



Territorial Observation No. 2
November 2009

Territorial Dynamics in Europe
Trends in Accessibility



The ESPON 2013 Programme

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This publication is part-financed by the European Regional Development Fund, the EU Member States and the Partner States Iceland, Liechtenstein, Norway and Switzerland. The Managing Authority responsible for the ESPON 2013 Programme is the Ministry for Sustainable Development and Infrastructures of Luxembourg.

ISBN: 978-2-9599669-9-6

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First edition, printed in November 2009

In the same series of ESPON publications:
Territorial Observation No.1:
“Territorial Dynamics in Europe – Trends in Population Development”, November 2008

Printed on paper produced environmentally friendly

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Territorial Dynamics in Europe

Trends in Accessibility

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Introduction – Territorial observation of regional accessibility trends in Europe

This ESPON Territorial Observation No. 2 presents new information on territorial structures and recent dynamics of accessibility development within the European Union, its regions and cities.

The term accessibility as used in ESPON expresses how easy people in one region can reach people in another region. Accessibility of a region is indirectly a measure for the potential for activities and enterprises in the region to reach markets and activities in other regions.

Accessibility plays a significant role in European policy discussions related to the development of regions and cities as well as the European territory as such. In several European policy documents over the last decade, latest in the European Commission Green Paper on Territorial Cohesion and in the Territorial Agenda of the EU involving all EU Member States, accessibility is seen as key factor in improving the territorial balance in Europe and the attractiveness of Member States, their regions and cities.

The newest European facts and evidence on trends in accessibility presented is providing an update on European accessibility patterns for the information of policy makers in regions and cities as well as on national and European level.

ESPON results have revealed that accessibility seen from the European level might not reflect the same patterns as accessibility seen from a national or regional perspective. However, as the larger context becomes increasingly important for regions, cities and larger territories, the observation of the European dimension of accessibility becomes equally inevitable.

The accessibility trends for transport by air, road and rail have been analysed independently to show differences between the different transport modes. Moreover, these findings have been combined into one indicator showing the multimodal potential accessibility of places by analysing the joint effect of the three transport modes.

The multimodal accessibility of regions has been used for investigating relationships between accessibility and economic development and between accessibility and migration, issues that are particular in focus in policy documents related to the European territory.

This ESPON Territorial Observation No. 2 on potential accessibility of regions seen in a European context is structured in a summary chapter and 2 main chapters, each with a particular focus:

- (1) Summary of main territorial observations, concluded in 10 points of particular relevance for policy makers involved in regional competitiveness and territorial cohesion (Chapter 1).
- (2) Most recent European territorial trends in accessibility for three different modes of transport, air, road and rail, as well as for multimodal transport (Chapter 2).
- (3) Relation between multimodal accessibility and economic development and between multimodal accessibility and migration flows in Europe (Chapter 3).

The Territorial Observation No. 2 is applying the concept of “potential accessibility” and based on indicators previously used in analyses and modelling within ESPON projects. The concepts and indicators used in this publication are presented in a textbox in Chapter 1.

The content and maps takes the departure from an ESPON project¹ completed recently providing data on accessibility change for 2001-2006², covering, with few exceptions, all 27 EU Member States plus Iceland, Liechtenstein, Norway and Switzerland. In providing comparable regional information across Europe, NUTS 3 regions have been chosen.

Please note that the latest data available display the situation in 2006. Consequently, the Territorial Observation No. 2 does not reflect any effects of the recent global economic downturn.

The ESPON 2013 Programme will continue observing accessibility trends in Europe. Looking into future accessibility developments and integrating economic, social and environmental issues in understanding better the development potential for European regions and cities will continue to be a major priority.

The underlying data are available at www.espon.eu

¹ ESPON (2009), Update of Air and Multimodal Potential Accessibility Indicators by Klaus Spiekermann, Spiekermann and Wegener – Urban and Regional Research.

² This period corresponds to the most recent data provision available.

1 – Summary: Potential accessibility and regional development dynamics

Transport is a key component of the attractiveness of cities and regions and plays an important role in decisions on where to work, live and invest. Even in this era of the information society and virtual trade, the need for travel has not diminished, in fact, the opposite is true.

The future of transport in Europe is of high priority at all policy levels. The European Commission foresees a European Union in 2050 integrated in the globalised economy. This requires strong relationships and links internally in Europe and with neighbouring countries and other continents.

To be able to support Europe playing a significant economic role in the World, European accessibility will have to satisfy a greater demand for transport of goods and people from European regions and cities. Demands are likely to target 3 geographical scales: (1) the accessibility within European countries, (2) between European countries and regions (3) between the EU and other regions or countries in the World.

Accessibility is today recognised as an important factor in the development of territories, regions and cities. It is seen as a central agglomeration benefit and driver in the economic and social development of places³. In the same logic, the level of accessibility becomes important for the location advantage and competitiveness of a territory – being it Europe as such, a country, a region, city or corridor – relative to other places.

Improvements in accessibility of regions and places currently underperforming may support cohesion and support a better balanced territory at regional,

national and/or European scale, and help releasing territorial potentials currently underused to the benefit of European competitiveness.

This makes accessibility of places an important factor in territorial development and in related policy considerations at regional, national and European level. In this context, the latest trends in European potential accessibility become important for policy makers at all levels working in this policy area.

1.1 Main observations of European accessibility trends

Which trends are the most important over the last years?

The accessibility of European regions and cities is increasing. Rail accessibility has an average growth 2001-2006 of 13,1%, while air and road accessibility has increased 7,8% and 7,4% respectively during the same period. This overall trend in the development of the accessibility is positive for the European economy and at the same time, it is remarkable that the least polluting transport mode (rail) is gaining the most, which makes a contribution to achieving environmental objectives and to a slow down of the climate change process.

The European territory displays different patterns of accessibility according to the transport mode considered. Besides this, accessibility levels are still varying widely across the regions and cities of Europe.

In general, the best access can be found in the core area of Europe, where the highest density of European citizens live and work. Capital regions, in particular in central Europe, show high levels of accessibility. However, low accessibility is also an issue for some regions located in the core of Europe.

The main territorial structure built up over history is still visible in the core-periphery dichotomy. It is composed by a significant core-periphery pattern of European road accessibility, concentration of accessibility by rail in corridors and city hubs, a more polycentric accessibility by air and hotspots of multimodal accessibility. However, the core-periphery pattern is increasingly being interwoven by a polycentric structure.

From 2001-2006, both improvements and further imbalances have occurred in the development of accessibility across regions and modes of transport in Europe. Signs exist that the core-periphery pattern is slowly changing supporting a process towards a more even accessibility of places, regions and cities, seen from a European perspective. However, changes of the relative position of regions in terms of accessibility are altogether minor in the short period from 2001 to 2006.

Looking at multimodal and air accessibility, Europe appears as a mosaic with regions of high, medium and low accessibility. A European polycentric picture can be identified including regions with high accessibility surrounded by regions with lower accessibility.

³ World Bank's Development Report 2009 on "Reshaping Economic Geography" (WDR 2009)

1 – Summary: Potential accessibility and regional development dynamics

In particular, the development of new infrastructures for high-speed trains has during 2001-2006 influenced positively the potential accessibility of many European regions and cities. These developments have created benefits, mainly for some regions in Germany, Italy and Spain. Also air accessibility improvements have contributed in this respect. New road infrastructures have resulted in improved road accessibility, particularly for countries in Eastern Europe.

Looking at economic development and migration flows in relation to potential accessibility of regions, the economy is more clearly related to good access than migration.

In 2006, the Gross Domestic Product (GDP) per capita was strongly linked to the potential accessibility in 7 out of 10 European regions. This means in general that regions with high accessibility are most often more economically and competitively successful than remote and isolated regions.

Also in 2006, good potential accessibility came together with net migration in 6 out of 10 regions. This means that the attractiveness of a place for migrants might be related to its accessibility. However, attractiveness for in-migration is most often relying on other factors than accessibility.

For Europe as a whole, accessibility is becoming increasingly important in times of global economic recession. Good internal and external accessibility can help the strengthening of the economic cohesion and improve the competitive position of the EU.

Connections to/and from world markets and global decision making centres is therefore gaining in relative importance for the economic development of individual continents.

1.2 Ten points for policy consideration

What should policy makers be aware of and consider?

Policy makers engaged with competitiveness and territorial cohesion at regional/local, national and/or European level should in particular take the following 10 key points into consideration:

- Transport infrastructure and transport service development during 2001-2006 has increased the overall accessibility of European regions and cities, with the highest improvement for rail accessibility.
- The growth in accessibility 2001-2006 has only slightly changed the overall European territorial structures and patterns of accessibility of different modes of transport.
- Some signs of positive changes exist due to new infrastructure investments and increased use of existing facilities that improve the accessibility of some European regions and support better European territorial balance.
- New high-speed rail and air services have improved the accessibility of some regions outside the core area (Pentagon) supporting a polycentric pattern.
- Road transport developments have improved the situation for many regions, particularly in Eastern Europe, benefiting both from reduced border waiting times and from new infrastructure endowment.
- Dynamic modifications of airline destinations since 2001 have incurred changes in regional accessibility by air, both in positive and negative direction, as low cost air carriers can involve risks in terms of long-term air accessibility improvement. Only regions with large international airports seem to ensure a stable position of air accessibility.
- Low level of accessibility remains for many regions due to disparities in multimodal accessibility (as combined working of air, rail and road transport) that continue to exist in Europe. This affects the competitiveness of these places.
- Economic development of a region is often related with potential accessibility. In general, there is a strong positive relationship between accessibility and economy. Regions with a high accessibility are most often also economic and competitively successful.
- A less strong relationship exists between potential accessibility and in-migration. Other factors than accessibility play an important role for the attractiveness of regions and places for migrants.

- Different modes of transport create different patterns of accessibility. Roads tend to shape contiguous spaces of higher accessibility, rail is more geographically punctual providing high accessibility to corridors and cities (transport nodes), new air connections support European polycentric development and world integration, and multimodal accessibility materialises in geographical hotspots where modes of transport meet.

In conclusion, accessibility is an important driver in development of regions and cities in times of accelerated globalisation. Accessibility within the European territory and European accessibility to other continents in the World are therefore issues that require continuous European observation in order to provide detailed and comparable facts and evidence for the European policy process related to territorial development and cohesion.

Measuring potential accessibility

In the framework of this publication, potential accessibility describes how easy people in one region can reach people located in other regions. Within the accessibility model used by ESPON potential accessibility is based on two elements: (1) population in NUTS 3 regions and (2) the effort in time to reach them.

The accessibility model measures the minimum travel time between all NUTS 3 regions for rail, road and air separately. For multimodal accessibility the accessibility by road, rail and air are integrated into one indicator expressing the combined effects of these modes for each NUTS 3 region.

The potential accessibility of a NUTS 3 region is calculated by summing up the population in all other European regions, weighted by the travel time to go there. In order to avoid “edge” effects, European regions just outside the territory covered by ESPON are also included in this calculation, in particular Eastern European regions and the Western Balkan.

The absolute levels of potential accessibility resulting from the calculation are presented for each mode in three different formats:

1. Standardised values with the EU average (EU 27=100), in which regions being in a better (more than 100) or worse (less than 100) position than the European average can easily be distinguished.
2. Relative change between 2001 and 2006 in percentage that allow comparing changes over time, for each NUTS 3 region. The change is calculated as a percentage of its absolute value in 2001. These changes then present the relative development of potential accessibility between 2001 and 2006.
3. Change of the relative position of the regions, which represents the dynamics of regions’ accessibility, both upwards and downwards. This allows for examining if an improvement of potential accessibility indicates at the same time an improvement of the relative position of the region.

For more information about the measuring of potential accessibility within the ESPON Programme, please consult www.espon.eu

2 – European territorial accessibility dynamics for different modes of transport

The territorial dynamics for each mode of transport, air, rail and road in the first years of this millennium is presented below and combined into information on multimodal accessibility, expressing the overall situation for a region in terms of accessibility. For each mode and transport and for multimodal accessibility, the following questions are relevant:

What are the main European territorial structures, changes and trends?

Which regions are in a favourable position and which are gaining or losing the most?

2.1 Potential accessibility by air

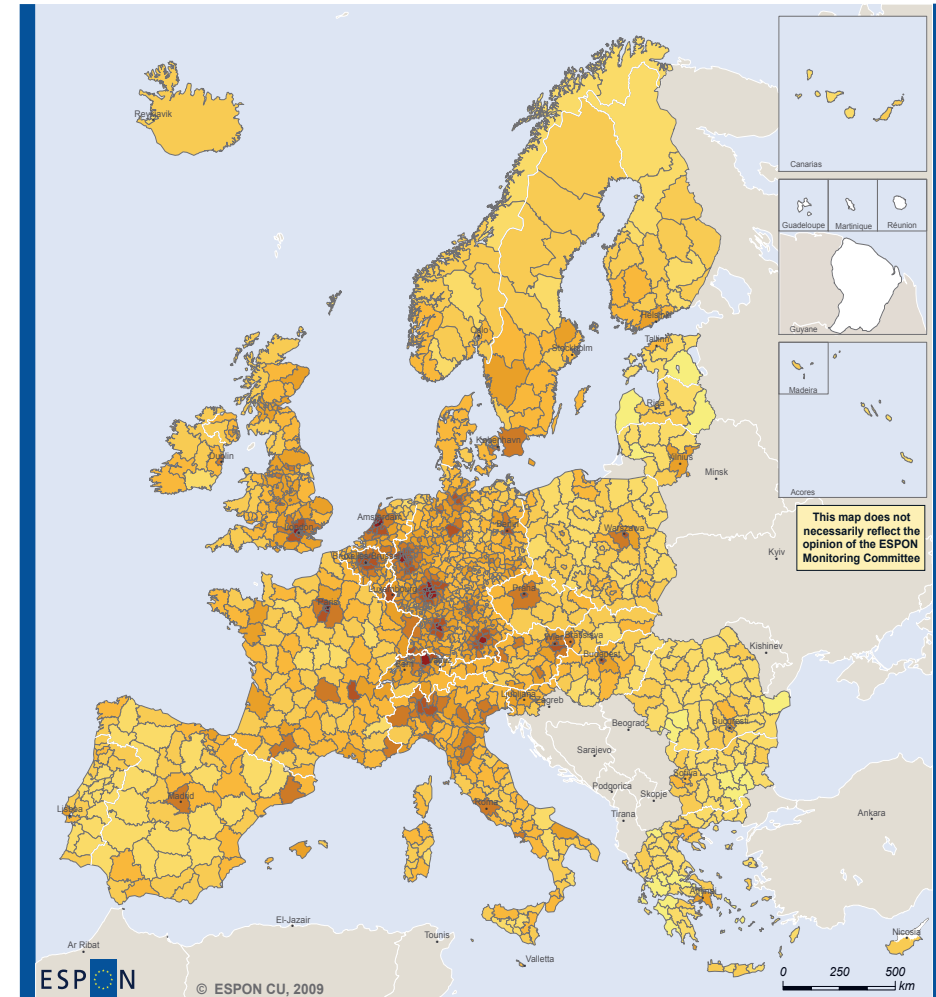
Situation and structure

European air accessibility is a patchwork of regions with high, medium and low accessibility, displaying a more polycentric pattern at European scale. Regions with highest accessibility by air are located around major international airports in Europe with highest values in London, Paris, Bruxelles / Brussel, Amsterdam, Düsseldorf, Frankfurt, Zürich and München.

In addition, the airports in Madrid, Barcelona and Lyon, Wien, Praha, Berlin, Hannover, Hamburg, København and Warszawa, as well as several airports close to cities in northern Italy, create very high accessibility values for the surrounding regions.

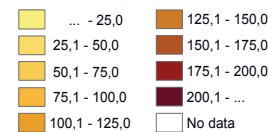
Areas benefiting from an airport seem to be rather limited in terms of territorial extension. This also makes low air accessibility an issue for regions in the core of Europe. However, many regions in central Europe benefits from the major airports located here, which is not the case for more peripheral locations.

Map 1 Potential accessibility by air, 2006



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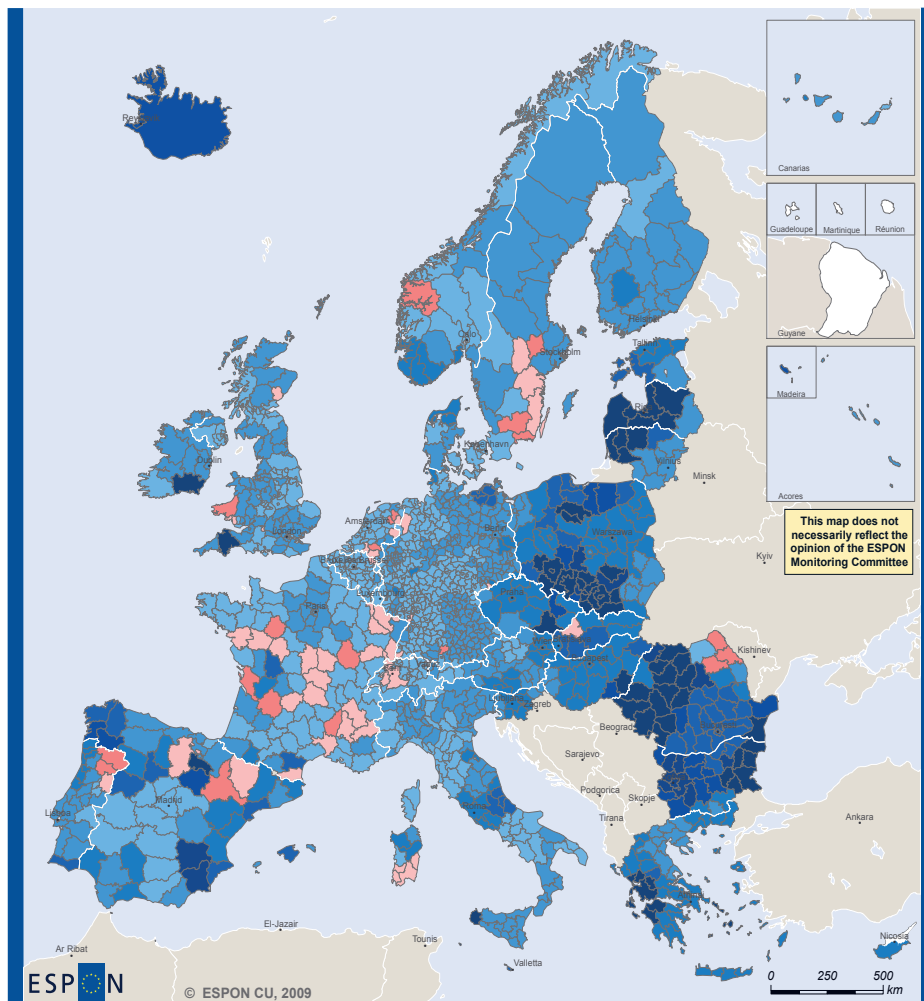
Potential accessibility, air (2006, EU27 = 100)



© EuroGeographics Association for administrative boundaries
Regional level: NUTS 3
Origin of data: ESPON Accessibility update, 2009
Sources: RRG GIS Database, S&W Flight Network,
S&W Accessibility Model

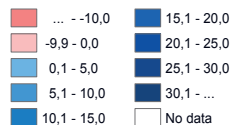
2 – European territorial accessibility dynamics for different modes of transport

Map 2 Potential accessibility by air, relative change 2001-2006



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**Potential accessibility, air
(2001-2006, relative change in %)**



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Regional level: NUTS 3
Origin of data: ESPON Accessibility update, 2009
Sources: RRG GIS Database, S&W Flight Network,
S&W Accessibility Model

Lowest accessibility by air exists in many rural parts of Spain and Portugal, Greece, Romania and Bulgaria, Poland and the Baltic States. Because of the highly developed system of consolidated regional airports, the regions in the Nordic countries are with a few exceptions higher accessible by air than expected due to the remote location.

Seen from a European perspective, the pattern is rather polycentric and balanced in contrast to the situation at national level which often displays large differences between regions. Although there is a substantial dynamic in the air market, the overall pattern of accessibility by air has not changed substantially in the period 2001-2006 due to stability of the main international airport hubs.

Changes and trends

The average growth 2001-2006 in air accessibility within Europe was 7,8%.

The relative changes of potential accessibility by air since 2001 shows a clear spatial pattern. Highest relative improvements can be found in parts of Spain, Italy and Greece, and particularly in most regions of the newer EU Member States. All regions here had clearly below average accessibility by air in 2001, but growth of up to more than 30% due to an increasing number of flight connections.

Regions with lowest relative gains in accessibility by air are the regions around major airports that possess already an above average potential accessibility by air. This goes as well for regions located in areas between major airports.

A couple of regions had to face losses in accessibility by air due to a reduction of flight services in the period 2001-2006. These regions are concentrated in France, Spain and southern Sweden. This trend might also reflect the increased competition from improved rail services in these areas.

Relative position of regions

The diverse spatial patterns of growth and even decline of potential accessibility by air between 2001 and 2006 led to changes in the relative position of individual regions.

In a European perspective, the regions benefiting the most are regions in Eastern Europe, Greece, parts of Italy, Spain and some regions in the Nordic countries. Although these regions still have below European average accessibility by air, in 2006 they are closer to the average than five years before.

Table 1 shows the dynamic of accessibility for the concrete top 10 gaining and losing regions in terms of moving position. The 10 regions improving their relative position most are clearly to be found in Eastern EU Member States. These regions still have a below average accessibility, but their relative position is improving rapidly. The 10 regions with the most significant losses of relative position are regions having below or average accessibility by air and are mainly located in territories in between international airports.

Observations for policy considerations

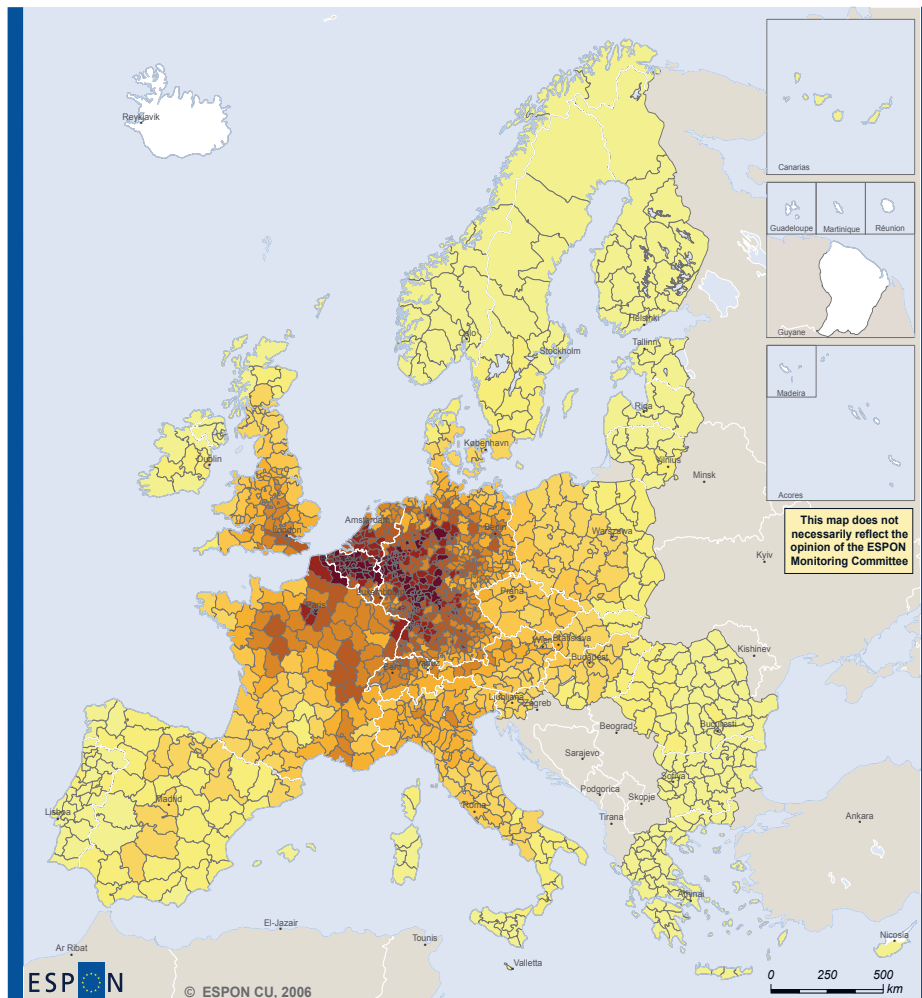
- New air transport infrastructure projects and better exploitation of existing airport facilities has a substantial impact on the air accessibility of individual regions. New flight services are able to influence European territorial balance in terms of air accessibility by bringing high accessibility to regions outside the European core.
- As air carriers react to short term changes under recently liberalised market conditions, a regions' accessibility by air can change relatively quickly, both in positive and negative direction. Only large international airports seem to have truly consolidated position.
- Regional strategies including development of regional airports involve some risk for a long term improvement of air accessibility. Recent cancellation of many flight connections as a consequence of the current financial crisis underlines the market driven regional fluctuations in accessibility by air. In this respect, high level of access by air is more volatile than accessibility by road or rail.

Table 1 Top Ten Movers, positive and negative, for air accessibility (change of index points 2001-2006)

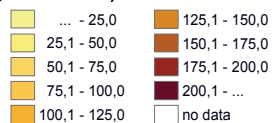
Country	Region	Upwards
Romania	Timis	40,8
Greece	Kefallinia	39,8
Poland	Bydgosko-Torunski	37,0
Lithuania	Klaipedos (Apskritis)	35,6
Romania	Mures	30,6
Poland	Miasto Kraków	30,5
Romania	Arad	30,0
Czech Republic	Jihomoravský	28,7
Lithuania	Telsiu (Apskritis)	28,5
Poland	Miasto Wroclaw	26,4

Country	Region	Downwards
Netherlands	Noordoost-Noord-Brabant	-19,7
France	Dordogne	-20,0
Netherlands	Zuidoost-Noord-Brabant	-20,6
Netherlands	Zuidwest-Drenthe	-21,0
Sweden	Västmanlands län	-22,0
Sweden	Blekinge län	-22,9
Sweden	Kronobergs län	-23,1
Spain	Zaragoza	-25,5
Portugal	Alto Trás-os-Montes	-27,6
France	Côte-d'Or	-28,2

Map 3 Potential accessibility by rail, 2006



**Potential accessibility, rail
(2006, EU27 = 100)**



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 Regional level: NUTS 3
 Origin of data: ESPON Accessibility update, 2006
 Sources: RRG GIS Database, S&W Accessibility Model

2.2 Potential accessibility by rail

Situation and structure

Regions in the European core have in absolute terms the highest level of potential accessibility by rail for the year 2006. Congestions in densely populated areas might contribute to decision makers' willingness investing in rail infrastructure. Instead of forming a wide-spread space of high accessibility, regions with top accessibility built corridors along high-speed rail tracks with the main cities as important hubs.

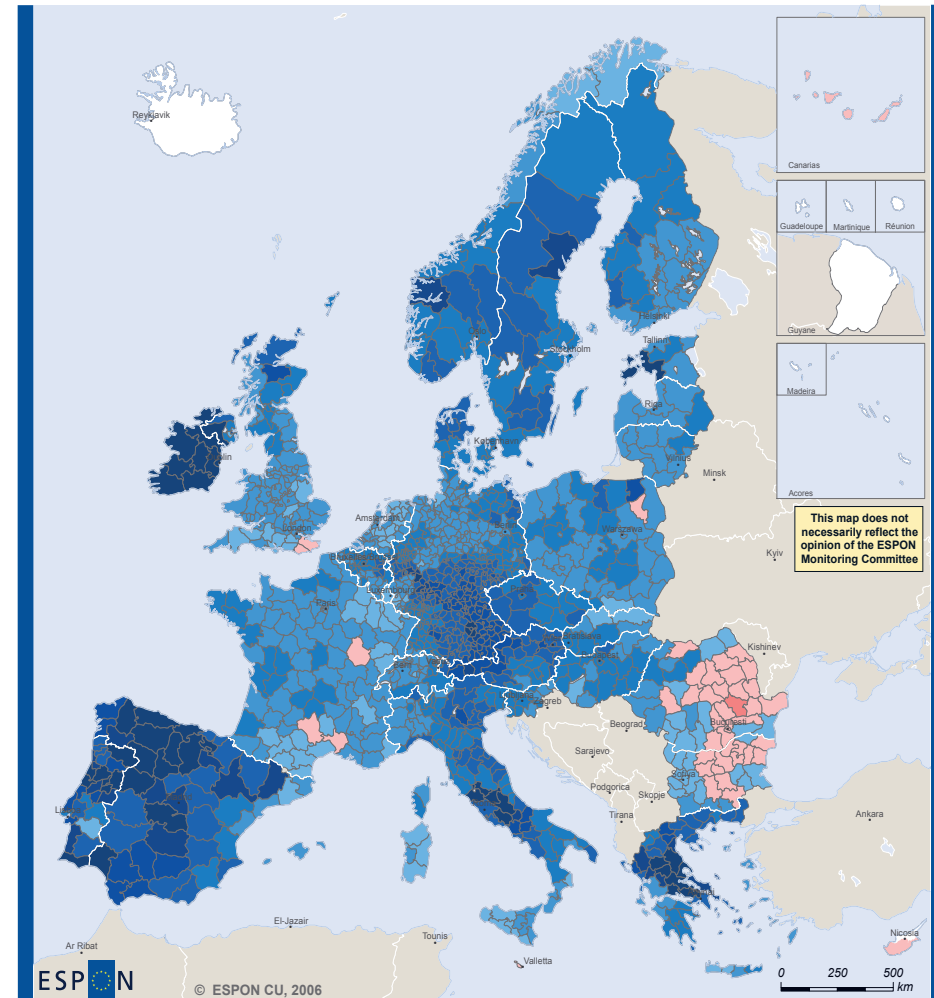
High-speed rail connections also brings very high accessibility to regions outside the traditional European core, e.g. in France to Tours, Lyon and Marseille or in Germany to Berlin.

Below average accessibility by rail can still be found in Ireland, Spain, Portugal, Southern Italy and most regions of the newer EU Member States. Lowest accessibility by rail can be found in the sparsely populated northern parts of the Nordic countries, the Baltic States and most regions of Romania, Bulgaria and Greece. This is due to facts such as investing in rail infrastructure is not being considered profitable in the stage of development and/or lacking possibilities/priorities related to public investment in the rail sector. A long process of planning and building rail infrastructure may contribute to the deficiencies.

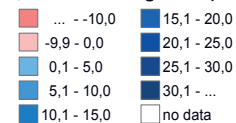
Changes and trends

The average growth 2001-2006 in rail accessibility within Europe was 13,1%. Highest relative gains in rail accessibility from 2001 to 2006 occurred in many peripheral regions showing absolute values below average, e.g. in Ireland, Spain and Portugal, central regions in Greece and the southern regions of Italy and the Nordic countries. Recent investments in high-speed rail infrastructure, e.g. in Spain, explain the reason in this part of Europe. In particular, high-speed projects in Southern Germany led to significant relative gains for regions in terms of improved accessibility. The other regions mentioned have a lower relative improvement of rail accessibility.

Map 4 Potential accessibility by rail, relative change 2001-2006



**Potential accessibility, rail
(2001-2006, relative change in %)**



© EuroGeographics Association for administrative boundaries
Regional level: NUTS 3
Origin of data: ESPON Accessibility update, 2006
Sources: RRG GIS Database, S&W Accessibility Model

Relative position of regions

Comparing rail accessibility in different parts of Europe, most regions in the Eastern EU Member States lost index points in relative terms between 2001 and 2006. In addition, some regions with high accessibility by rail diminished their dominance as other regions caught up, particularly some French regions. Regions experiencing a relative benefit are mainly located in southern Germany, Italy and Spain where new high-speed rail projects led to improvement of their position compared to other European regions.

In concrete terms the top 10 movers in positive direction are all German regions, while regions losing most profoundly their position are all situated in the western part of Europe. Some of these declines are mostly due to changes in stops of high speed trains, such as for regions close to the Channel in the UK.

Table 2 Top Ten Movers, positive and negative, for rail accessibility (change of index points 2001-2006)

Country	Region	Upwards
Germany	Westerwaldkreis	62,0
Germany	Ingolstadt, Kreisfreie Stadt	37,7
Germany	Wiesbaden, Kreisfreie Stadt	30,2
Germany	Pfaffenhofen an der Ilm	28,4
Germany	Rhein-Sieg-Kreis	27,5
Germany	Offenbach, Landkreis	26,6
Germany	Offenbach am Min, Kreisfreie Stadt	26,3
Germany	Rheingau-Taunus-Kreis	25,4
Germany	Neuburg-Schrobenhausen	25,2
Germany	Frankfurt am Main, Kreisfreie Stadt	25,1

Country	Region	Downwards
Netherlands	Agglomeratie Leiden en Bollenstreek	-15,1
United Kingdom	Brighton and Hove	-15,2
Netherlands	IJmond	-15,9
Netherlands	Utrecht	-16,1
United Kingdom	East Sussex CC	-18,0
United Kingdom	Southend-on-Sea	-18,1
France	Côte-d'Or	-18,3
Netherlands	Arnhem/Nijmegen	-18,7
United Kingdom	Kent CC	-21,2
United Kingdom	Medway Towns	-25,1

Observations for policy considerations

- Rail infrastructure projects have a substantial impact on potential accessibility of individual regions particular new high-speed rail services can influence territorial balances within Europe and bring higher accessibility to regions outside the European core.
- Eastern EU Member States have hitherto prioritised road infrastructure at the expense of rail infrastructure and services during 2001-2006. In the longer term more focus could be considered on investment decisions favouring public transport infrastructure in order to prevent potential congestion and pollution challenges.
- Due to specific characteristics of rail networks, the effects of high accessibility by rail are normally concentrated around city hubs (nodes) and along corridors of high-speed rail lines.

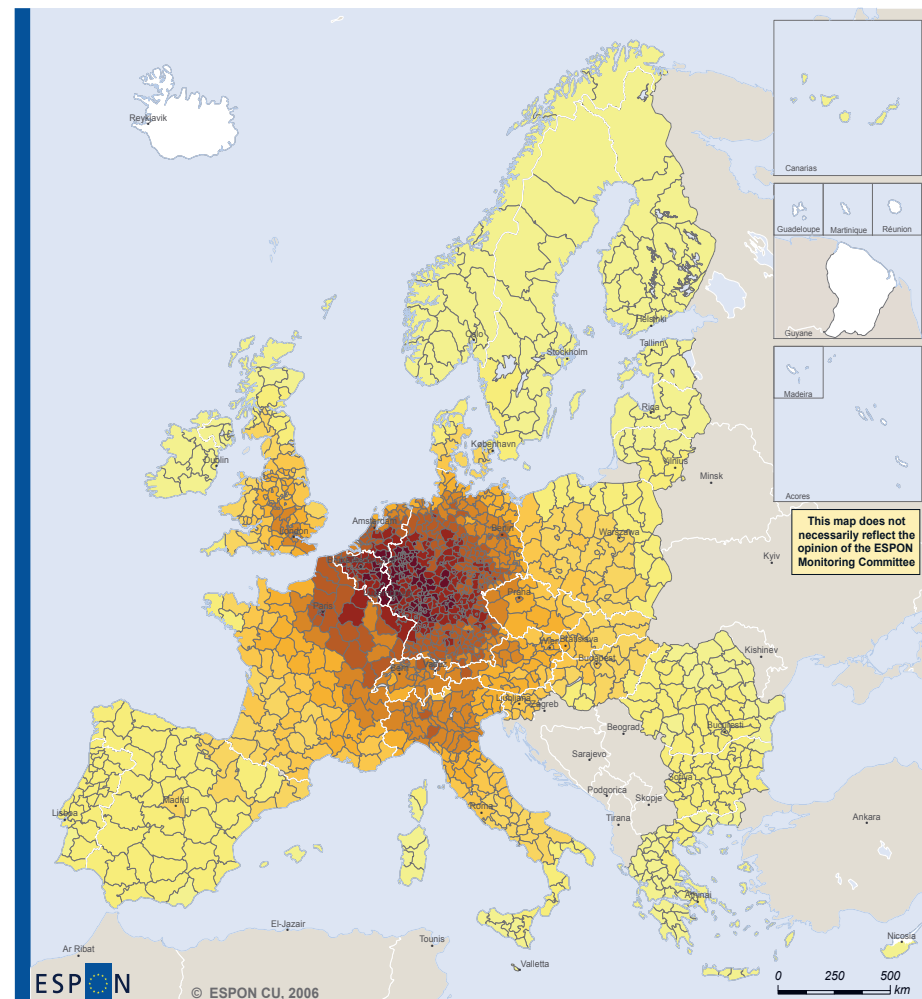
2.3 Potential accessibility by road

Situation and structure

In Europe, the accessibility by road has a clear core-periphery pattern with the highest potential accessibility for 2006 in the regions of Belgium, the Netherlands and in the Western parts of Germany. In addition, regions in northern and eastern parts of France, in the South-east of England, in Switzerland, the Western parts of Austria and the Northern parts of Italy also encounter very good accessibility by road due to ambitious investments schemes in road infrastructure of the 1960s and 1970s. In all these regions, the combination of good road infrastructure in form of dense motorways and high concentration of population leads to these favourite positions.

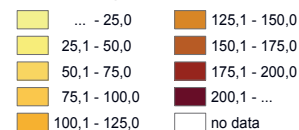
Accessibility by road decreases when moving successively towards regions away from the European core area. The lowest accessibility by road is found in peripheral regions of the Nordic countries. Also most regions of the Baltic States, Bulgaria, Romania and Greece have very low levels of potential accessibility by road seen from a European perspective.

Map 5 Potential accessibility by road, 2006



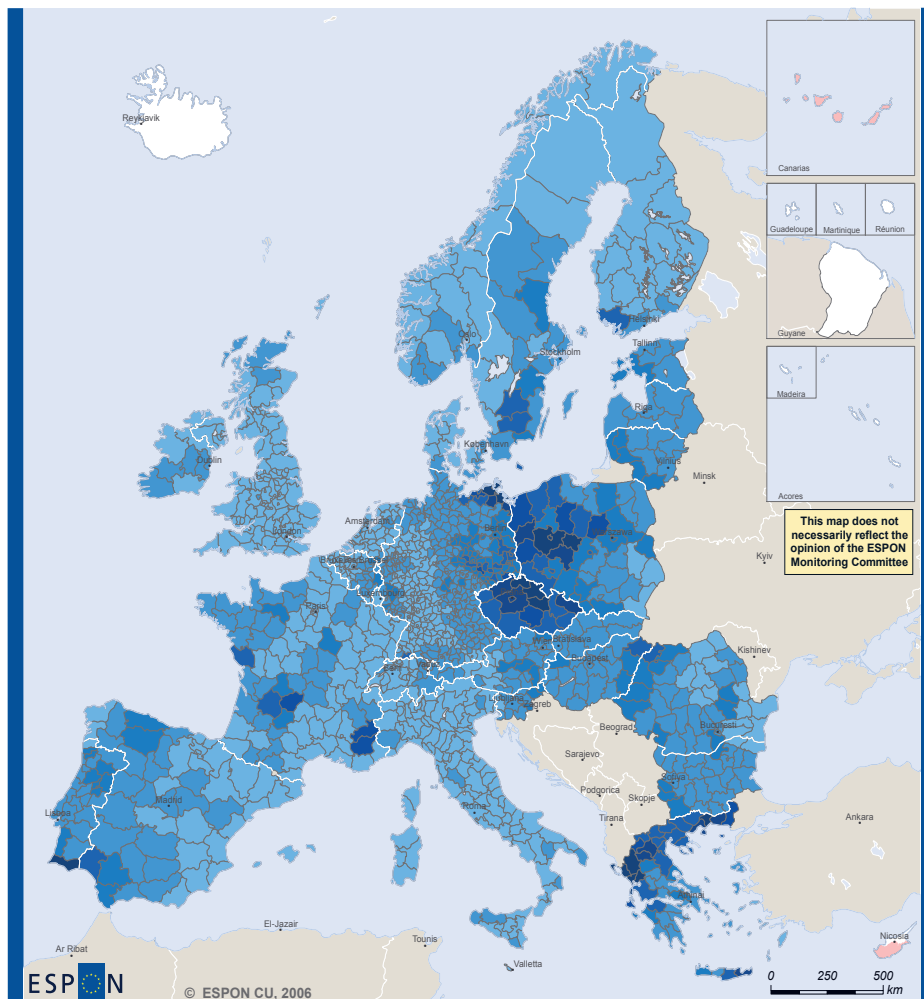
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Potential accessibility, road (2006, EU27 = 100)



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Regional level: NUTS 3
Origin of data: ESPON Accessibility update, 2006
Sources: RRG GIS Database, S&W Accessibility Model

Map 6 Potential accessibility by road, relative change 2001-2006

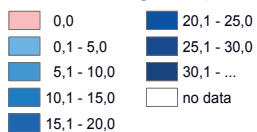


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Origin of data: ESPON Accessibility update, 2009
Sources: RRG GIS Database, S&W Accessibility Model

**Potential accessibility, road
(2001-2006, relative change in %)**



Changes and trends

The average growth 2001-2006 in road accessibility within Europe was 7,4%.

The relative development of potential accessibility by road since 2001 has an apparent spatial pattern. The clear improvement of road accessibility is a fact due to completed road infrastructure projects in several regions all over the EU, such as in northern Greece as a consequence of new motorway investments.

High relative increase of road accessibility can also be found in the Western part of Poland and the Czech Republic where the combination of infrastructure projects and reduction of border crossing waiting times in the context of the enlargement of the EU have combined positive effects.

Regions with already high levels of road accessibility did not encounter strong relative gains, as new motorways and better connections in these regions only have relative low impact on the already existing high level.

Relative position of regions

The relative position of regions within Europe related to accessibility by road included many changes between 2001 and 2006. Benefiting regions are mainly located in Western Poland, the Czech Republic, the eastern German Länder and the area of Maastricht, Aachen, Heerlen and Liège (MAHL). These areas improved their relative position by more than six index points. Apparently, common investments in cross-border areas pay off.

All regions of the newer EU Member States also increased their relative position with the exception of a few regions at the eastern border of the EU, Malta and Cyprus. Many regions in Greece, France, Spain and Portugal rose as well.

Loss in relative positions is found in the Nordic countries, the United Kingdom and Ireland, in southern Italy as well as in many regions in the European core. These regions have basically a good position, but lose some comparative advantage in location as other regions are catching up.

The main dynamics in terms of most pronounced changes in regions position related to road accessibility can be seen in Table 3. Please note that three regions within Île de France and two regions of Inner London are among ten main losers in terms of potential accessibility by road.

Table 3 Top Ten Movers, positive and negative, for road accessibility (change of index points 2001-2006)

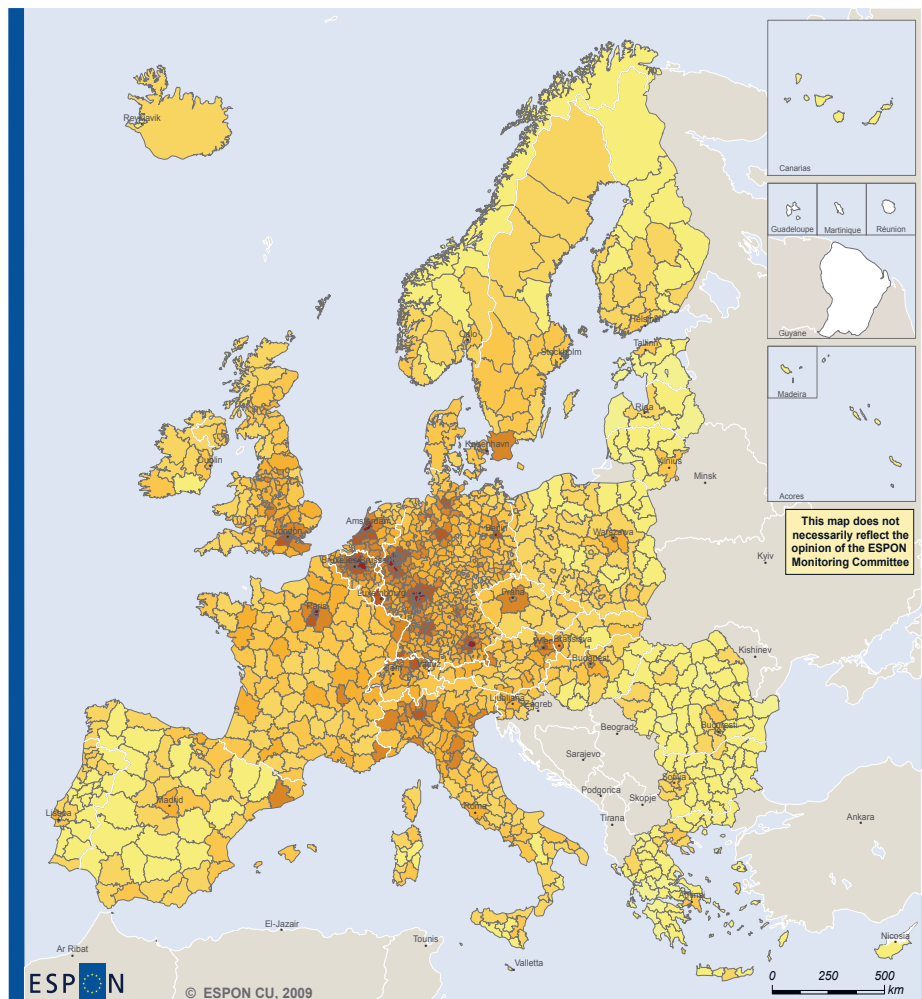
Country	Region	Upwards
Germany	Nordvorpommern	35,5
Germany	Stralsund, Kreisfreie Stadt	33,1
Germany	Greifswald, Kreisfreie Stadt	31,0
Germany	Rügen	27,2
Poland	Miasto Poznan	26,3
Czech Republic	Hlavní mesto Praha	25,6
Germany	Leipziger Land	25,0
Czech Republic	Liberecký	22,1
Germany	Sächsische Schweiz	21,0
Czech Republic	Královehradecký	20,4

Country	Region	Downwards
France	Val-d'Oise	-6,2
Germany	Gießen, Landkreis	-6,4
Germany	Westerwaldkreis	-6,4
France	Paris	-6,4
United Kingdom	Inner London - East	-6,4
United Kingdom	Inner London - West	-6,5
Germany	Limburg-Weilburg	-6,6
United Kingdom	Birmingham	-6,6
United Kingdom	Dudley and Sandwell	-6,6
France	Seine-Saint-Denis	-7,0

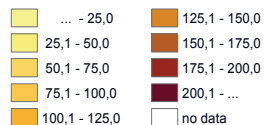
Observations for policy considerations

- Road transport and reduced border waiting times as well as infrastructure development has improved the situation in several regions, particularly in some of the Eastern EU Member States.
- Joint investments in cross-border areas seem to provide for enhancing improvements in road accessibility on both sides of the border
- Signs of decline in road accessibility of central parts of metropolitan regions are present which may improve problems of congestion and pollution.

Map 7 Multimodal potential accessibility, 2006



**Potential accessibility, multimodal
(2006, EU27 = 100)**



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 Regional level: NUTS 3
 Origin of data: ESPON Accessibility update, 2009
 Sources: RRG GIS Database, S&W Flight Network,
 S&W Accessibility Model

2.4 Multimodal potential accessibility

Situation and structure

Analysing multimodal accessibility creates a territorial pattern which creates a more balanced version of the traditional European core-periphery pattern. The basic core-periphery picture is constituted by road and rail transport and somehow balanced by the impact of air transport. The high importance of air connections for the accessibility of many capitals, like London or Paris, and other important urban regions, such as Milano, is marked by high multimodal accessibilities, or multimodal hotspots, which are clearly above the accessibilities of the surrounding regions. However, in other regions, where accessibility by road or rail or both is high as well, like Bruxelles/Brussel, Düsseldorf and Frankfurt, the area with high multimodal accessibility becomes larger and contiguous including regions in between.

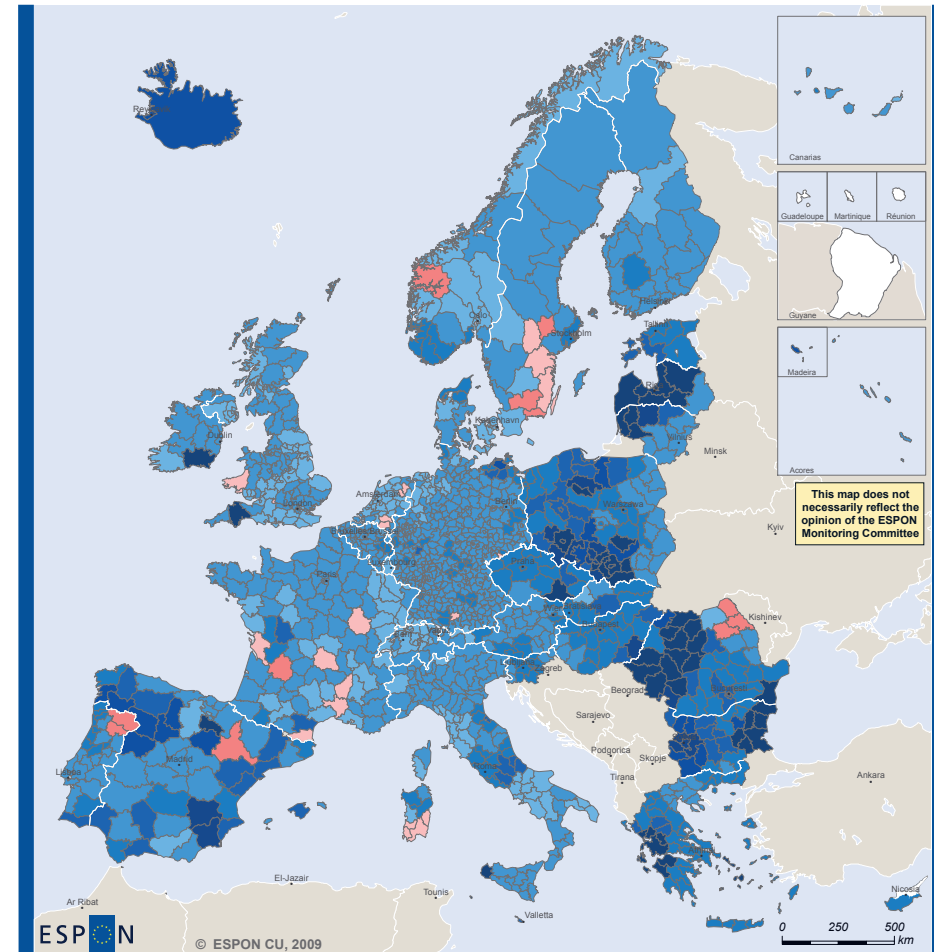
Changes and trends

Multi modal accessibility within Europe increased 2001-2006 with 8,7%.

The highest relative changes of multimodal accessibility occurred in regions of the Eastern EU Member States, mainly based on relative growth in road and air transport accessibility. However, also many Spanish regions had high relative increases, a combination of improvements in rail and air accessibility.

Looking at regions in countries of the European core area, a relatively low improvement in multimodal accessibility was detected. The reduction of accessibility by air experienced in several French regions was however often compensated by growth in rail accessibility.

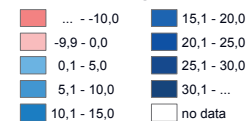
Map 8 Multimodal potential accessibility, relative change 2001-2006



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Origin of data: ESPON Accessibility update, 2009
Sources: RRG GIS Database, S&W Flight Network,
S&W Accessibility Model

**Potential accessibility, multimodal
(2001-2006, relative change in %)**



Relative position of regions

Most regions in the Eastern EU Member States gained in multimodal accessibility between 2001 and 2006. Regions in Romania, Czech Republic, Lithuania, Poland and Greece improved their situation the fastest. However, examples exist of regions at the eastern border of the EU that did not move upwards, such as the region of Lasi in Romania.

Increase of the relative position appeared also in Greece, parts of Italy and Spain as well as in corridors in Belgium and Germany benefiting from investments in high-speed rail.

The highest losses in relative position of multimodal accessibility were identified in regions of Portugal, Sweden, Netherlands, Norway, Romania, Spain and France. Those regions scored in 2001 below or just about average in multimodal accessibility and do not seem to improve.

Table 4 Top Ten Movers, positive and negative, for multimodal accessibility (change of index points 2001-2006)

Country	Region	Upwards
Greece	Kefallinia	34,0
Romania	Timis	33,7
Lithuania	Klaipedos (Apskritis)	30,0
Poland	Bydgosko-Torunski	28,0
Romania	Mures	24,8
Poland	Miasto Kraków	24,7
Lithuania	Telsiu (Apskritis)	24,0
Romania	Arad	24,0
Czech Republic	Jihomoravský	22,3
Greece	Lefkada	22,3

Country	Region	Downwards
France	Côte-d'Or	-15,0
Portugal	Douro	-15,0
Spain	Zaragoza	-15,6
Romania	Lasi	-15,6
Norway	Sogn og Fjordane	-16,1
Netherlands	Noordoost-Noord-Brabant	-16,2
Sweden	Kronobergs län	-19,1
Sweden	Västmanlands län	-19,2
Sweden	Blekinge län	-19,3
Portugal	Alto Trás-os-Montes	-20,7

Observations for policy considerations

- The pattern of multimodal accessibility in Europe is basically more polycentric than a traditional core-periphery picture. This is due to the influence of more polycentric patterns created by air accessibility, and to some extent to rail accessibility, where larger cities and capital cities enjoy high accessibility levels.
- The increase of multimodal accessibility in many regions of Eastern Europe is positive for competitiveness of these regions and for territorial cohesion at European scale.

3 – European accessibility, economy and migration

Generally it is assumed that regional accessibility is important for the economic and social opportunities of a location or a place. Recent research and evidence⁴ on agglomeration economies suggests that economic growth, labour migration and accessibility are closely interrelated in the real world.

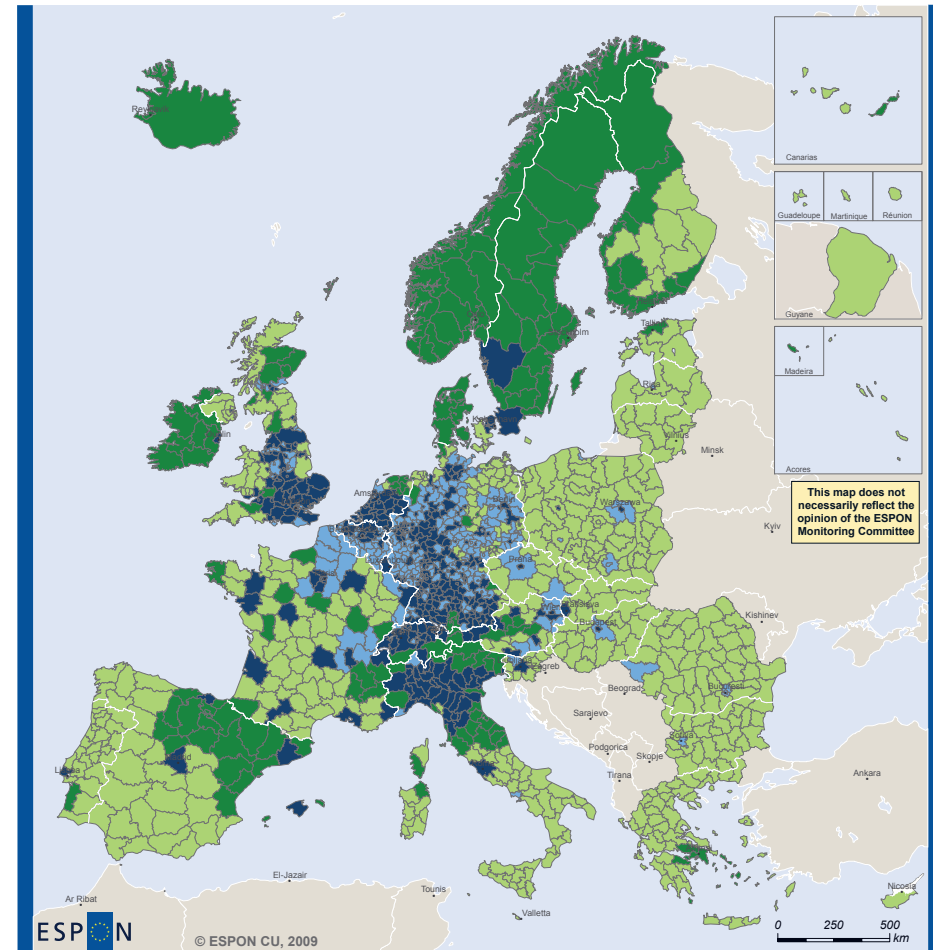
To investigate this further, potential multimodal accessibility of regions has been linked to GDP-PPS per capita and to net migration trends in order to explore the situation on the EU territory and its regions. Using multimodal accessibility provides comprehensive findings relating to land borne and air transport modes. Considering transport modes individually may however provide additional and more detailed findings.

3.1 GDP and accessibility

The political debate on European territorial development underlines that accessibility and mobility are prerequisites for regions' economic development. Regions having a high accessibility to raw materials, suppliers and markets are in general economically more successful regions enjoying a more competitive position in the global market. If so, transport infrastructure improvement might be an important policy instrument to promote regional economic development.

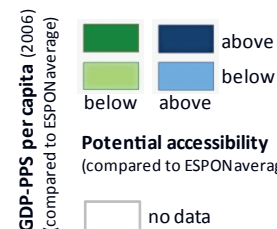
⁴ World Bank's Development Report 2009 on "Reshaping Economic Geography" (WDR 2009)

Map 9 GDP-PPS per capita versus potential multimodal accessibility



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Regional level: NUTS 3



Sources:
GDP-pps per capita: EUROSTAT, 2006
Accessibility: S&W Accessibility model, 2006

Origin data:
GDP-pps per capita: ESPON Database, 2009
Accessibility: ESPON Accessibility update, 2009

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3 – European accessibility, economy and migration

How does the accessibility level relate to GDP development?

Are regions with high accessibility at the same time the most economic successful regions?

To better understand this relation, ESPON compared the potential multimodal accessibility of regions in 2006 with GDP-PPS per capita in 2006.

The relation between multimodal accessibility and economic development in 2006 is displayed in Map 9, grouping regions with regard to GDP and accessibility. In relation to potential accessibility and GDP, 69% of the regions are in a double positive or double negative situation, i.e. they have both GDP and accessibility above respectively below European average. Moreover, accessibility and GDP shows a significant high positive correlation of 0.52. Both observations indicate a significant link between accessibility and economic development. Three key findings should be highlighted:

- Almost 1/3 of European regions (32%) have high potential multimodal accessibility (dark blue). These regions are mainly located in the economic core of Europe, the so-called Pentagon. Remarkable is, that most of the remaining regions in this core area are regions with a GDP per capita lower than average combined with a high potential accessibility (light blue, 18% of all regions). Most capital regions of Europe show the same pattern: a double positive situation in the capital region surrounded by regions with a below average GDP per capita. These “surrounding” regions seem to dispose of under-used potential that could be exploited in order to increase their economic welfare. Moreover, they vicinity to neighbouring areas with high GDP could be a development opportunity as well.
- More than 1/3 of the regions of Europe (37%) show both accessibility and GDP per capita below average (light green). These regions, predominantly found in peripheral areas in Eastern and Southern Europe, face a “double” challenging situation and would require particular attention in relation to the aim of territorial cohesion. Remedies to increase their economic welfare may require however more than only policies and measures improving their accessibility. A package of measures enforcing place specific development opportunities should be defined including a mix of measures that could explore a higher accessibility.
- More than 1/8 of the European regions (13%) are performing low on accessibility but high on GDP per capita (dark green). These regions can be found in the Nordic countries, north-east of Spain, Scotland, Ireland and in and around northern Italy. Apparently, accessibility is not a decisive factor for the high regional economic performance in these regions. The question is how do these more sparsely populated regions then create their economic welfare? Regions in the Nordic countries, for example, have overcome their peripheral allocation by capitalising on current strengths in relation to ICT, research, educational and environmental opportunities and less on improving their accessibility.

It can be concluded that high level accessibility has a strong relation to economic development of regions. As stated, 2/3 of European regions are double positive or double negative in relation to GDP and accessibility. As such these regions are in line with the assumption that GDP is significantly linked to potential accessibility. However, 13% of the regions have found other ways to overcome their low accessibility and nevertheless reached a more than average economic welfare, while 18% have the advantage of high accessibility that is not yet materialised in a high GDP per capita. Consequently, accessibility seems to be a necessary but not sufficient prerequisite for a positive economic development of regions.

3.2 Migration and accessibility

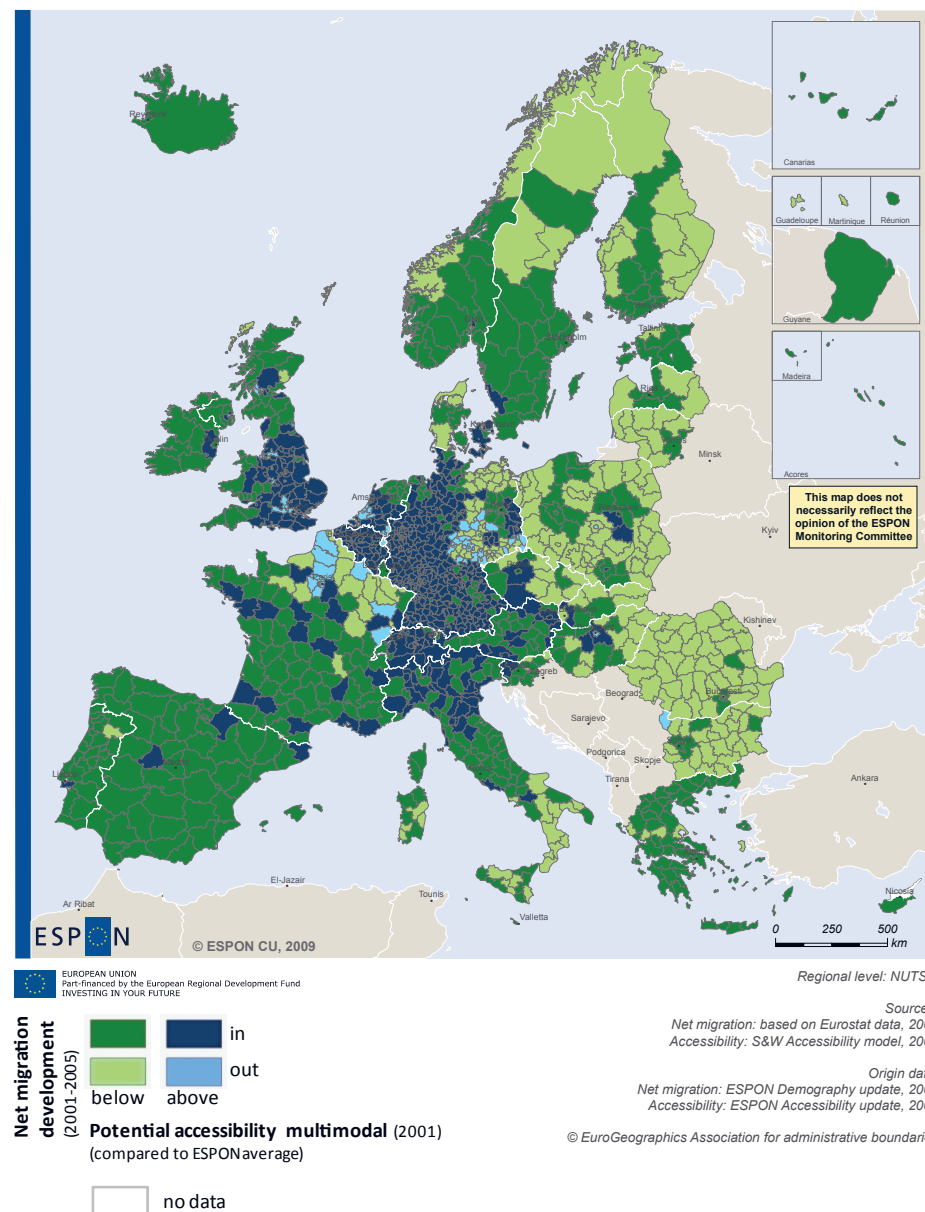
The effects of migration on labour markets and social sustainability is often mentioned in the European policy debate around Territorial Cohesion. The move of capital and labour is seen being driven by the benefits of agglomeration. One of these benefits is accessibility.

To what extent affects the accessibility of a region the migration movements?

Are regions with a high accessibility more attractive to people than regions with a low accessibility?

To better understand this relation, ESPON compared the potential multimodal accessibility of regions in 2001 with migration trends between 2001 and 2005 with the result displayed in Map 10.

Map 10 Annual net migration development versus potential multimodal accessibility



3 – European accessibility, economy and migration

In total, 61% of the regions appears to be in a double positive or double negative situation, i.e. they have an above average accessibility and in-migration or they show below average accessibility and out-migration. This confirms the existence of a link between accessibility and migration. However, as correlation between these two variables (0.14) is not that high, the interpretation of these conclusions must include other factors of explanation.

For distinct group of regions, four main findings should be drawn:

- More than 2/5 of the European regions (41%) reveal a potential accessibility that is above average and at the same time in-migration (dark blue). These regions are mainly grouped in the centre of Europe, however, some large areas can also be found outside this centre in the north of Italy and the core area of the United Kingdom, as well as some more scattered regions in France and Sweden. Most capital cities outside the core area do not have this double positive situation but often one or more neighbouring regions that fall into this category. This situation is true in almost half of the European capital cities, in Paris, London, Bruxelles/Brussel, Lisboa, Madrid, Roma, Ljubljana, Budapest, Bratislava, Praha, Berlin, København and Warsaw, indicating a significant level of sub-urbanisation.
- More than 1/3 of the regions (34%) have accessibility below average and at the same time a positive in-migration (dark green). These regions are located throughout the entire Europe, however slightly less in the Eastern part. Apparently, this category of regions manages to attract people despite a low level of potential accessibility. The interesting question is whether attractiveness factors here are particular urban or nature qualities and/or based on types of investments different to traditional ones?

- 1/5 of the European regions (20%) are in a double negative situation facing both low accessibility and net out-migration (light green). These regions are mainly located in the Eastern part of Europe, although these regions can also be found in the far North of Europe, the North of France and in the South of Italy.
- A small number of regions (5%, light blue) are facing net out-migration despite the fact that their potential accessibility is above average. These regions are mainly found in the core of Europe. This trend of out-migration despite high accessibility can be due to different reasons, such as border migration (along the borders of the Netherlands), suburbanisation (London, Paris, Budapest and the Dutch Randstad), classic urbanisation (Middle-East of Germany) and/or by declining industries (such as in parts of Northern France).

In summary, in 61% of European regions net migration is closely linked to potential accessibility. However, other factors are influencing the migration flows and need consideration by the individual regions. Improving the potential accessibility of a place will not by automatically provide a positive effect on migration. Complementary actions to traditional infrastructure improvements have to be considered to support the attractiveness of these places.



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The ESPON 2013 Programme is part-financed by the European Regional Development Fund, the EU Member States and the Partner States Iceland, Liechtenstein, Norway and Switzerland. It shall support policy development in relation to the aim of territorial cohesion and a harmonious development of the European territory.

ESPON shall support Cohesion Policy development with European-wide comparable information, evidence, analyses and scenarios on framework conditions for the development of regions, cities and larger territories. In doing so, it shall facilitate the mobilisation of territorial capital and development opportunities, contributing to improving

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ISBN 978-2-9599669-9-6