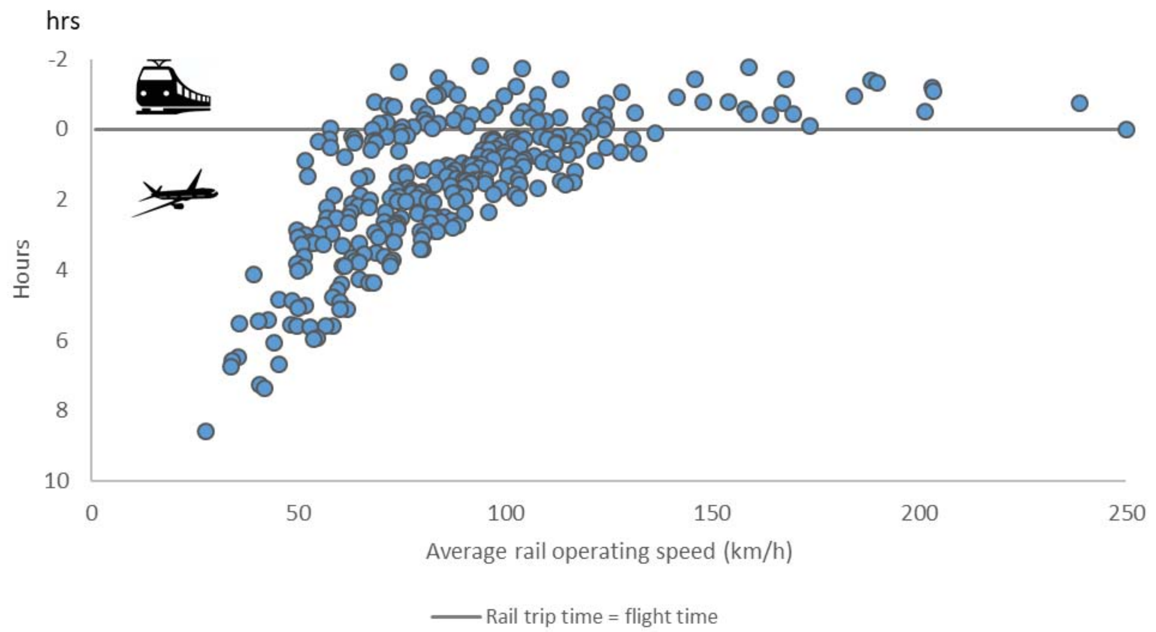
Figure 4-6).

Figure 4-5: Difference in travel time by rail as opposed to air according to distance between city-pairs (hours), 2019



Note: Negative values on the vertical axis indicate that the total travel time by rail is less than that by air.
Source: DG REGIO, DG JRC based on SABRE airline data

Figure 4-6: Difference in travel time by rail as opposed to air according to train operating speed (hours), 2019



Note: Negative values on the vertical axis indicate that the total travel time by rail is less than that by air.
Source: DG REGIO, DG JRC based on SABRE airline data

4.2 ROAD AND RAIL PERFORMANCE FOR DAY TRIPS AND BEYOND DIFFERS BETWEEN MEMBER STATES AND DEGREE OF URBANISATION

Outside cities, public transport tends to be less developed in terms of network density and service frequency. Distances are often too great to use a bicycle or to walk. As a result, car dependency tends to be higher. For travel to places up to 120 km away, trains are the main alternative to cars, providing there is a railway station nearby. For longer distances of up to 500 km between larger urban centres, trains can outperform cars (as well as planes as seen above).

Box 4.1: Deriving policy-relevant indicators: accessibility in terms of proximity and

transport performance

Improving accessibility, i.e. the ease of reaching destinations or activities distributed in space, is one of the main goals of transport policies. Accessibility indicators combine the effectiveness of transport systems with the spatial distribution of places. However, the accessibility of a city can be high because of a good transport system or because the city is large and dense with many potential destinations, and people, concentrated in a small area. In order to distinguish between the two, the International Transport Forum together with the European Commission and the OECD has developed a methodological framework based on three components (summarised in Table 4-1):

Absolute accessibility is the total number of destinations, or the population that can be reached (by driving, cycling, walking or taking public transport) within a given time from a particular place. As indicated above, it encompasses both the size and density of a city or a particular area and the transport network that connects the place in question to other places both within the city and outside.

Proximity refers to the spatial concentration around the origin of a trip and the potential destinations or number of people that can be reached. It measures the number of destinations, or population, within a given distance to the origin regardless of the time required to travel to them. Proximity in the present context is determined by geographical characteristics and land use policy that affect the distance between the origin and potential destinations for travellers.

Transport performance for any mode takes explicit account of the spatial distribution of destinations. It relates the total number of destinations, or population, accessible (by car, public transport or bike) to the number of destinations, or population, nearby (i.e. within a given radius). It is calculated as the ratio between absolute accessibility using a given mode and proximity to potential destinations or the population that can be reached. A ratio of one or more means that the performance of a particular mode is high; a ratio close to zero that it is low in providing access to nearby destinations. Although the ratio is somewhat abstract, it avoids the bias resulting from the number of destinations or size of population surrounding the location concerned. It incorporates several aspects of the effectiveness of the mode being assessed in providing access to destinations, such as, in the case of public transport, the frequency of service, the vehicle speed, the number of stops and changes and the distance to the nearest stop or station. Note that this concept of transport performance is narrowly defined within an accessibility context and as such does not reflect other quality aspects of a transport system such as ticket prices, environmental costs, traffic safety or access to parking.

Table 4-1: Accessibility indicators

Accessibility indicator	**Description**
Absolute Accessibility	Number of destinations, or the population, reachable within a fixed amount of time with a given mode, i.e. accessible destinations or population.
Proximity	Total number of destinations, or the population, within a certain distance, i.e. nearby destinations or population.

Transport performance	Ratio of accessible destinations, or population, to nearby destinations or population.

A feature of this set of indicators is that accessibility is the product of proximity and transport performance. These two together, therefore, indicate the effect of land use patterns and transport networks on accessibility.

4.2.1 Passenger rail performance is poor, particularly in rural areas, but improves if the rail trip is combined with a bike ride

As a sustainable means of transport, rail is pivotal in the design and construction of the TEN-T, as it is in the EU's climate policy.

The extent to which travellers are willing to consider using trains depends in large measure on the time journeys take as compared with using a car. It also depends on the ease of reaching the departure station and of reaching the final destination from the arrival station.[14] A realistic comparison between train and car use needs to take a door-to-door perspective, where the time taken also depends on the means of travel (walking, cycling, public transport, car) used in combination with the train. It needs, in addition, to take account of the frequency of the train service, which means that the travel time may differ between travellers constrained in their choice of departure and/or arrival times, such as commuters, and those able to be flexible about these times (see Box 4-2).

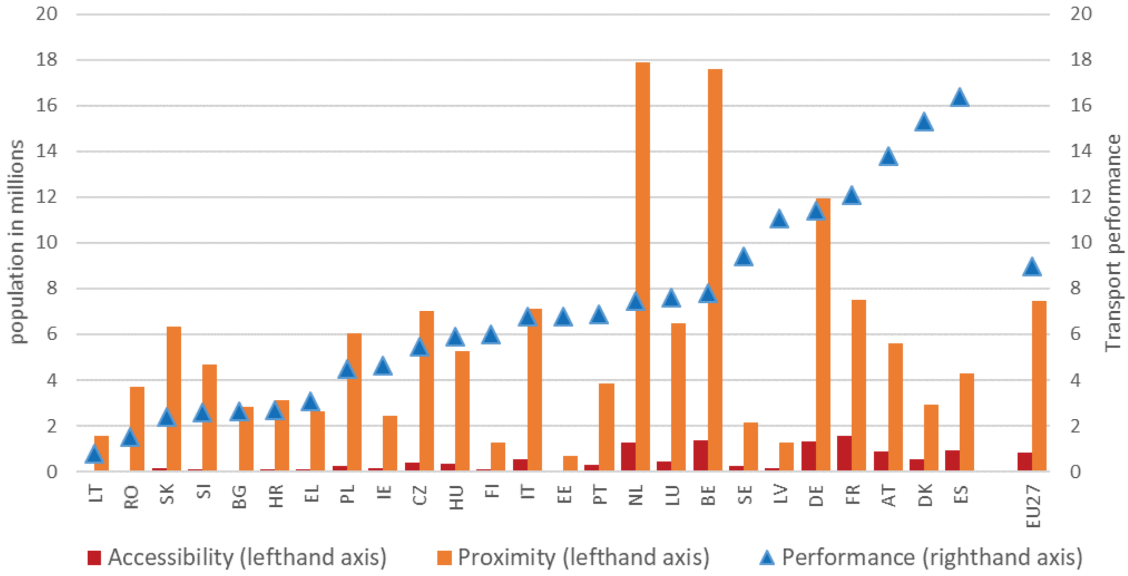
Rail performance (defined here as the population that can be reached within 90 minutes divided by the population living within a 120 km radius – see Box 4-1) varies substantially between Member States (Figure 4-7). Spain has the highest performance, followed by Austria and Germany. The eastern EU countries, particularly Lithuania and Romania, have the lowest performance[15].

The high performance of rail transport does not always translate into good accessibility. For example, the high performance in Denmark translates into only medium-level accessibility, suggesting that the low level of proximity (i.e. the dispersed nature of population) offsets the quality of the rail network and services. Similarly, in Sweden, where rail performance is similar to that in the Netherlands and Belgium, accessibility is relatively low, because of low proximity, reflecting its low population density. Conversely, accessibility by rail is highest in the Netherlands and Belgium, though rail performance is only average.

In all Member States, rail performance is much lower than performance by car. The number of people in the EU that can be reached by car within 90 minutes is 9 times more than by rail. This, however, assumes that people walk to and from the station. Using other means can increase rail performance significantly (see below).

[14] The focus of the transport analyses in this chapter is on accessibility and travel times and does not take into account other determining factors of travel choice behaviour, which include first of all direct transport costs such as ticket prices, but also aspects relating to safety and comfort.
[15] These comparisons assume that the rail trip is combined with short walks to and from the stations, and that the traveller can optimise the timing of the journey.

Figure 4-7: Accessibility, proximity and transport performance by rail plus a short walk, 2019



Note: Accessibility is defined as the population that can be reached within 90 minutes of travel time; proximity as the population living within a 120 km radius and rail performance as the ratio of the former to the latter. The figures assume travelling at an optimal time. A short walk is defined as a walk of not more than 15 minutes. Cyprus and Malta, which do not have railways, are not included.
Source: REGIO-GIS

Rail performance varies even more between regions (at the NUTS3 level) (Map 4-3, panel a). Again assuming the rail journey is combined with walking to and from the station, around 12% of people in the EU, mainly living in urban areas, have access to a relatively decent rail service (performance above 20). The top performing regions include Paris and surrounding regions, Berlin, Barcelona, København and its surrounding region, and Wien, but also Zaragoza and Valladolid in Spain, because of the presence of high-speed train services. However, in all NUTS3 regions, rail performance is lower than road (see below), which hardly encourages people to travel by train especially if they need to travel frequently.

Rail performance improves significantly if travel by train is combined with a short bike ride instead of a short walk (Map 4-3, panel b). This increases average performance in the EU from 9 to 21 and the proportion of population with access to a performance above 20 to 40%. In a number of metro regions in France and Germany, including Berlin and Paris, rail performance is increased to around 80 or above. However, rail performance remains lower than that of road in all regions.

Box 4.2: Flexible versus time-constrained rail journeys

The estimates of performance in this subsection are based on the assumption that travellers do not have any time-constraints, can plan their journey using the fastest train service available and do not have to wait at stations. Journeys with constraints on departure times may be more relevant for day-to-day travel, such as for commuting. This restricts the choice of service and may involve waiting time if connections are involved, depending on the frequency of services. Indeed, the attractiveness of trains for commuting is dependent on good service frequencies. Performance for time-constrained journeys is obviously lower. Urban areas with the highest performance in this case are now in Austria and France, as well as Denmark, suggesting very frequent services in and around their cities. Performance in urban areas in the Netherlands is almost the same as in Belgium, though performance using the fastest available connection is much higher in Belgium (as shown in Figure 4-9a). This indicates that services in Belgium are less frequent than in the Netherlands.

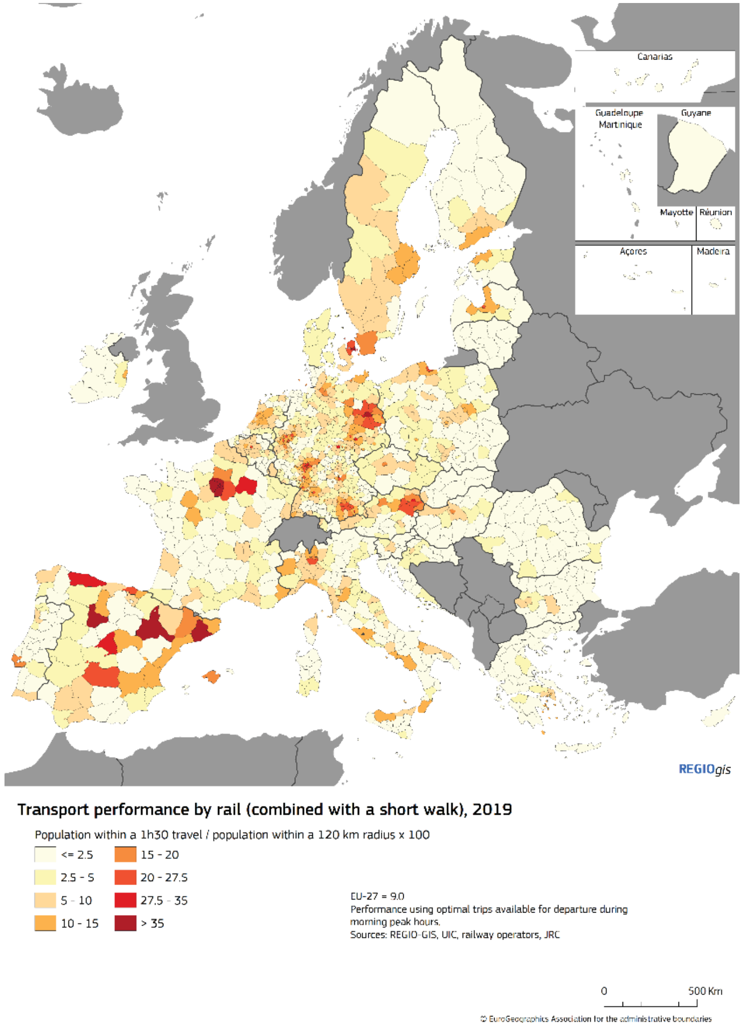
As expected, whether walking or cycling to the station, rail performance tends to be highest in cities, followed by towns (Figure 4-8, panel a). It is lowest in rural areas (see Box 4-3 for definitions), reflecting the fact that train stations tend to be located in or close to urban centres and that the population is more dispersed in rural areas.

For rail journeys combined with a short walk, urban areas in Denmark, France, Austria and Spain have the highest performance, especially in Denmark with its dense suburban rail network in Copenhagen and surrounding areas. In most countries, smaller towns are less well connected than larger cities, though in Luxembourg, Sweden and Poland, the performance is similar.

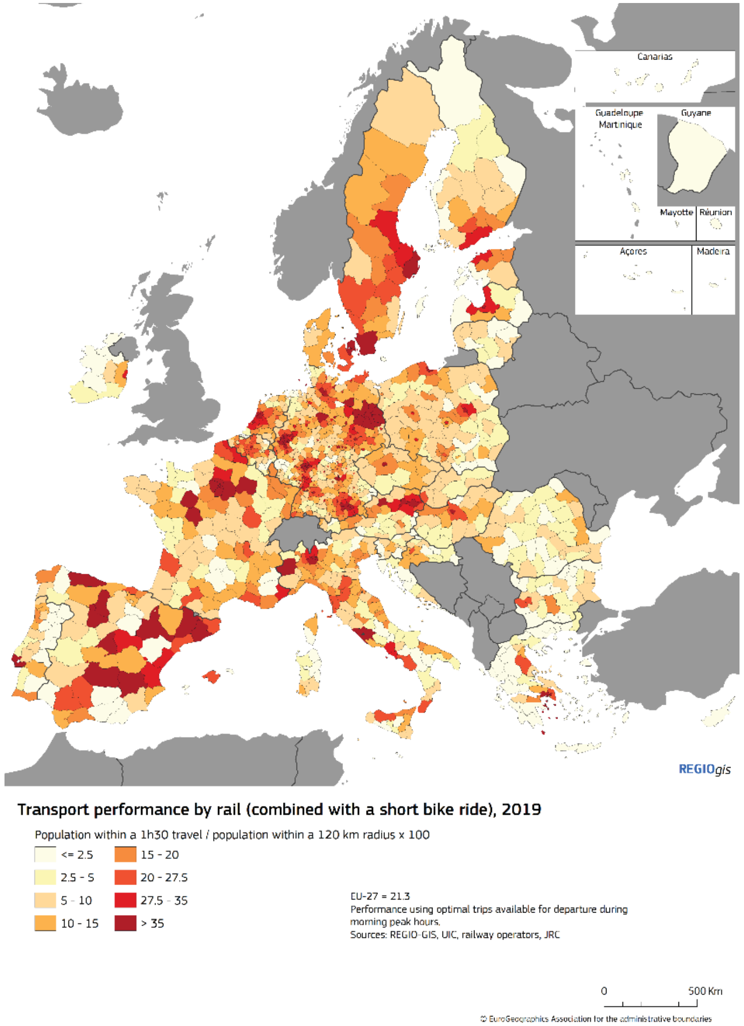
Using a bike instead of walking to the station increases rail performance to over 50 in cities in Denmark and France. In all Member States, cities benefit the most from the rail-bicycle combination in terms of their transport performance score (Figure 4-8, panel b). However, rail performance also improves in towns and suburbs by using a bike, especially in Sweden, Germany and Denmark, as well as in rural areas, if less so. This argues in favour of further developing cycle-friendly infrastructure around railway stations.

Map 4-3: Rail performance by NUTS 3 region, 2019

(a) Rail combined with a short walk



(b) rail combined with a bike ride



Box 4.3: Degree of urbanisation level 2

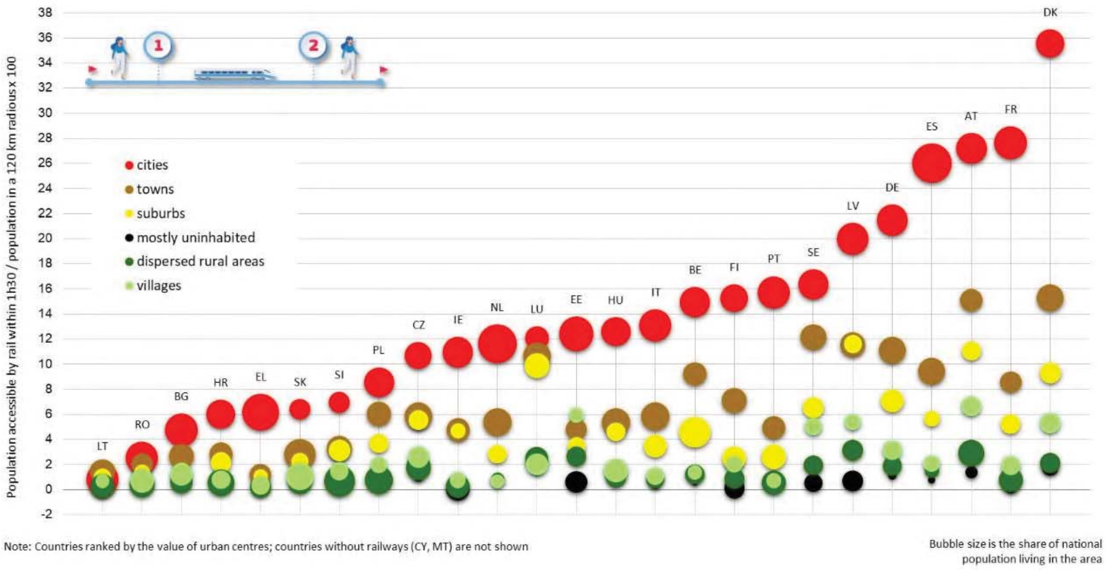
This typology classifies local administrative units (LAUs) into six categories, based on population size and density.

1. *Cities*: LAUs that contain an urban centre with population over 50 000
2. *Towns*: LAUs with the majority of the population living in a dense or semi-dense urban cluster
3. *Suburbs*: LAUs with the majority of their population living in an urban cluster that is not dense or semi-dense.
4. *Villages*: LAUs with the majority of their population living in a rural cluster
5. *Dispersed rural areas*: LAUs with the majority of their population living in low density rural areas
6. *Mostly uninhabited*: LAUs with the majority of their population living in very low density rural areas

For a comprehensive description, see https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-02-20-499

Figure 4-8: Rail performance by degree of urbanisation level 2, 2019

(a) Rail trip combined with a short walk



Source: REGIO-GIS

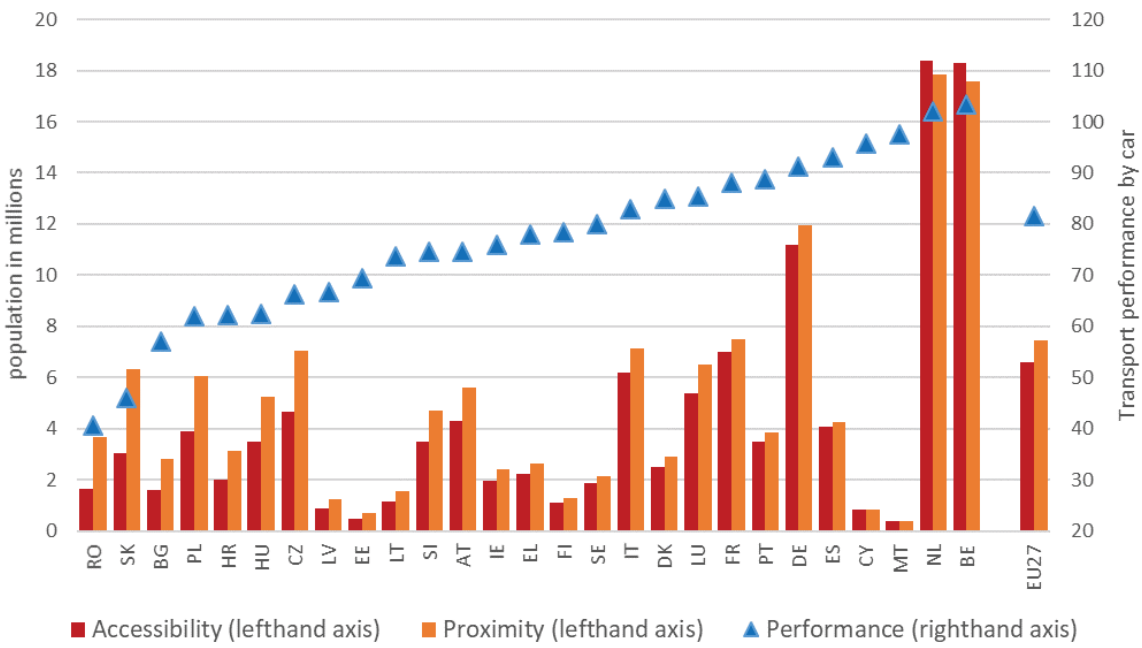
(b) Increase in rail performance if combined with a short bike ride instead of a short walk

Note: A short bike ride is defined as a bike ride of not more than 15 minutes.
Source: REGIO-GIS

4.2.2 *Road performance is higher than rail, but remains low in some Member States and rural areas*

Road performance[16] by car in 2018 varies substantially between Member States, being highest in Belgium and the Netherlands (Figure 4-9). Both countries are relatively small and highly urbanised, with a dense road network. Malta and Cyprus are third and fourth, reflecting the fact that both islands are relatively small and most destinations can be reached within 90 minutes. Portugal and Spain, two countries in which there has been several decades of substantial Cohesion Policy investment in transport infrastructure, now have road performance above the EU average and similar to that of Germany and France. Road performance is lowest in Slovakia and Bulgaria because their road networks are not yet fully developed, but also because of mountainous areas where the road network is constrained by geography.[17]

Figure 4-9: Accessibility, proximity and transport performance by car, 2018



Note: Accessibility is defined as the population that can be reached within 90 minutes of travel time by car; proximity as the population living within a 120 km radius; car performance is calculated as the ratio of the former to the latter (See also Box 2).

Source: REGIO-GIS

There is a close link between accessibility and proximity across Member States. Accessibility alone, however, is not a suitable indicator of road performance because it is to a large degree determined by proximity, i.e. how many people live nearby. For example, in Finland or Sweden, accessibility is less than half that in Poland, but this does not mean that Sweden and Finland need more investment in roads to catch up. Road performance shows that in

[16] For a description of the transport performance indicator see Box 2. In this section, road performance is defined as the population that can be reached within 90 minutes of driving time by car, divided by the population living within a 120 km radius.

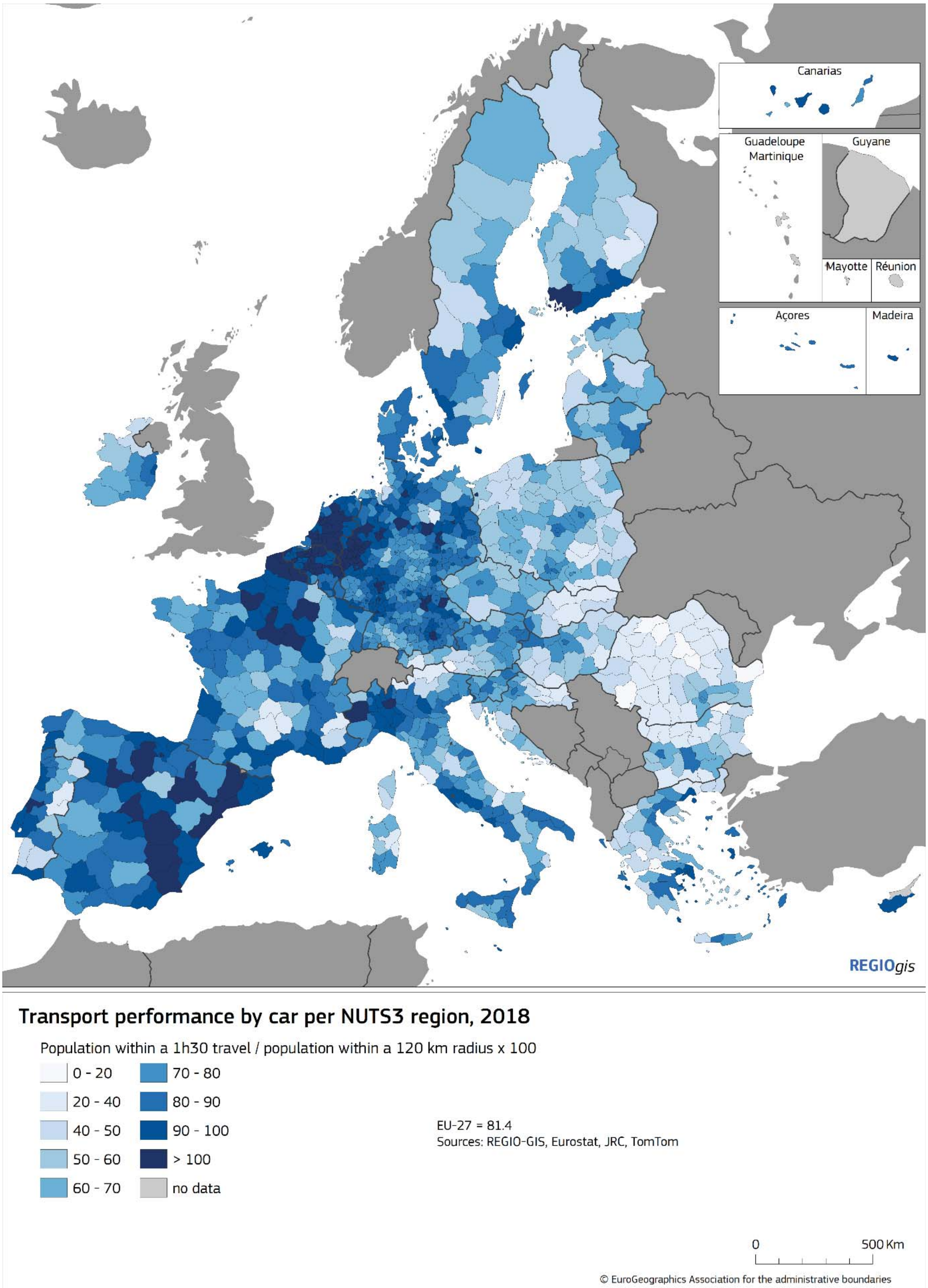
[17] In addition there may be economic constraints as roads in mountainous areas are more costly to build and maintain.

Finland and Sweden, around 80% of the population within a 120-km radius can be reached in 90 minutes, as against only 62% in Poland.

Road performance by car also varies substantially between regions within countries, both in less-developed Member States (especially in Bulgaria, Greece and Poland) and more-developed ones (particularly in France and Finland) (

Map 4-4). Road performance tends to be relatively low in regions in eastern Europe and high in densely populated regions in the Netherlands and Belgium, as well as in many Spanish regions. In several of the latter, though not densely populated on average, the population is concentrated in densely populated cities, towns and villages, with decent road networks providing access to a large population within 90 minutes of driving. Most of the capital metro regions have high road transport performance, which stands out particularly in Bulgaria, Croatia, Romania and Slovakia, where overall road performance is low.

Map 4-4: Road performance by car in NUTS-3 regions, 2018

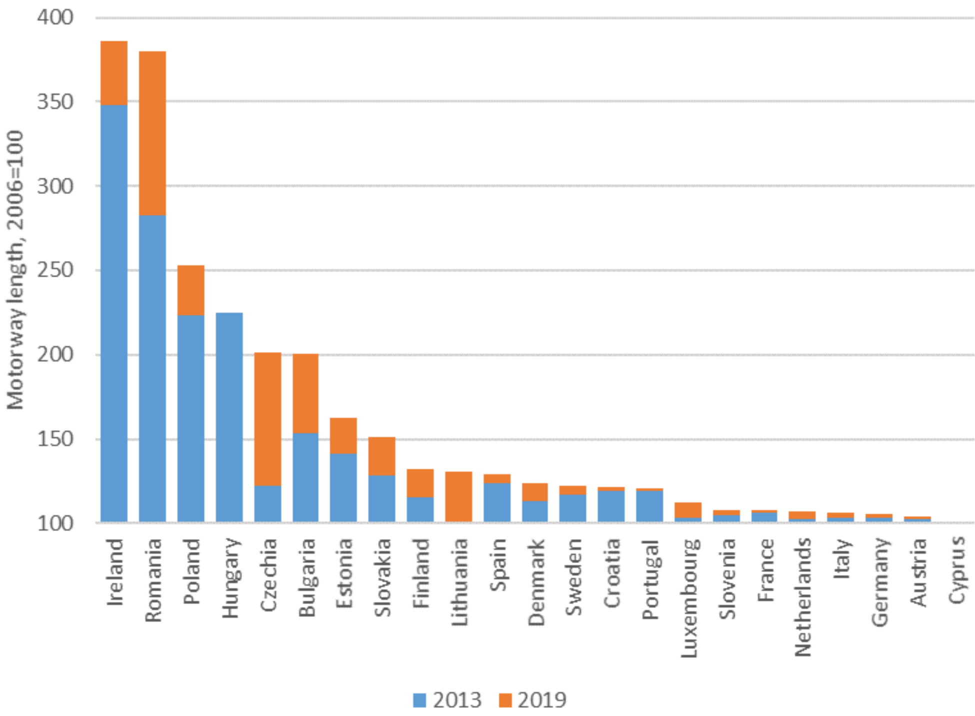


Box 4.4: The increase in motorways over recent years varies strongly between Member States

Investment in new motorways can help to increase road transport accessibility and performance. Road transport accessibility and performance are statistically related to the density of motorways and their share in the road network at large.

In the period 2006-2019 the length of motorways increased in all Member States, except Cyprus, where it remained unchanged (Figure 4.-10). However, there is large variation across Member States, with motorway length in Ireland and Romania increasing by almost 4 times over this period, while in Austria, Germany, Italy, Netherlands, France and Slovenia, the increase was below 10%. The increase was on average larger in eastern Member States, where there were comparatively few motorways at the beginning of the period.

Figure 4.-10: Motorway length, 2006-2019

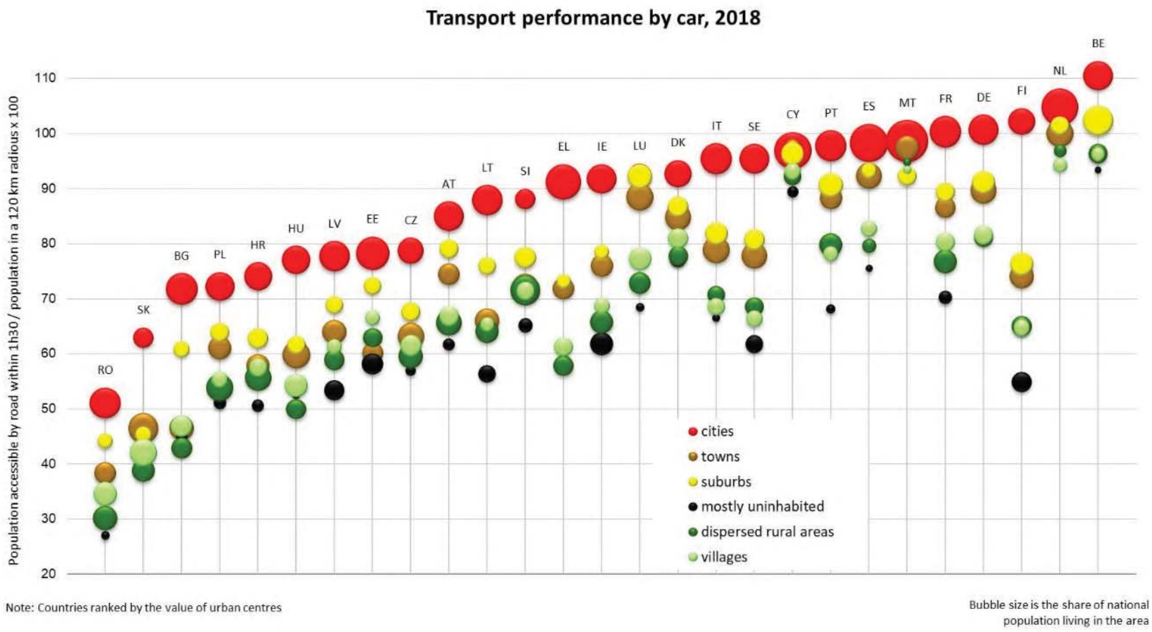


Note: Belgium, Latvia, Greece, Malta no data. Denmark, Spain and Italy 2018
Source: Eurostat [road_if_motorwa]

As in the case of rail, road performance differs according to the degree of urbanisation. Cities have the highest performance in all Member States. The performance for cities does not only reflect intra-urban trips but strongly depends on the travel time between the city and surrounding areas of up to 120 km away, which may well include rural areas. Despite their generally high performance, there are large differences between cities in different countries

(Figure 4-11). Whereas in the Netherlands, Belgium, Finland, Germany and France, the road performance indicator exceeds 100, it is below 75 in Romania, Slovakia, Bulgaria, Poland and Croatia. In addition, in the latter countries there are large differences in performance between the three types of urban area because of the low performance in towns and suburbs. There are also large differences in this respect in many other countries. In some, this reflects low average population density and the long distances between places, especially in Finland and Sweden.

Figure 4-11: Road performance by degree of urbanisation level 2, 2018



Source: REGIO-GIS

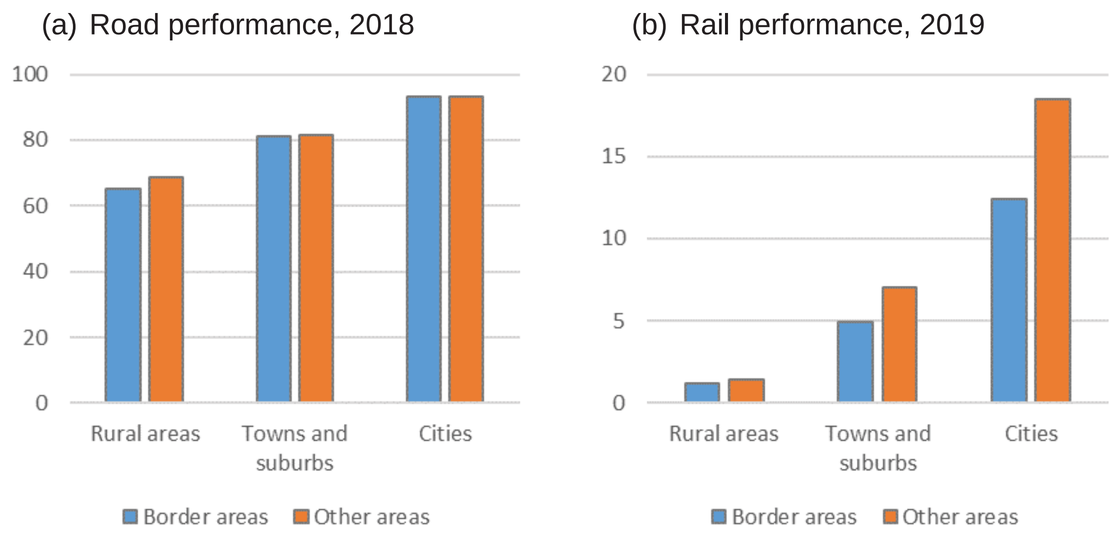
The three types of rural area have the lowest road performance in all countries, but this does not necessarily indicate a lack of roads. In fact, the road network per head is four times longer in villages than in cities, 10 times longer in dispersed rural areas and 20 times longer in mostly uninhabited areas. A more dispersed population means that more roads are needed to provide a given degree of access. Road performance is therefore particularly low in dispersed rural areas and the mostly uninhabited ones. Rural areas have a road performance similar to that in urban areas only in the densely populated Member States of Belgium and the Netherlands and in Malta and Cyprus. In these countries, the areas concerned tend to be sparsely populated areas close to (or even surrounded) by more densely populated and well-connected ones, rather than being remote from these. In most Member States however, performance in rural areas is considerably lower than in urban areas. Even so, there is large variation across countries, with rural areas in north-western and southern Member States, including in Germany, France, Spain and Italy, showing a higher performance than eastern Member States such as Romania, Slovakia and Bulgaria.

Box 4.5: Transport performance is lower in border areas

One out of seven EU residents live within 25 km of a national land border. Although EU transport policy places considerable emphasis on cross-border infrastructure investment and connectivity, road transport performance is lower in border areas than in other areas

(Figure 4-12a). This difference is more pronounced in rural areas. In cities, towns and suburbs, road performance is more similar between border and other areas. In addition to the complexity of coordinating cross-border infrastructure, the low performance in border areas is also affected by natural obstacles along these borders, such as mountains and large rivers. Indeed, some of the lowest performances are found in border areas in mountainous areas (Poland-Slovakia, Austria-Italy, Bulgaria-Greece) or along a river border (Bulgaria-Romania). Conversely, the best performances are found in the flat and comparatively densely populated areas along the borders between the Benelux countries, France and Germany.

Figure 4-12: Transport performance in border and non-border areas by degree of urbanisation



Source: REGIO-GIS

Compared to road, cross-border rail transport is hindered by a variety of additional obstacles relating to technical interoperability, timetable coordination and administrative issues, among other factors. Consequently, and despite the emphasis EU transport policy has placed on overcoming these issues, the European railway area still features numerous gaps on the continent's land borders where the national railway networks are not properly connected. Indeed, the difference in rail transport performance between border and non-border areas is larger than for road transport (Figure 4-12b), which is even more notable when seen in relation to the lower average performance of rail. The lower performance of rail in cross-border areas is more pronounced for cities and for towns and suburbs. This may be linked to the fact that rail networks are in most cases primarily designed to connect cities and towns, and suburbs, and that it is therefore in these areas that the impact of missing cross-border connections is strongest.

4.2.3 The roll-out of electric vehicle charging points is still uneven

The transition to alternative fuel vehicles, needed to reduce dependence on oil and to mitigate the environmental impact of road transport, depends on the building-up of an infrastructure network for such vehicles, electricity charging points, in particular.

In 2021, the number of charging points in the EU is just 120 per million inhabitants. The largest numbers relative to population are in some of the alpine regions in Austria and Italy, in various parts of Germany and the Netherlands, and in a few regions in France (Map 4-5). The charging infrastructure, on the other hand, is relatively underdeveloped in regions in Lithuania, Poland, Romania, Bulgaria, Greece, Cyprus and Denmark. The variation between regions across the EU largely reflects differences between Member States rather than within them, suggesting the importance of differences in national policies with respect to charging infrastructure. Nevertheless, there is considerable regional variation in some countries, including France and Spain.

Map 4-5: Electric vehicle charging points in EU regions, 2021