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Research Report

Economic Development Perspectives of the Elbe/Oder Chamber Union (KEO)

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Economic Development Perspectives of the Elbe/Oder Chamber Union (KEO)

Michael Bräuninger, Silvia Stiller, Mark-Oliver Teuber, Jan Wedemeier

HWWI Policy
Report No. 18

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HWWI Policy Report No. 18

Economic Development Perspectives of the Elbe/Oder Chamber Union (KEO)

Michael Bräuninger, Silvia Stiller, Mark-Oliver Teuber, Jan Wedemeier
with the assistance of Ulrike Biermann, Henriette Bunde, Marco Görlinger

Study of the Hamburg Institute of International Economics (HWWI) for the Elbe/Oder Chamber Union on behalf of the Hamburg Chamber of Commerce as KEO General Secretariat:

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Preface from Decin

For a simple reason consumer goods and goods of all kinds can be purchased at relatively low prices: The logistics industry and the commerce are constantly competing with each other in their search for the most cost-effective means of transport of their goods. In the end it is the consumer who benefits from being able to purchase a cheap smart phone from Asia or a medium-sized car with a high share in copper from South America.

The region between Flensburg in the North of Germany, Warsaw in the East and Prague in the South, comprises the sphere of influence of the Elbe/Oder Chamber Union. Twelve years ago Polish, Czech and German chambers of industry and commerce affiliated to facilitate the entry of Poland and the Czech Republic in the European Union, while developing the markets for the North German ports.

Today, the integration of Poland and the Czech Republic in the European Union has been successfully completed. The two countries' trade with Germany is prospering. Despite of the domestic market this is by no means self-evident! This study shows, the major challenges which the KEO is currently facing. To the special challenges of demographic change, to name only one example from the study must be added general trends in the global market.

With this study we want to support industrial stakeholders in gaining a clearer picture of their home markets and future perspectives of development of those. At the same time the policy makers should also be faced with a statement of the facts to help make better decisions.

As a union of chambers we are convinced that commercial exchange is not an end in itself. It serves individuals and their consumption needs. Since it is anything but our intention to direct the consumer behaviour of people by means of a given product selection or even to restrict quantities, we need to organize sustainable supply chains. Here the focus primarily is on the reduction of emissions and resource-saving economies.

This is why we welcome expressly that the European Union by means of the TEN-T network wants to create optimum transport links. Above all, it is important that the cross-border projects because of their large contribution to the network are centre stage in the discussion. This study helps to highlight these projects. Without the support of the HHLA Intermodal GmbH and the *"Amber Coast Logistics"* project of the Interreg program of the European Union we would not have been able to commission this study.

The HWWI has developed a series of recommendations for action, showing how trade barriers between Poland, the Czech Republic and Germany can be further dismantled and how the infrastructure can be further developed to meet requirements. We are confident that we will succeed with our united forces. The people in our three-country region will benefit from our efforts through more secure jobs and the opportunity to earn a good income.

Jiri Aster
President of the Elbe/Oder Chamber Union
President of OHK Decin

(This English version of the preface is an unofficial translation of the official German version.)

Preface from Warsaw

The catchment area of Elbe and Oder forms a macro-region, which is one of the most dynamically developing regions in the European Union. It is also an example of effective cooperation in the fields of commerce, transport, services, and urban planning. I therefore warmly welcome the initiative of the Hamburg Institute of International Economics and the Elbe/Oder Chamber Union, to make an analysis of the economic potential of the Elbe and Oder, two important European waterways for freight transport in Germany, Poland and the Czech Republic. Along the transport routes powerful urban areas emerged with substantial demographic, technological, and social potential.

Despite existing differences in economic structure and income levels this area has a lot in common. These consist particularly in the very good trade relations in the region itself, the positive trends in the labour and employment market and the significant role of the waterways and ports. The study can be a valuable incentive in this regard for having a comprehensive discussion and for further developing regional cooperation between Germany, the Czech Republic and Poland.

Germany and the Czech Republic are among the strategic economic partners of Poland. These two countries account for almost a third of the export volume of Poland. This analysis of the structures in the Elbe/Oder catchment area can help politicians and state and local government authorities to find optimal solutions for current and future problems in the areas of commerce, transport and regional planning. I am therefore grateful to the initiators and authors of this study for their very valuable recommendations. It should be emphasized that the present publication came about in conjunction with the conference "Growth Opportunities for Western Poland, Germany and the Czech Republic – Strengthen trimodal transnational traffic" under the aegis of Mr. Waldemar Pawlak, Deputy Chairman of the Council of Ministers and Minister of the Economy of the Republic of Poland.

Ilona Antoniszyn-Klik
Under-Secretary of State at the Ministry of Economics of the Republic of Poland

(This English version of the preface is an unofficial translation of the official German version.)

Preface from Berlin

Merging of the Elbe-Oder region and strengthening its joint economic strength will only succeed if the unobstructed mobility of people and goods is guaranteed. A basic requirement for a positive development of the region is efficient transportation routes, namely rail, road and waterway in combination with attractive offers for combined transport.

In the continuing strong growth of cross-border freight transport railways must gain a larger share taking into account the increasing demands of climate and environmental protection. For this purpose the infrastructure must be improved accordingly. Although there is already significant progress – I remember, for example, the construction of the Oder bridge at Frankfurt in 2008 – further efforts are required in all the neighbouring countries of the Elbe-Oder region with a long-term perspective of a new railway line between Dresden and Prague.

For the Federal Government, it is also clear that the shipping/waterway system must play an important role as it is a particularly environmentally friendly means of transport when tackling the challenges imposed by traffic growth. Furthermore securing and maintaining the waterways are important requirements.

The Elbe has growth potential for commercial container transportation to and from the port of Hamburg. If only a small percentage of the projected container handling of the Hamburg container port could be transported by barge, this would result in a potential of about one million containers per year, equivalent to 10 000 trains. For this reason the Federal Ministry of Transport, Building and Urban Development is committed to the Federal Elbe waterway. In recent years Germany has already negotiated with Poland on improving the situation of the German-Polish border waters. Germany will recommence these negotiations with Poland.

The Federal Government also attaches particular importance to the road link between Berlin and Warsaw. This as European Route 30 is part of the Trans-European Road Network (TEN) and the Pan European Network (PAN).

The construction of the A 17/D 8 from Dresden to Prague likewise is a project of outstanding importance. This road link also is part of the Pan-European network and a component of the EU's eastward expansion to the Czech Republic.

The new B 178 from the A 4 to the border between Germany and Poland – funded with ERDF funds – must also be highlighted. The B 178 is to create a direct connection between the German motorway network and the European Route 442 in the Czech Republic via Poland.

The Federal Ministry of Transport, Building and Urban Development aims to further strengthen the Elbe-Oder region through needs-based development of cross-border roads and port-hinterland connections as well as the integration of the regions in the national transport infrastructure to major commercial centers.

(This English version of the preface is an unofficial translation of the official German version.)

Enak Ferlemann MdB
Parliamentary State Secretary in the Federal Ministry of Transport, Building and Urban Development

Preface from Hamburg

Economic studies for cross-border projects in the immediate border area between Poland, the Czech Republic and Germany are fortunately several in numbers. The evaluation of EU programmes such as Interreg, shows that since the accession of Poland and the Czech Republic to the EU and a Common Domestic Market, in particular with their direct EU neighbour Germany there have been strong positive developments in cross-border trade.

With this study we assume a new perspective: We want to look at trade of goods in the KEO area. So that we do not only confine ourselves with the observation of mere trade flows, we have adopted a more fundamental approach when commissioning the HWWI with this study. We have commissioned an analysis of the economic structure in our cooperation area. In this analysis national borders only play a role insofar as they break down in a transparent manner the data for this common area. Let us have a look at the unit labour costs when manufacturing within the KEO area: Germany has 16 percent higher labour costs than the Czech Republic. Polish labour costs are in turn 13 percent lower than the Czech and thus 29 percent below German unit labour costs.

Nevertheless, there would be scarcely a German entrepreneur who would hit upon the idea of using this wage cost effect, for example, for the production of textiles. In fact, the production of consumer goods, especially textiles has been carried out for decades in Asia and transported by sea to the KEO region. As a result a structural change in Poland and the Czech Republic is in full swing, something we want to support as a Chamber Union.

Europe is competing with China, India, South Africa, Brazil and Russia, of course, to mention only the countries of the BRICS group. The KEO region is located in the centre of the EU's internal market and must face the competition with these countries. We compete with our international rivals due to an advantage in knowledge which ensures our prosperity. This study therefore focuses on the area of patent applications and government spendings on research and development. In this policy context all three countries should work together to make the economic area an area for knowledge sharing and innovation in order to maintain a strong economic structure for further economic competition. In the area of infrastructure further requirement-based development based on the main traffic flows is imperative.

But there are still many obstacles to dismantling the trade barriers between Poland, the Czech Republic and Germany. Their abolition could quickly achieve a significant impact. The forthcoming introduction of the Euro in Poland and the Czech Republic could be such a prospect for increased trade with Germany.

(This English version of the preface is an unofficial translation of the official German version.)

Prof. Dr. Hans-Jörg Schmidt-Trenz
Secretary-General
of the Elbe/Oder
Chamber Union Chief
Executive Officer of the
Hamburg Chamber of Commerce

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Summary

The Elbe/Oder Chamber Union (KEO) is a consortium of 15 German, 6 Polish and 9 Czech chambers of industry and commerce, which has set itself the goal of jointly representing the interests of companies in the region at national and European level. In 2010, 37.6 million people lived in the corresponding chamber districts, representing a market share of 7.5 % of the EU population. The gross domestic product of the KEO region in 2008 was 716.6 billion euros, equal to 5.7 % of the GDP of the EU.

The regions in the KEO are very heterogeneous and the regional gross domestic products differ both in dimensions and in their composition. In terms of per capita income the German regions are well ahead of the rest of the KEO regions; Prague is an exception from the other regions with a relatively high per capita income. The areas of the KEO region with the lowest incomes can be found in Poland.

Overall, the economically weaker regions have started catching up in recent years. Czech and Polish regions are showing growth rates, which are significantly above the growth of the gross domestic product and the productivity of the German regions. Among the German KEO regions the State of Saxony Anhalt is growing fastest.

For the future, this process of catching up is expected to continue in many regions. In the course of that these regions will experience an increase in per capita income. Because of the continuing economic change, an increase in job productivity is also expected. The HWWI forecasts a growth of the gross domestic product of 93.8 % in Poland, 59.3 % in the Czech Republic and 32.9 % for Germany up to 2030.

Despite the favourable macroeconomic outlook nevertheless, the risk of a future increasing polarization in the area is evident, in which course rural regions, and structurally weak towns, become detached from economic catch-up process. While in numerous, particularly rural areas, the per capita income is well below the EU average, cities and their catchment areas are already developing very dynamically as regional centres of growth.

Pronounced regional disparities can also be seen in terms of demographic development prospects. In the recent past many regions in the KEO have had a decreasing population. Demographic projections imply that this drop could exacerbate especially in economically weaker regions, due to emigration. Overall, for the KEO area a population decline of 6 % from 2010 to 2030 is predicted.

In the KEO area there are already pronounced differences in population structures. The major cities Berlin, Hamburg and Prague are important centres of growth in terms of population development and the economy. In Poland, at many places suburbanization is developing and the population increases in the surrounding areas of larger cities.

The overall conclusion is that foreign trade in recent years has increased in the KEO area, and that at the same time, trade relations have intensified within this region. For the future development of trade relations the development of the national gross domestic products are of great importance as this directly affects the demand for goods.

Due to the positive trends in the gross domestic products a significant increase in foreign trade for Poland, the Czech Republic and Germany is expected in the future, which also affects the export-oriented regions in the KEO area. The HWWI forecasts for the period up to 2030 an export growth of 201.4 % for Poland, 146.5 %, for the Czech Republic and 92.7 % for Germany.

International trade in goods is an important determant for the level of traffic in the KEO area. At national level, road freight transport dominates in Germany (67 % share), Poland (80.5 %) and the Czech Republic (77.8 %), while the use of rail for freight transport in the three countries ranges from 19.4 to 22.1 %. Inland waterway transport only has a more prominent position in Germany (12.1 %). In the last decade in all three countries, there has been an increase particularly in road freight traffic.

Due to the future growth of gross domestic product and foreign trade, the utilization of all modes of transport will increase in the KEO area, which could lead to shortages in transport capacity in many places. In general, the density of the route networks of rail and navigable inland waterways between the regions in the KEO area differs significantly. In particular, the road network in German regions is on average much denser than in the Polish and Czech regions. Moreover, Polish rivers are generally not navigable. There are many sea and inland ports in the KEO area. Hamburg is the second largest container port in Europe. The port of Gdansk, that is located outside the KEO, but affects the transport conditions of this area, is one of the largest ports and contributes to total turnover in the Baltic Sea. All seaports in the KEO area, with the exception of Hamburg, have mainly intra-regional trade relations. This means that the exchange of goods takes place predominantly in direct trade with the regional Baltic and North Sea ports.

Underlying conditions for sustained positive economic development of the KEO regions are ongoing integration through trade and the continuation of structural change. The further development of knowledge-intensive service sectors and industries is an important prerequisite for increasing productivity and technological performance.

Many policy areas can be identified in order to strengthen the competitiveness of these regions, among them the development of education and research capabilities, handling the demographic challenges, the reduction of transaction costs for cross-border activities and the qualitative and quantitative improvement of the transport infrastructure are particularly relevant.

1 | Background

In the course of the European integration process non-tariff barriers and other transaction costs between European countries, for example, by means of cross-border recognition of qualifications and the promotion of language skills, will lose importance in the future. This provides impetus for the intensification of cross-border trade and labour market integration in the European Union (EU). The use of these potentials for the regional division of labour between neighbouring countries will have positive effects for these economic areas (cf. Niebuhr/Stiller 2006).

Table 1

Member Chambers of the Chamber Union Elbe/Oder

Country	Member chamber
Germany	Berlin, Chemnitz, Dresden, Flensburg, Halle-Dessau, Hamburg, Leipzig, Lübeck, Lüneburg-Wolfsburg, Magdeburg, Neubrandenburg, Potsdam, Rostock, Schwerin, Stade
Poland	Gliwice, Gorzow Wielkopolski, Opole, Poznan, Szczecin, Wroclaw
Czech Republic	Chomutov, Decin, Liberec, Litomerice, Louny, Most, Praha, Teplice, Usti nad Labem

Source: HWWI.

The Elbe/Oder Chamber Union (KEO) is a consortium of 15 German, 6 Polish and 9 Czech chambers of industry and commerce to strengthen the economic performance of the participating regions. The aim of this initiative is jointly representing the interests of companies at national and European level. This concerns, in particular, the development of transport infrastructure. Through far-reaching improvement of road and rail networks and waterways transport costs should be reduced and economic development and cross-border network-

Figure 1

ing of the area should receive impetus. Since the 1st of May 2004 the KEO, although originally founded in 2000, with the accession of Poland and the Czech Republic belongs fully to the EU. Table 1 shows the chambers of industry and commerce which are KEO members. In addition, the German-Polish and German-Czech Chambers of Foreign Trade have been associated members of the KEO since 2009.

The study area defined by the chamber members is shown in Figure 1. This includes with the exception of Thuringia all the eastern German Federal States, Schleswig-Holstein, Hamburg and the Lower Saxony region of the former administrative district of Lüneburg. The Polish study area is divided into the voivodships Dolnoslaskie, Lubuskie, Slaskie, Opolskie, Wielkopolskie and Zachodniopomorskie. The Czech Republic is represented by the districts of Ustecky kraj, Liberecky kraj and the area around the capital Praha (Prague). As the German-Polish Chamber of Commerce and Industry is an associated member of the KEO, in addition to the KEO regions the Polish capital Warszawa (Warsaw) and the surrounding voivodship of Mazowieckie are considered in the analyzes.

In order to assess the economic status quo of the KEO area European comparisons are made and comparative values for the EU are presented.[1]

Figure 2 provides a first overview on the economic relevance of the KEO. 37.6 million people lived in the region in 2010 which corresponds to 7.5 % of the EU population (cf. Table 2). The gross domestic product of the KEO area in 2008 was 716.6 billion euros, 5.7 % of the EU's GDP. The per capita income is 19 028 euros which is below the corresponding average per capita income of the EU. It provides an initial indicator of the economic challenges faced by the KEO region. About half of the population in the KEO area is in employment with the unemployment rate around that of the EU average.

1 In general, harmonized data are published by Eurostat at the regional level with a time lag, while the study contains data from the first German edition, published in May 2012.

Overview on the KEO area 2010
• 37.6 m inhabitants (EU: 502.5 m)
• 155.5 inhabitants per km² (EU: 116.4 per km²)
• Unemployment rate 9.8 % (EU: 9.6 %)
• Employment rate 50.6 % (EU: 53.5)
• GDP per capita 19,028 euros (EU: 25,100 euros) (as of 2008)

Quellen: Eurostat (2011); Federal Statistical Office (2011); Statistical Offices of Poland and the Czech Republic (2011); Calculations HWWI.

Table 2

In the following the economic development prospects of the KEO region are analyzed. Chapter 2 shows the economic status quo and the demographic conditions, which are the conditions for regional growth potential. In Chapter 3, trade relations between the countries in the KEO region are analyzed, which are a key indicator of the division of labour between them. Subsequently, the port locations in the KEO area are considered in Chapter 4. Here particular attention is paid to the hinterland connections of ports and the transportation accessibility of the regions. The results of the analysis provide the basis for developing recommendations for the KEO region in Chapter 5.

2 | The economic status quo and spatial development perspectives

2.1 | Demographic conditions

37.6 million people lived in the KEO area in 2010, representing a market share of 7.5 % of the EU population. From a demographic perspective, the overall result is a negative population trend. From 2000 to 2010 the population of the region declined by 1.6 % (cf. Table 3), while that of the EU grew overall by 3.9 %.[2] There was thereby a strong spatial differentiation between growing and shrinking regions. East Germany and some voivodships in Poland were in particular affected by a high population decline that is in East Germany mainly attributed to the East-West migration (cf. Federal Statistical Office 2006). Saxony-Anhalt had to cope with the highest population decrease within the KEO area (-10.7% between 2000 and 2010). In Saxony-Anhalt there are in particular, numerous declining and aging cities and municipalities (cf. Stiller 2011).

2 For the statistical analysis, the spatial delineations relate mainly to the German Federal States and Polish superior administrative units – voivodships – (NUTS 1 or else NUTS 2 regions), whereas the Czech regions are reported as NUTS 3 (kraj). NUTS stands for Nomenclature of Territorial Statistical Units. The NUTS classification is a hierarchical system for dividing up the European Economic Area (cf. Eurostat 2011).

Population growth and concentration in the cities

With a population growth of 4.1 % between 2000 and 2010 Hamburg was the fastest-growing German sub-region and behind Prague the second fastest in the KEO area. Generally, the capitals of the countries in the KEO region represent distinct centres of growth with regard to population development. However, whereas in Poland the population of Warsaw is growing, voivodships in the border area are experiencing population losses. In contrast numerous German cities in the KEO area have experienced a population increase.

The population losses of the Polish regions are among others attributed to the EU accession of the country in 2004. Although the EU-15 Member States[3] could suspend the full free movement of workers from countries that had joined the EU in 2004 at the most up to the 1st of May 2011, only a few countries (e.g. Germany) made full use of this option. Thus, in the recent past Polish workers migrated mainly to the United Kingdom, Ireland and Sweden. Thus the exodus from Polish territories primarily corresponds to a migration in countries with higher wages (cf. Iglicka 2010).

3 This pertains to Belgium, Denmark, Germany, Finland, France, Greece, Great Britain, Italy, Ireland, Luxembourg, Netherlands, Austria, Portugal, Sweden and Spain.

The Czech part of the KEO area marked the highest population growth (3.9 % between 2000 and 2010), whereas the German or else Polish part areas experienced a population loss. In all Czech KEO regions, the population increased during this period. In particular, the population of the capital of Prague and its surrounding region increased by 6.4 %. In this regard Prague represents the fastest growing region of the KEO area (cf. Table 3).

Apart from the German city states of Berlin and Hamburg, Prague counts as one of the most densely populated regions of the KEO area. The population density of these three regions considerably exceeds that of the entire KEO area. For example, the population density of Berlin in 2010 exceeds that of the entire KEO area by more than twenty fold. The German state of Mecklenburg-Western Pomerania and the Polish voivodship Lubuskie represent the most sparsely populated regions.

Demographic indicators 2010

Regions	Population	Population density	Population growth 2000 bis 2010
	Inhabitants	Inhabitants/km²	%
KEO area	**37,602,727**	**155.5**	**-1.6**
German part	**20,403,753**	**163.9**	**-2.7**
Berlin	3,460,725	3,881.7	2.3
Brandenburg	2,503,273	84.9	-3.8
Hamburg	1,786,448	2,365.2	4.1
Lüneburg	1,692,238	109.1	1.2
Mecklenburg-Vorpommern	1,642,327	70.8	-7.5
Sachsen	4,149,477	225.3	-6.2
Sachsen-Anhalt	2,335,006	114.2	-10.7
Schleswig-Holstein	2,834,259	179.4	1.6
Polish part	**14,665,829**	**135.3**	**-0.9**
Dolnoslaskie	2,877,840	144.3	-1.2
Lubuskie	1,011,024	72.3	0.3
Opolskie	1,028,585	109.3	-3.9
Slaskie	4,635,882	375.9	-2.6
Wielkopolskie	3,419,426	114.6	2.2
Zachodniopomorskie	1,693,072	74.0	-0.3
Czech part	**2,533,145**	**281.7**	**3.9**
Liberecký kraj	439,942	139.1	2.5
Praha	1,257,158	2,533.9	6.4
Ústecký kraj	836,045	156.7	1.1
EU 27	*502,486,718*	*116.4**	*3.9*
Mazowieckie	*5,242,911*	*147.4*	*2.5*
Warszawa	*1,720,398*	*3,327.7*	*2.9*

* Figures from 2009

Sources: Eurostat (2011); Federal Statistical Office (2011); Statistical Offices of Poland and the Czech Republic (2011); Calculations HWWI.

Table 3

The number of inhabitants per square kilometre in 2010 hereby amounted to only 70.8 or else 72.3 persons (cf. Table 3), which is also well below the EU average. The population density is relevant to regional economic development for a number of reasons; among others it affects the quantity of local infrastructure and market potential.

Negative trend of the population development by the year 2030

One problem is represented by the expected population development. For the future one has to reckon with a significant decrease of the population in the KEO area. Between 2010 and 2030, there is a forecast of a decrease in population by 6 %. This trend is in turn to a large extent attributed to the East German states, particularly to Saxony-Anhalt. A population decline of 18.2 % is hereby expected (cf. Federal Statistical Office 2011). In Poland, Opolskie (-9.7 %) and Slaskie (-9.4 %) are in particular affected by the population losses. The development of these regions is thus significantly contrary to the EU trend: the population of the EU as a whole is projected to increase by 4.2 % by the year 2030.

Moreover, an increased spatial concentration of the population in urban centres is expected particularly in the German KEO area for example, in the metropolitan regions of Hamburg and Berlin. Whereas the big cities in many places continue growing, the population of rural areas will decline (cf. Figure 2). This is in view of the economic development prospects of individual regions problematic because population losses and a reduction of the economic performance often go hand in hand. With declining population figures, new problems can also arise in the form of no longer efficient logistical supply facilities and infrastructure services in rural areas.

Furthermore, especially in Poland a stronger trend to sub-urbanization can be discerned. The surrounding regions of the big cities Szczecin, Wroclaw and Poznan are expected by the year 2030 to experience a much stronger population growth as the cities themselves. The same picture is portrayed for Warsaw. The growth of the surrounding regions of Poland's capital, Warsaw Wschodnia and Warsaw Zachodnia will be 3.9 and 7.7 percentage points higher than that of Warsaw (cf. Figure 2).[4]

4 The population forecasts for the Czech regions are compiled by the Statistical Office of the Czech Republic only with natural population changes. A consideration of migration effects is not taken into account.

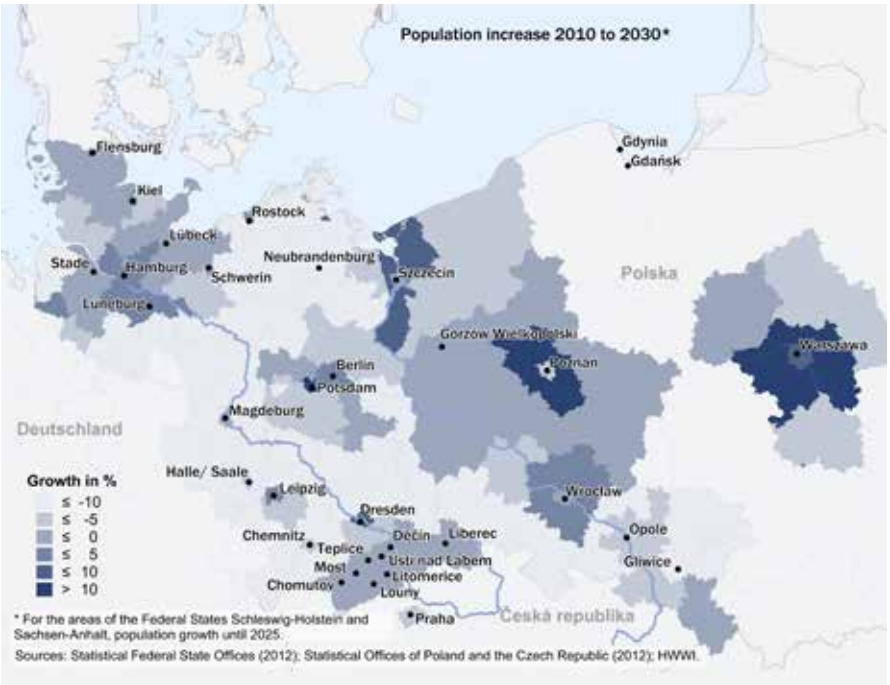


Figure 2

2.2 | Employment and unemployment

In the KEO area in 2008, more than 16.5 million people were in employment, whereby the number of jobs between 2000 and 2008 increased by 2.1 % (cf. Figure 3). The German part hereby constitutes the largest number of employed workers. More than 57 % of the workforce of the KEO area was employed there in 2008.

The development of the number of employed workers varies considerably between the regions of the KEO area. In the Czech part an increase in employment of 9.4 % was recorded from 2000 to 2008. Thus, there were in 2008, nearly 1.5 million employed workers in the Czech part of the KEO area. A particularly positive development was experienced by the capital Prague, where employment increased in this period by 12.8 %.

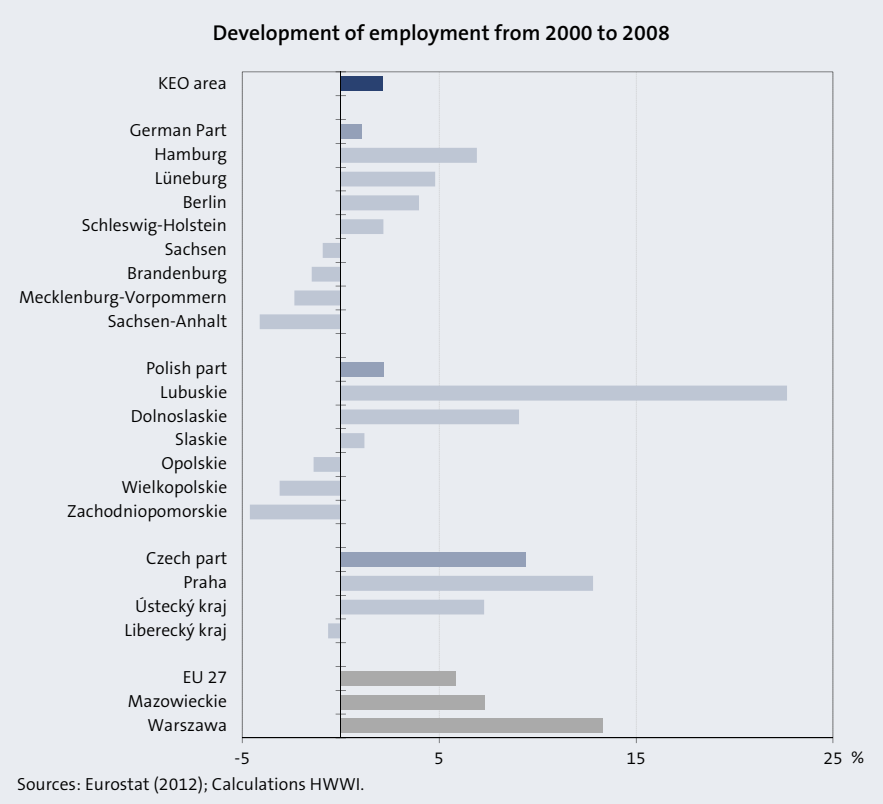


Figure 3

The German part of the KEO area reveals a different picture. Whereas the West German sub regions and the German capital showed an increase in the employment figures, they declined in the East German territorial states.

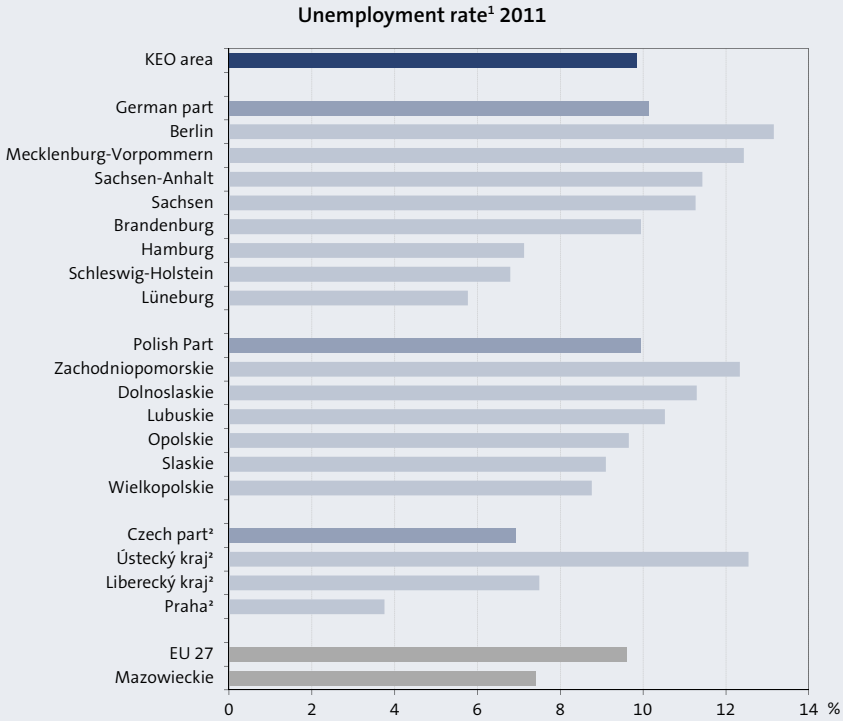
Saxony-Anhalt had to cope with the largest decline in employment. The number of employed workers hereby fell by 4.1 % from 2000 to 2008.

The highest increase in employment figures is portrayed by the Polish voivodship Lubuskie. The number of employed workers in the examined period increased by 22.7 % to 414 600 employed workers. However, the Polish part also entails the last position with respect to employment development. The employment in Zachodniopomorskie decreased by 4.6 % to 558 300 employed workers from 2000 to 2008 (cf. Figure 3).

A positive trend is reflected in the unemployment rate in the KEO area from 2000 to 2010 (cf. Figure 5). Almost all areas were able to reduce their respective unemployment rates, whereby in particular the Polish sub-regions portrayed a significantly positive development. Nevertheless, there are marked differences in the KEO area with regard to the unemployment rates, which is an indicator of the economic disparities in this region. Whereas the unemployment rate in Prague does not even reach 4 %, in the Czech Ustecky kraj as well as in Berlin and Zachodniopomorskie about 12 % of the labour force is unemployed (cf. Figure 4).

Significant decrease in the unemployment rate

In the period from 2000 to 2010, there was a significant decrease in the unemployment rate in the Polish part of the KEO area of 7.6 percentage points (cf. Figure 5). A decisive role was hereby played by the Polish capital Warsaw. Although it is not located in the KEO area, Warsaw is, as an important market, essential to the economic development of the Polish part of the KEO area. Warsaw is both in terms of demographic and labour market variables portrayed in a very good light. Between 2000 and 2010, the Polish capital located on the Vistula, was able to report a population increase of 2.9 % (cf. Table 3). The unemployment rate decreased in the period 2000 to 2009 by 4.5 percentage points.

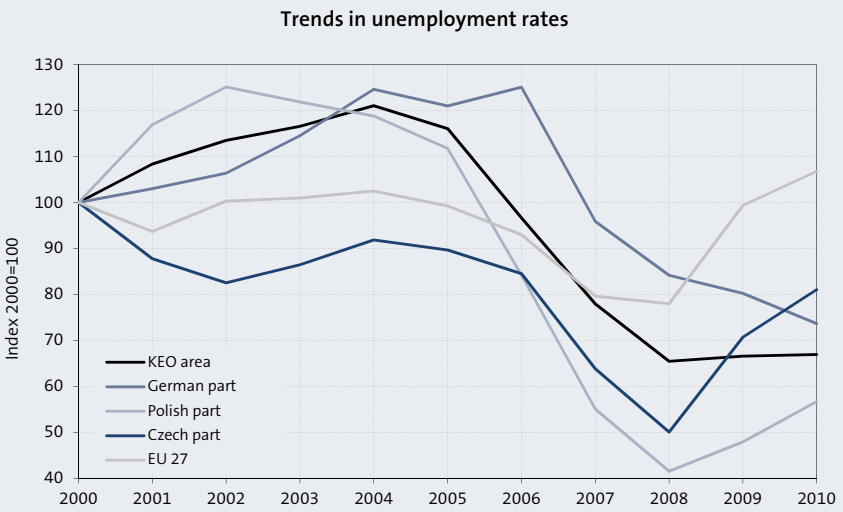


¹ The unemployment rate is defined as the number of people unemployed as a percentage of employable persons over 15 (Eurostat definition)

² Figures for Czech regions from data from the Czech Statistical Office. The figures for Czech regions and the KEO area are for 2010

Sources: Eurostat (2012); Statistical Office of the Czech Republic (2011); Calculations HWWI.

Figure 4



Sources: Eurostat (2011); Statistical Office of the Czech Republic (2011); Calculations HWWI.

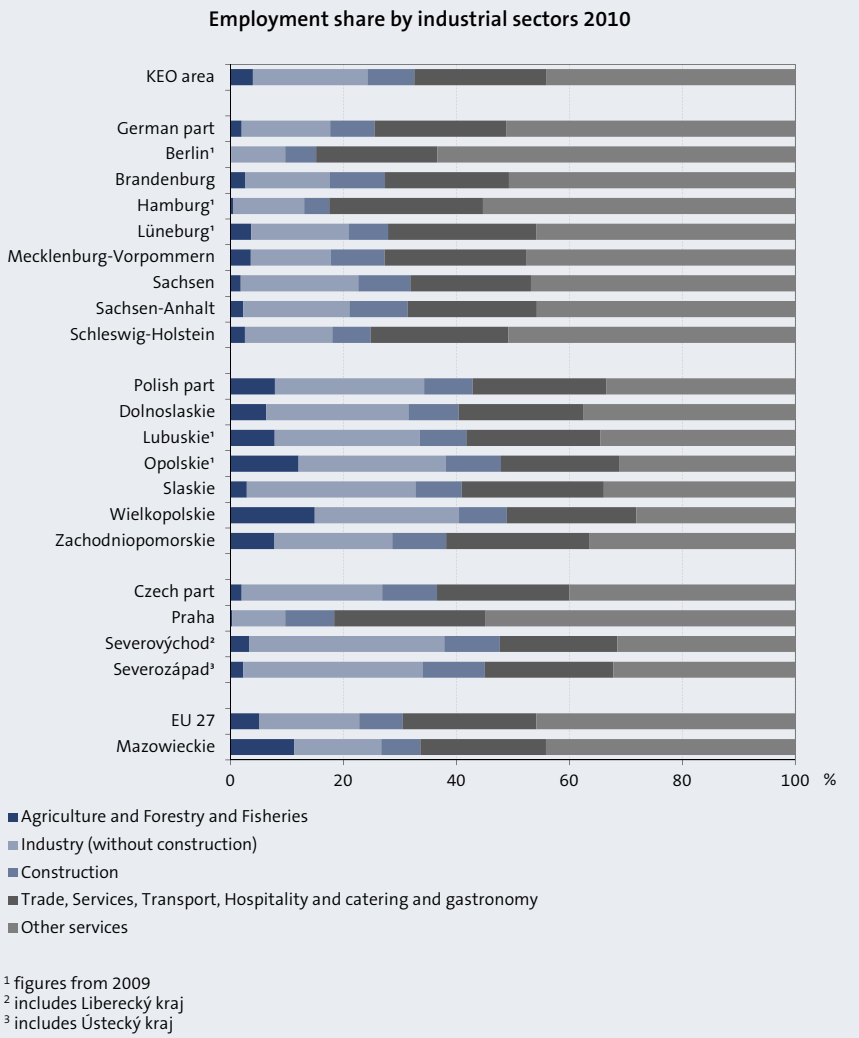
Figure 5

2.3 | Economic structure

The economic development potentials in the KEO area depend among others on factors such as the current economic structures, for which significant differences are discernible (cf. Figure 6). Whereas in most German regions of the Elbe/Oder region the change to a service economy is quite advanced, especially some Polish regions are still strongly influenced by agricultural and labour-intensive industry. As a consequence, there is a sector-differentiated structural image.

Heterogeneous economic structure

In the German part of the KEO area, the service sector share accounts for 74.5 % of total employment. In contrast, this amounts to 57.1 % in the Polish part. The Czech part has a service sector share of 63.4 %. This relatively advanced structural change towards a service economy is driven by the already strong economic region around the capital Prague. Here, 80 % of the employed workers are in the service sector. The Ustecky kraj and the Liberecky kraj on the other hand, still have structures that are significantly highly industrial in character. In the East German territorial states, the share of industry accounts for 24 % to 30 %. The city states of Berlin and Hamburg are already more specialized in services.



[1] figures from 2009
[2] includes Liberecký kraj
[3] includes Ústecký kraj

Sources: Eurostat (2012); Calculations HWWI.

Figure 6

Some Polish sub regions moreover have a relatively large agricultural economic character, especially the voivodeship Wielkopolskie with a share of employment in agriculture, forestry and fishing of 15 %. Overall, this share in the Polish part of the KEO area amounts to 7.9 %, which is significantly higher than the corresponding share in the Czech and German part (cf. Figure 6).

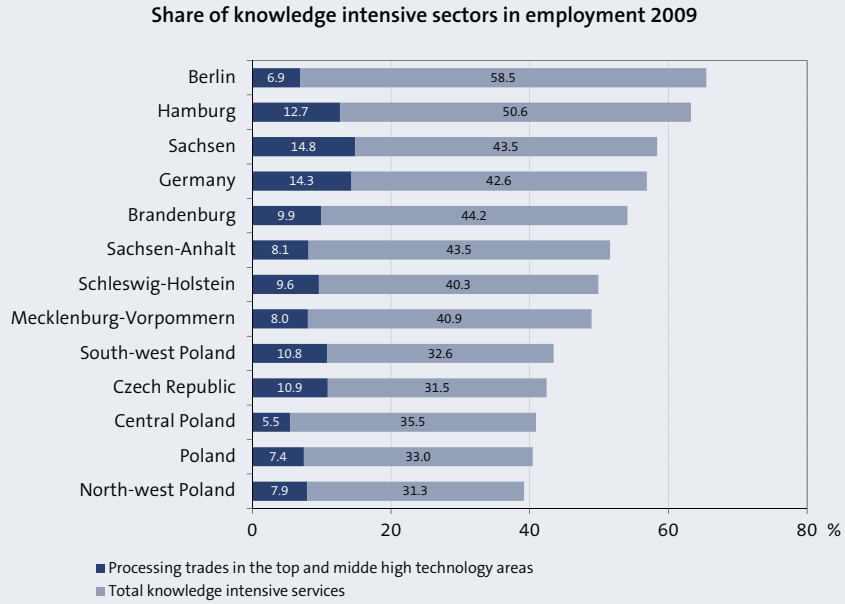
Within the KEO area the service sector is dominated by trade, maintenance, transportation, hospitality and gastronomy. This hereby accounts for 34.7 % of the provisioned services in the KEO area.

Key resource knowledge

An important indicator for the assessment of the economic structure is the significance of so-called knowledge-intensive branches or employment. These include knowledge-intensive services and industries. The relevant sectors are characterized by a comparatively high proportion of highly skilled workers and R & D personnel. These industries are in many places, especially in cities, initiators for change in economic structures and influence the adaptation of innovations positively.

In the KEO area there is a clear spatial differentiation with respect to the employment share of knowledge-intensive industries (cf. Figure 7).[5] They have at the national level in Poland (40.4 %) and the Czech Republic (42.4 %) a much lower employment share as in Germany (56.9 %). Whereas in Hamburg and Saxony 12.7 % or else 14.8 % of all workplaces are located in knowledge-intensive industries (in this case the manufacturing sector in the top and middle sector of high technology, for example, chemical industry, machinery and transport equipment), these are in Central Poland and North-western Poland, just 5.5 % or else 7.9 %. The Czech industry in terms of the importance of knowledge-intensive industries takes a middle position between Germany and Poland and has a national average that is among others ahead of Mecklenburg-Western Pomerania and Saxony-Anhalt. It should thereby be noted that the importance of manufacturing jobs in the German part of the KEO area is generally lower.

5 The Polish and Czech KEO area due to lack of regional data can not be considered in detail. It is therefore necessary in the case of the Czech Republic to conduct an analysis at the country level. Poland, however, can be divided into three zones. Hereby, the knowledge-intensive industries can be analysed in a differentiated manner for North-western Poland, Central Poland and South Poland.



Sources: Eurostat (2011); HWWI.

Figure 7

A strong differentiation between the regions is also evident in knowledge-intensive services, which for example include information services, architectural and engineering offices as well as the creative industries. These are exceptionally strong in Berlin (58.5 % of all employment relationships) and Hamburg (50.6 %). This is attributed to the fact that urban centres offer more favourable local conditions for the knowledge intensive economy, because education and research institutions and highly skilled workers are concentrated here.

Whereas the East German Federal States' share of knowledge intensive services ranges between 40.9 % and 44.2 %, this value in the eastern part of the KEO area ranges between 31.3 % and 35.5 %. In Schleswig-Holstein, this value is at 40.3 % also significantly lower than in the German city states (cf. Figure 7).

The pronounced differences in the relative importance of knowledge-intensive jobs show that in the future in many regions there will be a significant adjustment pressure in order to cope with structural change, driven by the expansion of the service sector, with a concomitant increasing importance of knowledge-intensive activities. Differing requirements for innovation also play a role in addressing these developments, which is reflected by indicators of innovation capacity.

A method for the analysis of regional innovation is the Regional Innovation Scoreboard (RIS) of the EU. The overall index results in a ranking, in which each region of the RIS can be classified into one of five categories of innovation ability. [6]

Figure 8 shows the KEO-regions with their classifications in the five categories. The most innovative regions of the KEO area thereby lie in Germany. In particular, the city states of Hamburg and Berlin and the region around Dresden exhibit a high capacity for innovation. The innovation weakest region of the German part is Saxony-Anhalt. Poland is in the ranking relatively weak and no voivodeship reaches at least an average ability to innovate. Four of the six voivodeships of the KEO area portray low innovation capacity. Furthermore Dolnoslaskie and Slaskie as well as Mazowieckie only have a medium low capacity for innovation. Also in the Czech Republic a significant regional heterogeneity related to the innovation capacity is discernible. This ranges from medium high innovation capacity in the capital region Prague to low innovation capacity in Ustecky kraj (cf. Figure 8).

6 The Regional Innovation Index (RIS) consists of three indices that identify the innovative strength of the regions for "Enabler", "Firm activities" or "Output". The RIS is further divided into five different categories that have been previously classified by a hierarchical cluster analysis. These sub-divide the regions into groups, with "high", "medium high", "average", "medium low" and "low" capacity for innovation (cf. regarding the used indicators and methodology also Regional Innovation Scoreboard 2009).

More innovative German companies

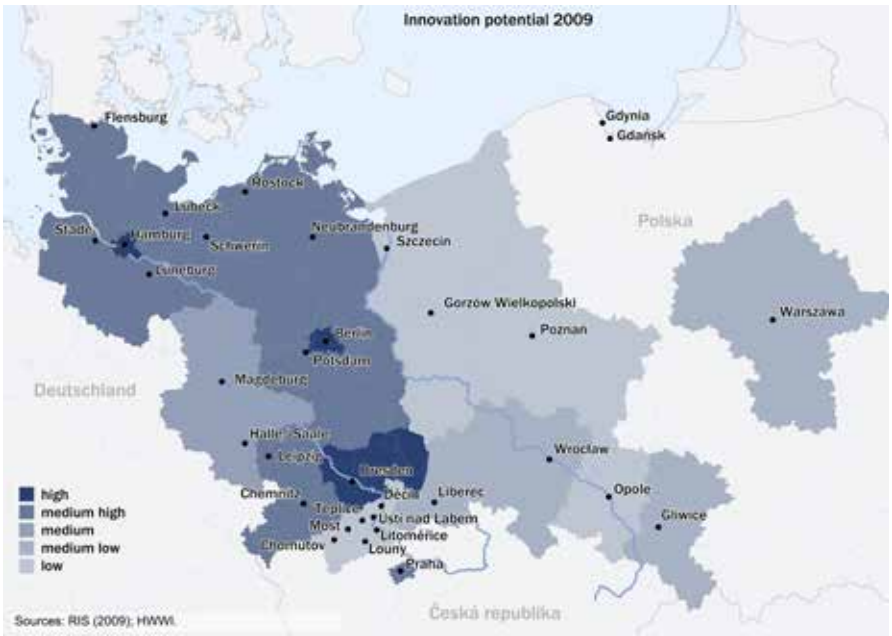


Figure 8

Overall, in the KEO area there are thus a number of regions which with respect to their innovation capacity, exhibit economic potential. In numerous regions, the ability to innovate however also represents a disadvantage, so that no strong economic stimulus can thereby emanate from this factor. Table 4

shows that with respect to the R & D investments (R & D expenditure in terms of gross domestic product and R & D personnel), which are highly relevant for the innovation capacity, there are significant differences between the regions. Berlin in terms of the R & D expenditures, as well as patents, takes on a top position in the KEO area. Worth noting is also the high share of R & D personnel in Prague and Berlin, which is associated with the high importance that these cities attribute to university education.

Innovation indicators at regional level

	Regional Innovation Score-board (innovation capacity)	GDP share of R&D expenditure[1]	Share of R&D-persons employed	Patents per 100.000 inhabitants	Share of HRST[2] of employed persons
	2009	2008	2008	2007	2010
Berlin	high	3.3	2.2	21.3	52.9
Brandenburg	medium high	1.2	0.7	11.9	43.1
Hamburg	high	2.0	2.0	19.8	52.2
Lüneburg	medium high	0.9	0.5	15.9	37.4
Mecklenburg-Vorpommern	medium high	1.3	1.0	6.0	38.1
Sachsen	medium high	2.6	1.6	10.6	41.8
Sachsen-Anhalt	average	1.1	1.0	5.0	34.5
Schleswig-Holstein	medium high	1.2	0.9	15.0	40.4
Dolnoslaskie	medium low	0.4	0.7	0.7	34.9
Lubuskie	low	0.1	0.2	0.4	31.2
Opolskie	low	0.1	0.4	0.3	30.6
Slaskie	medium low	0.4	0.6	0.3	37.6
Wielkopolskie	low	0.5	0.9	0.5	30.8
Zachodniopomorskie	low	0.2	0.6	0.2	34.3
Liberecký kraj	medium low	1.1	1.1[3,4]	2.8	33.6[4]
Praha	medium high	2.4	4.4[3]	3.7	59.1
Ústecký kraj	low	0.3[4]	0.3[3,4]	0.2	28.2[4]
Mazowieckie	medium low	1.2	1.3	0.8	44.3

[1] Data for Germany from 2007
[2] Human Resources in Science and Technology
[3] Data from 2009
[4] Data only available for the superordinae NUTS-2 level

Sources: Eurostat (2011); RIS (2009); Calculations HWWI.

Table 4

Catching-up processes in the Czech Republic

Prague already depicts a good position in terms of the R & D share of the gross domestic product and the HRST (Human Ressources in Science and Technology) employed workers. The Polish voivodeships, however, lag far behind in R & D investment and R & D personnel and hereby have considerable catching up to do in order to keep up with the knowledge based structural transformation step.

In view of the strength of innovation potential in the KEO area, it is important that face-to-face contacts play a role for the transfer of knowledge, even across national borders. The removal of border obstacles for companies and workers creates specific conditions for the development of networks as

well as the emergence of positive network externalities and cluster effects, which represent an important prerequisite for knowledge based growth.

Thus there are, for example, considerations to develop the axis Berlin-Cottbus-Wroclaw to a research location because the city of Wroclaw has almost as many students as Berlin (about 140 000 people). There is already collaboration between Cottbus and Wroclaw and besides Berlin, Cottbus and Wroclaw there are other campuses with German-Polish university courses (Zittau, Slubice, Szczecin, Poznan) (cf. Lammers et al. 2006). Spatial integration processes can thus also drive the development in the field of innovation and knowledge-intensive sectors of the economy.

Potential of high skilled workers especially in cities

In order to attain or else improve the technological performance capability and innovation power of the KEO regions, it is essential to have an adequate availability of skilled labour. In terms of the share of tertiary education qualification particularly the urban areas of the KEO area fare relatively well (cf. Figure 9).

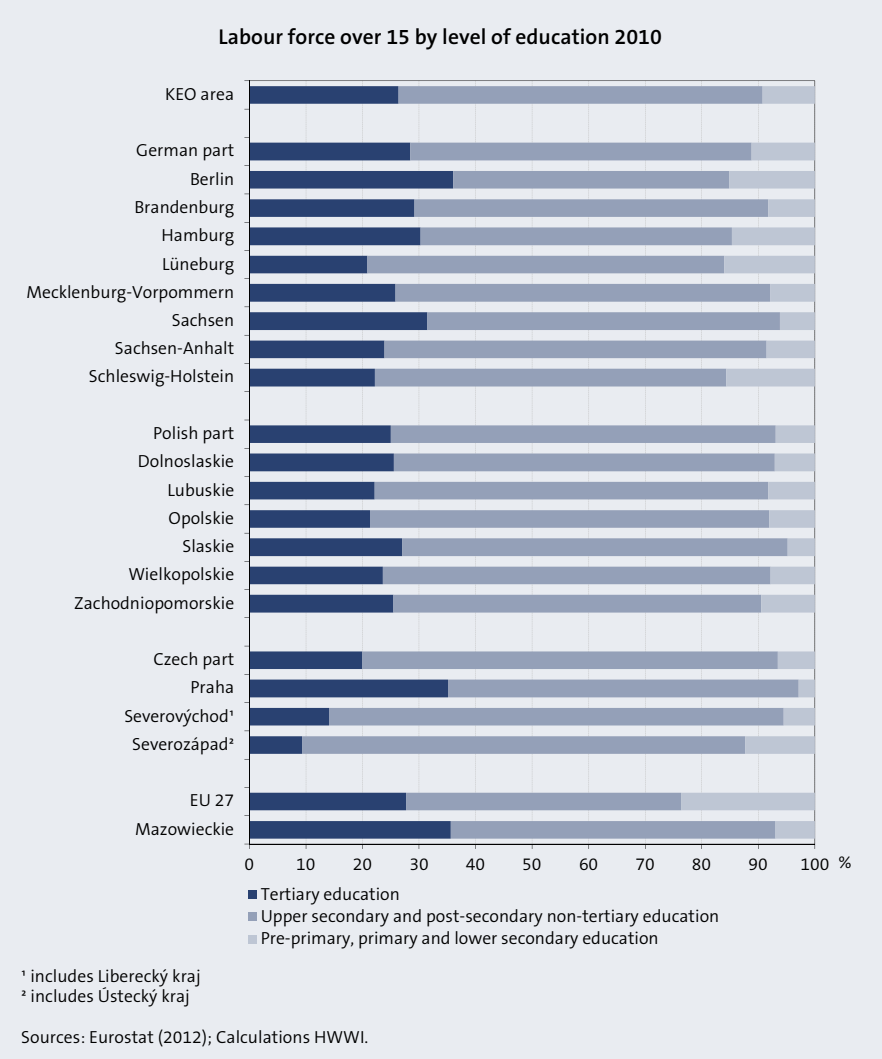


Figure 9

In Berlin, 36 % of the above 15-years of age labour force had such an appropriate education in the year 2010. Berlin thus under the KEO regions – ahead of Prague with 35.1 % – has the highest share of a highly qualified labour force above 15 years of age and is therefore well above the EU average.

The Czech region Severozapad has the least number of tertiary education qualifications. In 2010, only 9.3 % of the above 15-year old labour force could hereby exhibit such a qualification. This aspect is associated with the fact that the Czech part with 19.9 % compared to the German (28.4 %) and Polish part (25 %) of the KEO area, exhibits the smallest percentage number of tertiary education qualifications among the workforce above 15 years of age.

2.4 | Income trends

A GDP of 716.6 billion euros was generated in the KEO area in 2008. Of this amount, 73 % was attributed to the German part of the region; the Polish subareas were able to contribute 19.9 % of the gross domestic product, whereas the Czech part only exhibited a share of 7.1 %. Overall, 5.7 % of the EU gross domestic product was generated in the KEO area in 2008 (cf. Eurostat 2011), which is 1.8 percentage points under the KEO population share of the EU.

Between 2000 and 2008, the KEO area was able to increase its economic performance significantly. Based on a gross domestic product of 536.3 billion euros in 2000 it achieved a gross domestic product growth of 33.6 % by the year 2008. The gross domestic product of the EU in this period grew by 35.7 % (cf. Eurostat 2011).

High incomes in the cities

Due to the different structural economic conditions the per capita income (GDP per capita) differs significantly in the regions of the KEO area. The German areas are well ahead of the rest of the KEO regions (cf. Figure 10) with the exception of Prague. In terms of purchasing power standards per capita Hamburg and Prague are the regions with the highest incomes in the KEO area. Both cities in terms of their income, lie significantly well ahead of the entire KEO area as well as their respective national sub area. The difference to the other regions is thereby considerable. Hamburg in 2008 had a gross domestic product per capita that was more than twofold of that exhibited by five other German KEO regions. The income exhibited by Prague was almost threefold of that of Liberecky kraj (cf. Figure 11).

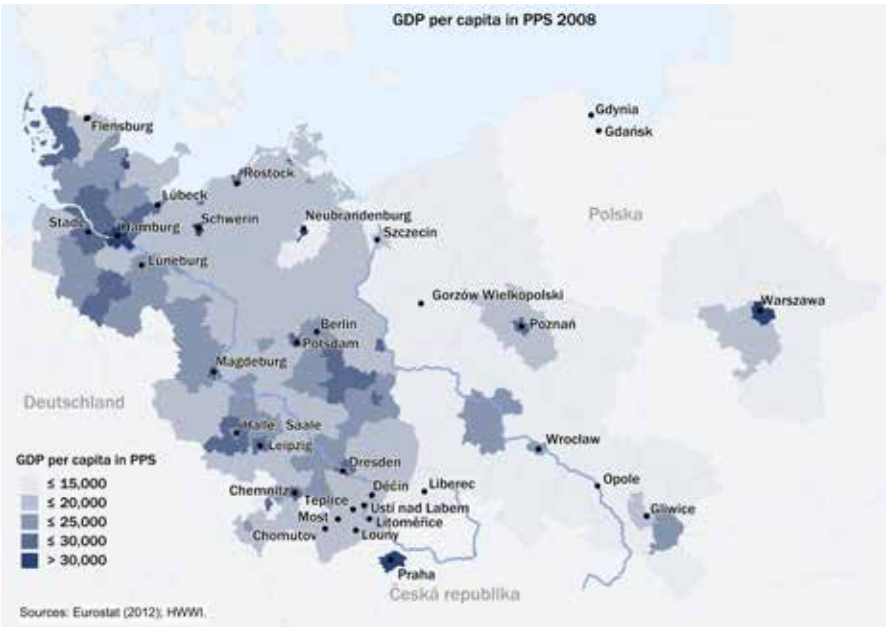
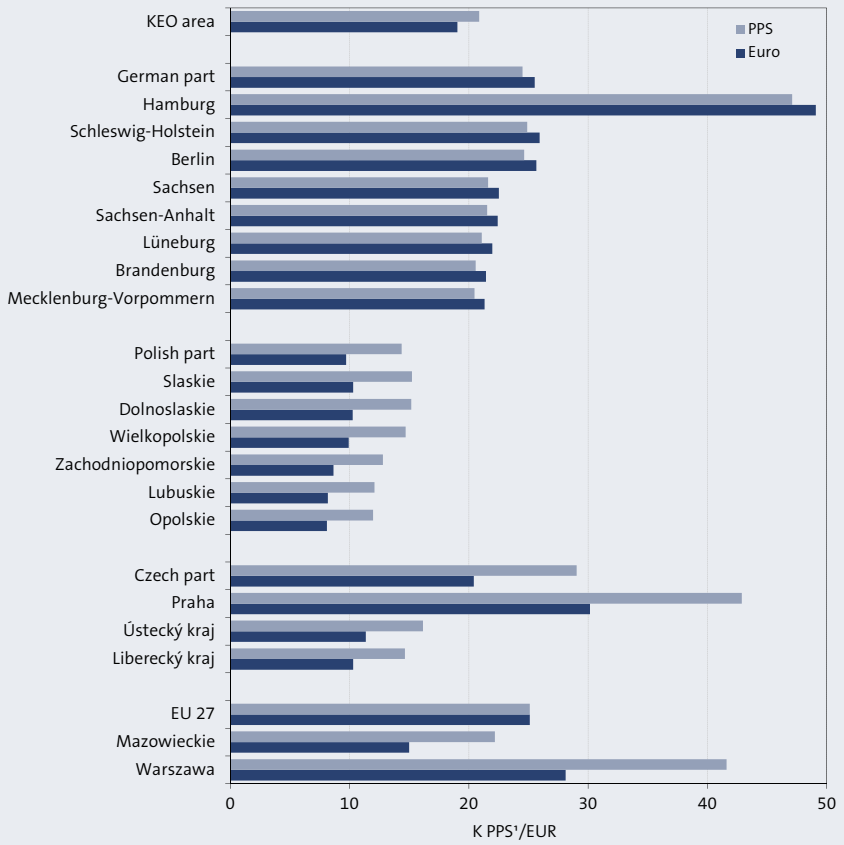


Figure 10

The regions with the lowest incomes within the KEO area can be found in Poland. The Polish part of the KEO area is with a GDP per capita of 14 360 PPS in 2008, far behind the German and Czech average. Particularly the voivodeship Opolskie that includes the region of the former capital of Upper Silesia, Opole, with a GDP per capita of 11 972 PPS in 2008 is ranked in the last place of all KEO regions.



¹ Purchasing power standards are fictitious currency units which eliminate purchasing power differences, i.e. the different price levels between the countries (Eurostat definiton)

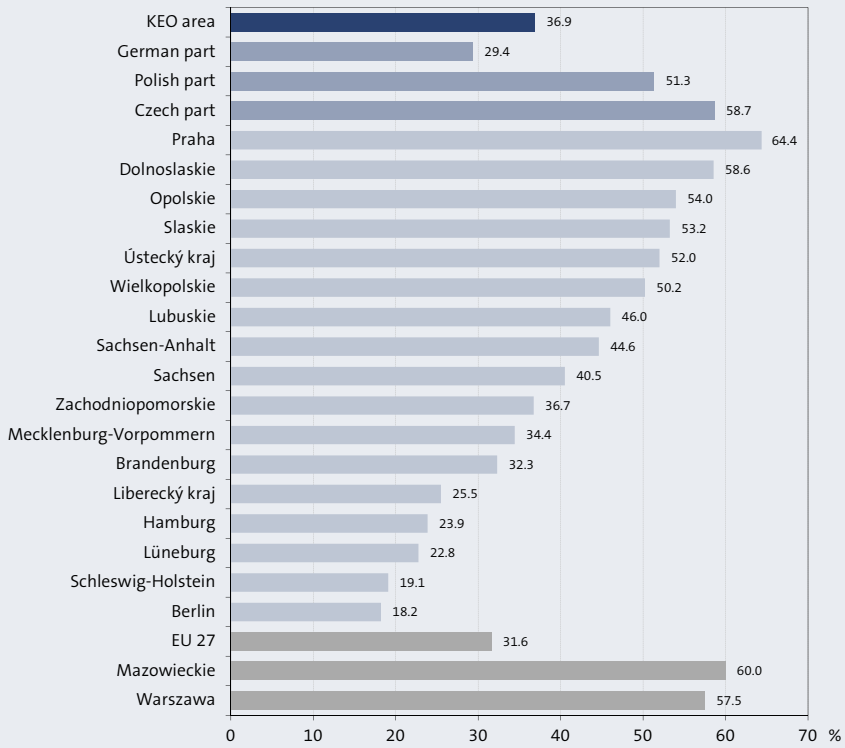
Sources: Eurostat (2011); Federal Statistical Office (2011); Statistical Offices of Poland and the Czech Republic (2011); Calculations HWWI.

Figure 11

There is a difference of more than 27 000 PPS between the Polish part of the KEO and Warsaw (cf. Figure 11), These income disparities can be attributed among others to the capital function of Warsaw (cf. Jasmand / Stiller 2005) and a higher concentration of knowledge-intensive services in urban regions as compared to the more sparsely populated Polish KEO regions.

The catching-up process of the Polish and Czech KEO region

The economically weaker regions in the Polish and Czech part of the KEO area started a catching-up process in the last few years, with the accession to the EU of the countries that has among others led to the intensification of foreign trade between the Czech Republic and Poland (cf. Chapter 3). Both countries exhibit a dynamic development with growth rates that exceed by far those of the German regions (cf. Figure 12).



Sources: Eurostat (2011); Federal Statistical Office (2011); Statistical Offices of Poland and the Czech Republic (2011); Calculations HWWI.

Figure 12

The catching-up process of the lower-income regions is clearly depicted by the difference in growth rates of the gross domestic product per capita (cf. Figure 12). From 2000 to 2008, the Czech and the Polish part with a growth of 58.7 % or else 51.3 % considerably exceeded the growth rate of GDP per capita in PPS of the German KEO area of 29.4 %. Once more the region of Prague is outstanding. The city by the Vltava was able to increase its economic performance from 2000 to 2008 by 64.4 % and is during this time period ahead of Dolnoslaskie the region with the strongest growth in the entire KEO area. Among the German KEO regions, the State Saxony-Anhalt is the fastest growing (+ 44.6 %). Berlin achieved a growth rate of 18.2 %.

Wide divergence between the peripheral and urban areas

Liberecky kraj can especially in terms of the development of the gross domestic product, not compete with the other Czech and Polish KEO regions.

Figure 13 clearly illustrates the spatial growth differences and shows that especially in the cities – with the exception of Berlin and Hamburg which have already reached a very high level – a higher growth was recorded. In addition to Prague, Warsaw which does not directly belong to the KEO area is outstanding. With a gross domestic product per capita of 41 594 PPS in 2008 and a growth rate in per capita income of 57.5 % between 2000 and 2008 the Polish capital significantly exceeds both the growth rate as well as the average income level of the Polish part of the KEO area. The cities of the region thus clearly stand out as a growth motor for the entire KEO area.

Significant differences in productivity

The regional growth of the gross domestic product is influenced by the productivity development. This is an indicator of the progress of technological capacity, whereby the productivity measures the GDP per worker. Similar to the different sectoral structures (cf. Figure 6), the productivity between the various sub-regions of the KEO area differs considerably. The German part lies

Figure 13

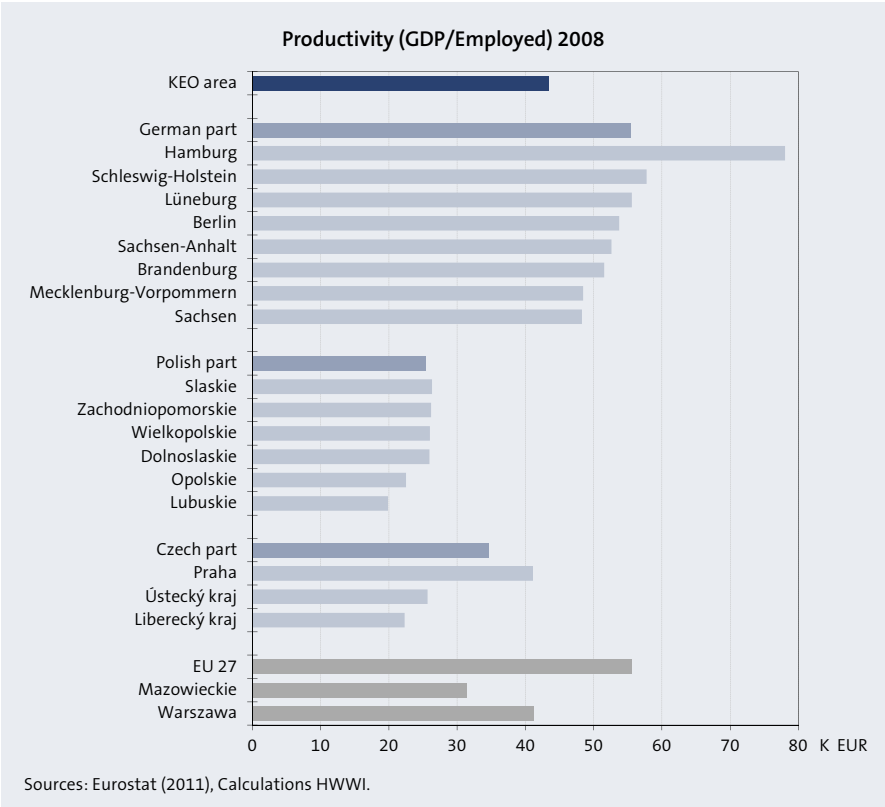
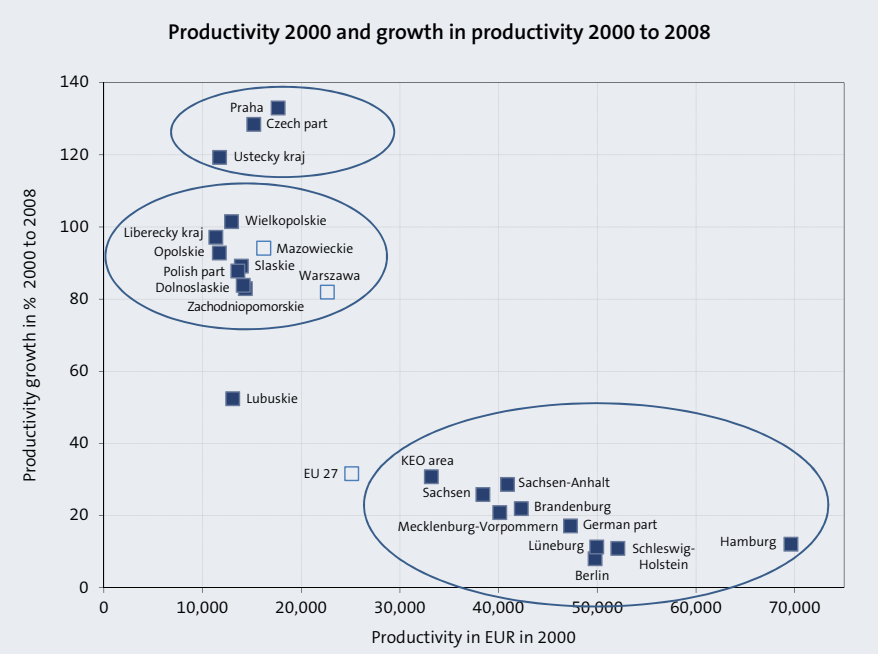


Figure 14

with a productivity of 55 391 euros in 2008, far ahead of the Polish (25 421 euros) and the Czech part (34 679 euros) (cf. Figure 14).

Once again, a process of catching up is shown. The productivity growth in the Polish and Czech regions exceeds that of the German areas by many folds, which is an important indicator for the convergence process. This has started in terms of productivity in the KEO area as well as in Poland and the Czech Republic as a whole in relation to the EU (cf. Figure 15). It is thereby possible to identify three groups: one Czech group with Prague and Ustecky kraj, a further predominantly with Polish regions and a third German group with a high level of productivity and a low growth rate.



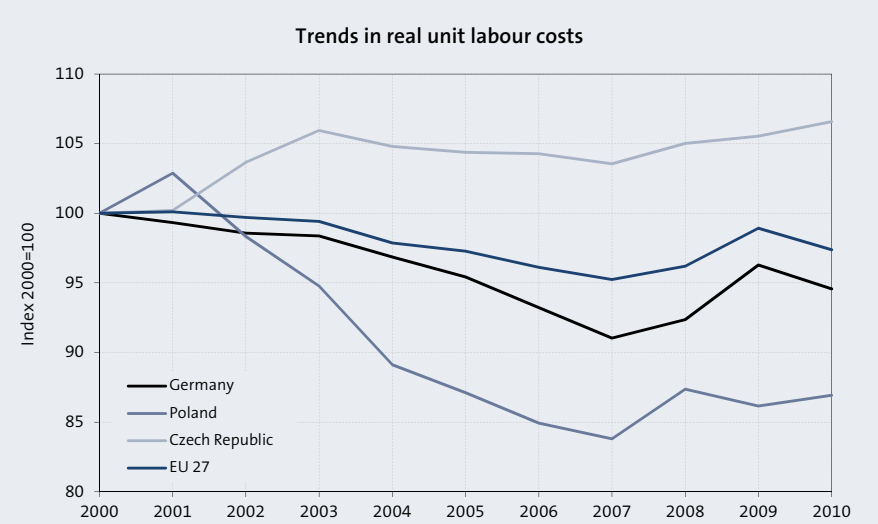
Sources: Eurostat (2011); Calculations HWWI.

Figure 15

Labour cost comparison over time

Productivity is combined with the level of work pay relevant to the unit labour cost level. The real unit labour costs are hereby an indicator for the competitiveness of a country.[7]

7 The real unit labour costs are determined by dividing the compensation per employee (at current prices) by the productivity (GDP per employed person in current prices) (cf. Eurostat 2012).



Sources: Eurostat (2012); Calculations HWWI.

Figure 16

Taking the development of real unit labour costs for the three countries of the KEO area between 2000 and 2010 into consideration, we obtain a differentiated picture. Germany experienced a decline during this period in real unit labour costs of 5.4 %, whereas the decline in Poland with over 13 % was even more pronounced. For the Czech Republic, however, a reverse trend could be observed. Since 2000, real unit labour costs increased by more than 6.5 % (cf. Figure 16). The Czech Republic is thus in this period after Finland, the country with the second highest increase in real unit labour costs within the EU (cf. Eurostat 2012).

Not only the increase, but also the level of unit labour costs in total for Poland is relatively low. In the manufacturing sector in 2010, Germany had 16 % higher unit labour costs than the Czech Republic. The Polish unit labour costs were in turn 13 % below those of the Czech Republic and thus 29 % lower than the German ones (cf. Schröder 2011).

3 | Trade and freight traffic

3.1 | Trade network links

The standard model used to explain the intensity of trade between regions is the gravity model (cf. Deardorff 1998). It analyses the influence of economic, geographical, cultural and historical factors on inter-regional trade. Empirical estimates of gravity models show that in addition to the income of the trading regions, the distance between trading partners is an important determinant for bilateral trade volumes. Ceteris paribus, the exchange of goods between neighbouring regions is therefore more intensive than between more distant regions.

The KEO area is characterized by the proximity of German, Czech and Polish regions. Some very strong trade links of the Eastern German states with the neighbouring countries can thereby be discerned. The states of Saxony-Anhalt and Brandenburg for example exhibit intensive export trade links with Poland (cf. Table 5). In 2011, Poland accounted for an export share of these federal states of 12.7 % (Saxony-Anhalt) or else 12.6 % (Brandenburg). Saxony-Anhalt exhibited with 6 % of its exports among the German KEO regions, the highest share of exports to the Czech Republic. In terms of volume Lower Saxony is the most important trading partner for Poland and the Czech Republic in the KEO area with an export value of 3 543 or else 2 593 million euros (cf. Table 5).

High importance of German markets for Poland and the Czech Republic

Overall, 26.1 % of Polish export goods have Germany as their destination. Thus, Germany is the most important trading partner for Poland. Thereby Polish statistics do not provide values to make a differentiation of the regional origin of the export goods according to voivodships possible. The trading volume's dependence on the regional GDP implies that in particular Polish regions with high incomes are the regions of origin of these exports. The shares of the national gross domestic product in 2008 of the voivodships Slaskie (13.2 %), Wielkopolskie (9.3 %) and Dolnoslaskie (8.1 %) are thereby the highest. In contrast Lubuskie and Opolskie (respectively with 2.3 %) as well as Zachodniopomorskie (4 %) make a significantly lower contribution to Poland's gross domestic product.

The importance of the German markets for the Czech exporters is more pronounced than for Polish companies. Whereas a third of exports from Prague (1 618 million euros) have Germany as a destination, this is 41.2 % of the exports of the Ustecky kraj (2 468 million euros) and 42.8 % of the Liberecky kraj (1 510 million euros). The corresponding exports to Poland have a share of 6.4 % (Ustecky kraj) and 8.7 % (Prague) (cf. Table 5).

Exports of the KEO regions 2010/2011[1]

Germany	Exports	Exports to Poland	Exports to Czech Rep.	Share Poland	Share Czech Rep.	Share of the region in German exports	Share of German GDP 2008
	m EUR	m EUR	m EUR	%	%	%	%
Germany	1,060,042	43,495	30,630	4.1	2.9	100.0	100.0
Berlin	12,737	592	357	4.6	2.8	1.2	3.6
Brandenburg	13,472	1,701	541	12.6	4.0	1.3	2.2
Hamburg	42,121	1,232	433	2.9	1.0	4.0	3.5
Mecklenburg-Vorpommern	7,191	451	94	6.3	1.3	0.7	1.4
Niedersachsen[2]	75,232	3,543	2,593	4.7	3.4	7.1	8.6
Sachsen	29,327	1,523	1,371	5.2	4.7	2.8	3.8
Sachsen-Anhalt	14,718	1,871	886	12.7	6.0	1.4	2.1
Schleswig-Holstein	18,166	721	288	4.0	1.6	1.7	3.0

Poland[3]	Exports	Exports to Germany	Exports to Czech Rep.	Share Germany	Share Czech Rep.	Share of the region in Polish exports	Share of Polish GDP 2008
	m EUR	m EUR	m EUR	%	%	%	%
Poland	136,693	35,664	8,534	26.1	6.2	100.0	100.0

Czech Republic	Exports	Exports to Germany	Exports to Poland	Share Germany	Share Poland	Share of the region in Czech exports	Share of Czech GDP 2008
	m EUR	m EUR	m EUR	%	%	%	%
Czech Republic	99,507	31,753	6,124	31.9	6.2	100.0	100.0
Liberecký kraj	3,531	1,510	232	42.8	6.6	3.5	3.1
Praha	4,853	1,618	424	33.3	8.7	4.9	25.4
Ústecký kraj	5,994	2,468	382	41.2	6.4	6.0	6.4

[1] Values for Germany and Poland for 2011. For Czech Republic values for 2010

[2] Niedersachsen comprises the KEO region Lüneburg. No data is available for Lüneburg

[3] For Poland no data is available at the regional level

Sources: Eurostat (2012); Federal Statistical Office (2012); Statistcal Office of Poland (2012); Statistical Office of the Czech Republic (2011); Calculations HWWI.

Table 5

Poland's share of exports from Hamburg amounts to 2.9 % and had a value of 1 232 m euros in 2011. Thereby mainly finished products (48 %) and primary products (16 %) as well as foodstuffs of plant origin (15 %) were exported to Poland (cf. Figure 17). Together these accounted for 79 % of the export goods, representing goods worth 975.7 m euros. Exports to the Czech Republic mainly comprised finished products (44 %), semi-finished products (21 %) and foodstuffs of plant origin (17 %). Together these accounted for 82 % of export goods or else a value of 356.8 m euros (cf. Figure 17). The share of primary products in the exports is thereby significantly higher than in the imports, whereas it is vice versa in the case of the finished products.

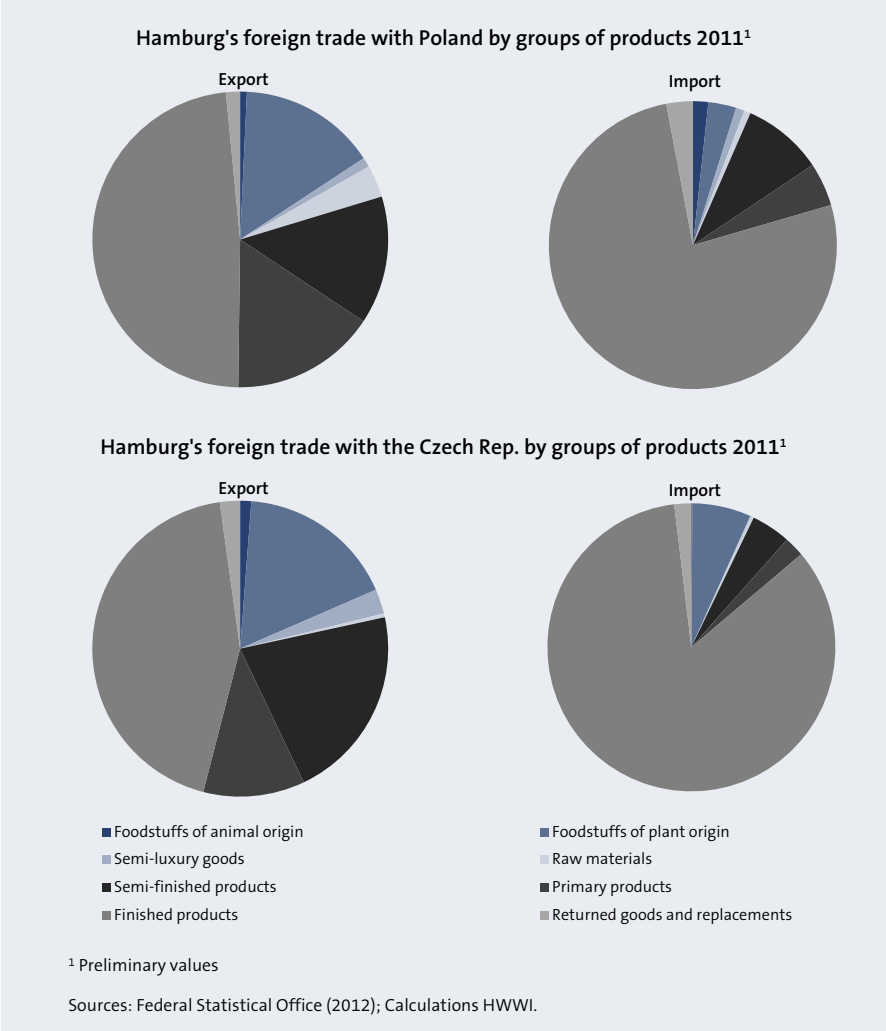


Figure 17

Intensive trade relations

Brandenburg (13.2 % of the imports of this federal state) imports an above-average amount of goods from Poland. Especially Saxony is an important import state for goods from the Czech Republic (15.2 % in terms of goods make a value of 3 037 m euros), whereas Saxony immediately borders Liberecky kraj and Ustecky kraj. In 2011 Hamburg imported a total of 1.9 % of its imports from Poland and 1.3 % from the Czech Republic. Combined, these goods represented a value of 2 253 m euros (cf. Table 6).

By a per capita meassure, the well-marked trade connections between the KEO countries can be illustrated more clearly. For example, each inhabitant of the Czech Republic imports on average 2 908 euros worth of goods from Germany. Furthermore German companies can make a gain of 1 138 euros from each Pole, whereas they can make only 240 euros per capita in Russia and in China only 48 euros (cf. Table 7).

Imports of the German KEO regions 2011[1]

Regions	Imports	Imports from Poland	Imports from Czech Rep.	Share Poland	Share Czech Rep.	Share of the region in German imports
	m EUR	m EUR	m EUR	%	%	%
Germany	901,952	32,425	32,955	3.6	3.7	100.0
Berlin	10,108	867	233	8.6	2.3	1.1
Brandenburg	18,491	2,433	318	13.2	1.7	2.1
Hamburg	69,541	1,320	933	1.9	1.3	7.7
Mecklenburg-Vorpommern	4,516	371	101	8.2	2.2	0.5
Niedersachsen[2]	83,217	4,577	2,469	5.5	3.0	9.2
Sachsen	19,938	1,204	3,037	6.0	15.2	2.2
Sachsen-Anhalt	14,831	1,246	474	8.4	3.2	1.6
Schleswig-Holstein	21,024	646	272	3.1	1.3	2.3

[1] Preliminary values

[2] Niedersachsen comprises the KEO region Lüneburg. No import data is available for Lüneburg

Sources: Federal Statistical Office (2012); Calculations HWWI.

Table 6

Exports per capita in EUR for the target country 2011

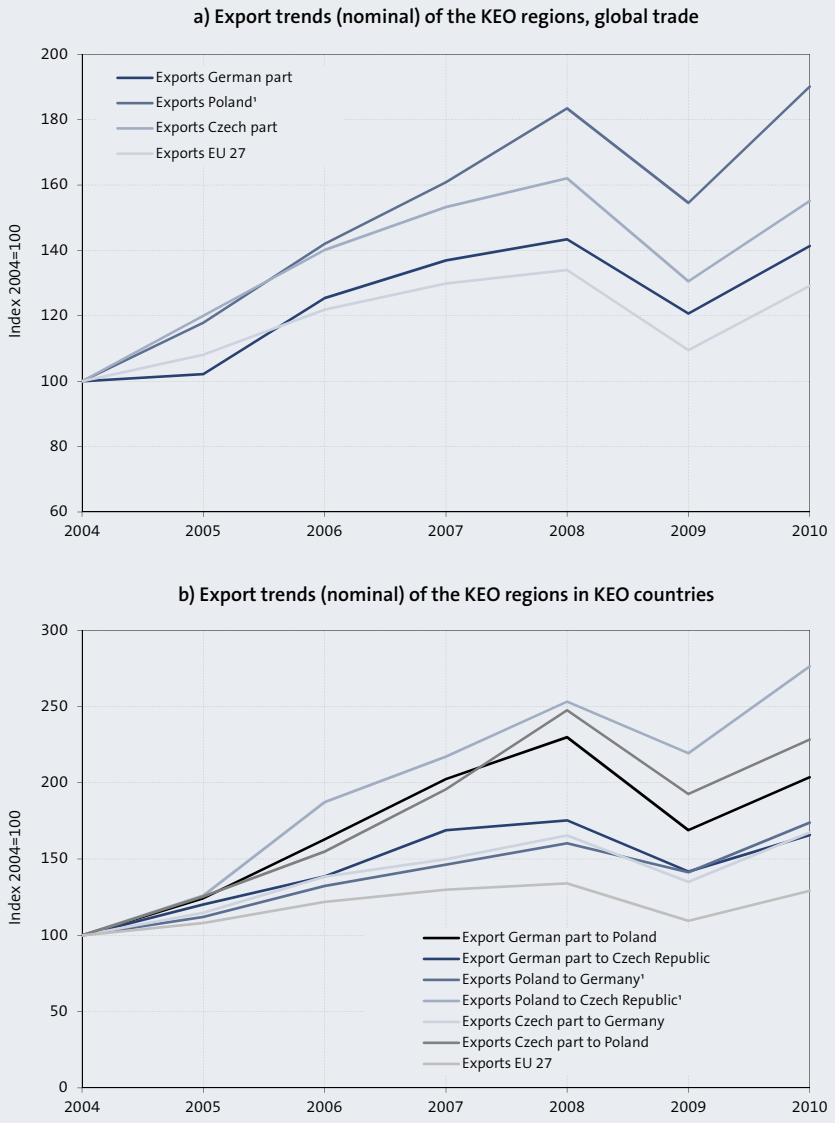
Export country	Target country					
	Germany	Poland	Czech Rep.	China	Russia	USA
Germany	:	1,138.62	2,908.03	48.17	240.17	236.23
Poland	429.38	:	792.04	0.99	42.58	8.59
Czech Rep.	458.44	191.49	:	0.89	26.29	7.34

Sources: Eurostat (2012); OECD (2012); Calculations HWWI.

Table 7

Foreign trade on a growth curve again

Export growth in the KEO region, and worldwide, was positive on average between 2004 and 2010, although the development of foreign trade was marked by the worldwide financial crisis between 2008 and 2009. Between 2009 and 2010 however, there was export growth which caused that the previous level that had existed before 2008 could be achieved in numerous regions (cf. Figure 18). On the whole the German and Czech regions inside the KEO area as well as Poland as a whole showed a strong growth of exports from 2004 on, with Poland having the biggest growth. In the course of this development the exports of the German KEO regions to Poland and the Czech Republic, and the exports of the Czech KEO regions to Poland and Germany developed tremendously more dynamic than exports within the EU in general (cf. Figure 18b).



¹ For Poland no export data is available at the regional level

Sources: Eurostat (2012); Federal Statistical Office (2012); Statistical Offices of Poland and the Czech Republic (2012); Calculations HWWI.

Figure 18

Further reduction of border obstacles and transaction costs

The overall conclusion is that foreign trade has increased in the KEO area since 2004 and that trade relations have intensified. For the future development of trade relations in the region, in addition to the reduction of border barriers and transaction costs in foreign trade, the development of the national gross domestic products is of importance because it directly affects the demand for goods. It should be noted that in the course of European integration tariff barriers between Poland, Germany and the Czech Republic have been completely eliminated. For non-tariff border barriers and transaction costs for cross-border exchange of goods, services, information and factors of production, there is further potential for reduction in the course of the further European integration process.

Within this context the empirical studies by Nitsch (2000) as well as by Head and Mayer (2000) show that non-tariff barriers and transaction costs have an impact on EU trade. In the 1980's and 1990's the trade relationships of the regions within a country had been more intensive than the ones with

other countries. Besides, non-tariff barriers between Poland, Germany and the Czech Republic such as different languages, cultural factors, missing interfaces between the transport systems and different regulations will still continue to exist. If these barriers lose their importance within the KEO area, economical integration effects can be expected based on the increase of international trade.

A further determinant for economic growth and the development of future trade is to be seen in context with the accessions of Poland and the Czech Republic into the euro zone. There are empirical studies which state the positive effect of the European Monetary Union on EU trade. That way, according to Cieslik et al. (2008) Polish exports into the euro zone would rise by 11.9 % in the year of accession. In the following years a drop of the export growth, which had been based on the accession, down to 2.7 % in the sixth year of membership could be stated (cf. Cieslik et al. 2008).

Against the background of the debt crisis Poland is currently not aiming at an accession to the European Monetary Union. Furthermore neither Poland nor the Czech Republic can meet the necessary Maastricht convergence criteria in order to be accepted to the monetary union. Among other criteria the fluctuations of the exchange rates of the Zloty and the Czech Crown to the Euro have always been too high.

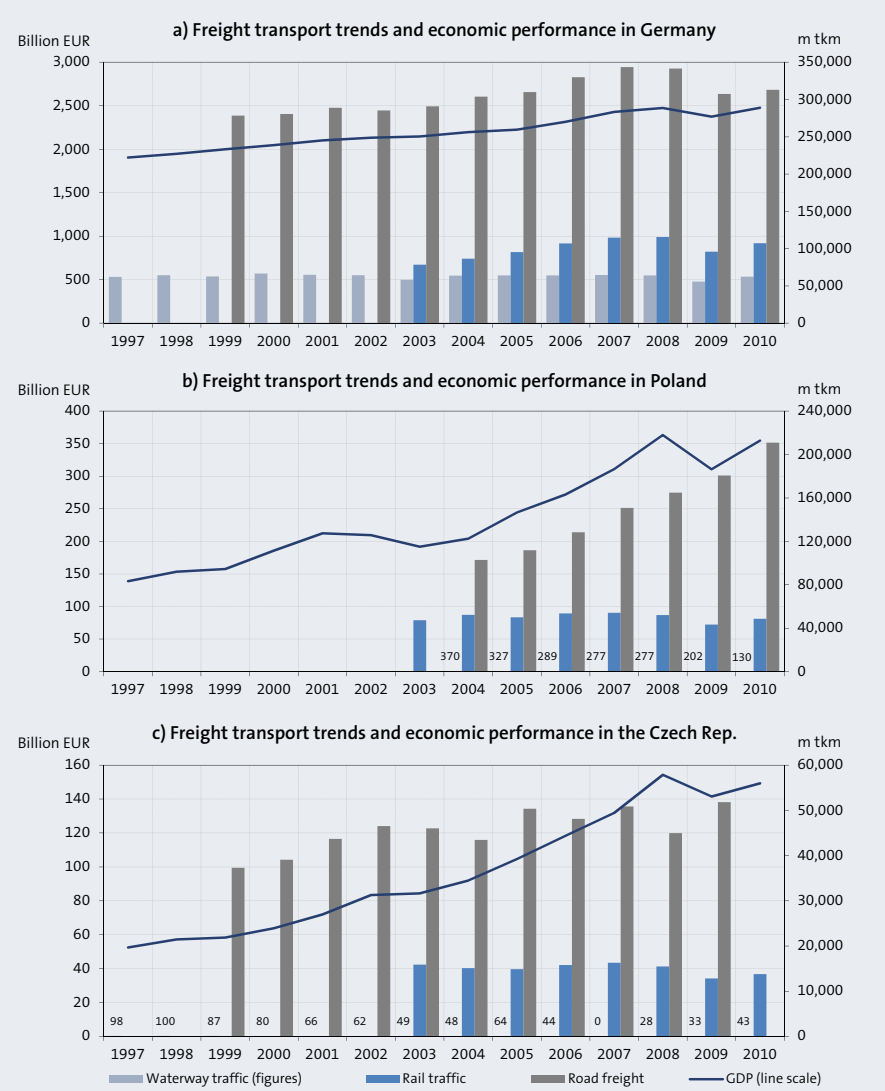
3.2 | Modal split in transport of goods

Increasing foreign trade of the KEO regions has tremendous implications on the transport of goods and the degree of capacity utilization of transport infrastructure. On top of that the KEO area is a transit country for traffic between Scandinavia and the Adria (multimodal) or between Ukraine and Germany (railway traffic). Figure 19 shows the capacity utilization of goods traffic broken down by transport modes in Germany, Poland and the Czech Republic for the period of 1997 to 2010 plus the development of the individual national gross domestic product.

Within this context the extreme importance of transport by road for the three KEO countries can be seen clearly, especially of course for Poland and the Czech Republic. Whereas in Germany goods transport both by rail and by road has been developing proportionally to the gross domestic product, in Poland and the Czech Republic solely lorry traffic has distincly increased during the last few years. As an example goods transport on the road has increased by 105 % from 2004 to 2010, whereas railway transportation and inland waterway transport dropped by 6.9 % or else 64.9 % in the same period (cf. Figure 19).

Only for goods transports inside Germany the inland waterway vessel has kept its importance. Although the overall transport of goods increased tremendously at the same time, the milage by tonne kilometre has stayed almost the same between 1997 and 2010 showing the relative importance of inland waterway vessels for domestic goods transport has been receding.

The relatively little importance of inland water transport for goods and the preeminent role of lorries as goods carriers can be seen by having a look at the graph showing the modal split. Figure 20 shows the modal split of EU member states for 2009. The modal split is measuring the shares of domestic rail, road or inland waterway transport in tonne kilometres. The utilization inten-



Sources: Eurostat (2012); HWWI.

Figure 19

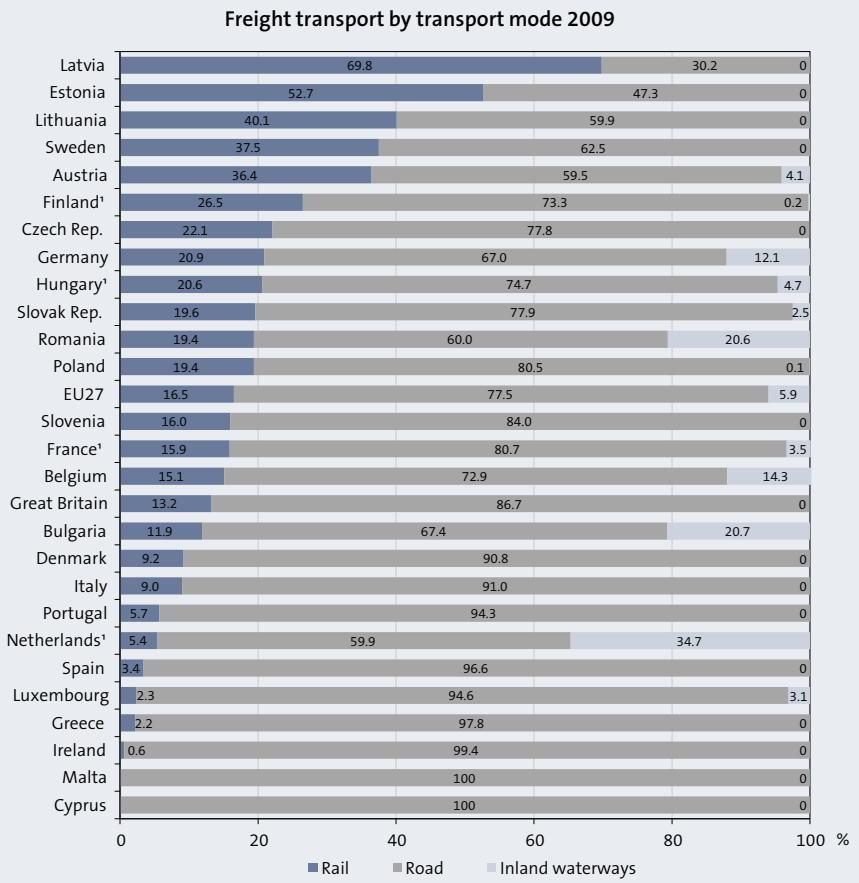
sities of the different transport modes in the individual countries of the EU 27 are very different.

The KEO countries of Germany, Poland and the Czech Republic utilize lorry as a transport mode most extensively (67.0 %, 80.5 %, 77.8 %). The utilization intensity of railway transport for goods is at an almost equal level in all three countries at between 19.4 % and 22.1 %. The inland waterway vessel for domestic transport holds an important position only in Germany (12.1 %), whereas in Poland only 0.1 % of all goods have been transported by this mode of transport.

In a Europe-wide comparison rail as a transport mode of goods is at its highest at 40 % to 70 % in the Baltic States. In other EU countries the majority of goods are transported on the road. Goods are transported on inland waterways almost exclusively in the Netherlands, Bulgaria, Romania, Belgium and Germany.

If we are looking at the development of the modal split during the last 20 years, it shows that in a lot of east European countries transport of goods on the rail has decreased. This negative development on the one hand has favoured the lorry as a transportation mode on the other (cf. Eurostat 2012). The differing development of the modal split in the individual countries is based,

among others, on the differing transport costs, e.g. personnel costs or energy costs. Those, on the other hand, are determined by geographical factors and the impact on the individual transport modes by the differing infrastructures and their characteristics.



¹ Data from 2008

Sources: Eurostat (2012); Calculations HWWI.

Figure 20

3.3 | Prospects for foreign trade up to 2030

For the future development of the modal split and the determination of the frequency and utilization of transportation of goods in the KEO area the development of both the individual gross domestic products and the cross-border trade is important. The gross domestic product and the growth rates of the trade volume of the EU countries have developed positively in the last decades. Especially the east European countries have experienced a strong economic and trade growth. Facilitated access to markets has driven the convergence process in the east European states; i.e. countries with low incomes per capita have been catching up economically with the countries with high incomes per capita (cf. Schlitte 2008).

After a time of trade barriers between the members of the EU having been reduced, particularly between the west, middle and east European states and especially since the 1990's and the subsequent course of the east expansion of the EU in 2004, the economic EU integration is going to extend in the

future. Especially a further decrease of transaction costs for foreign trade, e.g. by reforms of the statutory framework and the reduction of infrastructural bottlenecks can contribute to further integration.

Foreign trade continues growing

According to a projection of the HWWI the gross domestic product and the export volume will continue increasing from 2010 to 2030 (cf. Figure 21). The gross domestic product will increase relatively strong in all three countries, especially in Poland by 93.8 %. For Poland and the Czech Republic an export growth of 201.4 % and 146.5 % respectively is expected. In Germany trade volume will also expand distinctly by 92.7 % during this period, which will have implications on foreign trade in terms of transport of goods and will have further implications on the traffic streams in the KEO area due to trade integration between the Czech Republic, Poland and Germany.

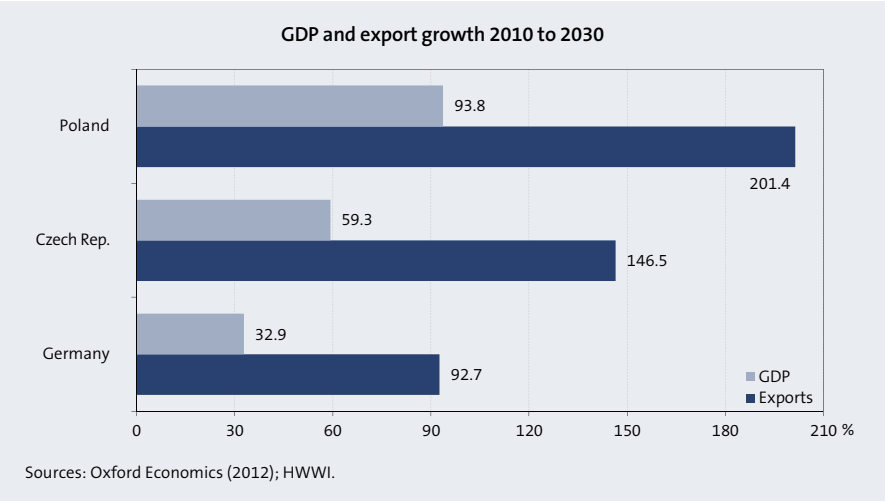


Figure 21

In the past the modes of transportation were affected by economic growth in different degrees. Road traffic has increased a lot along with trade growth. Contrary to that, the transport performance of inland waterway transportation was strongly fluctuating and partly receding. Transport of goods by rail has largely stagnated.

Various reasons have been responsible for this development. Per inland waterway vessel mainly bulk goods are transported. In Poland coal or iron ore transports have a great significance. In the Czech Republic mainly grain is transported per inland waterway vessel. Yet high-quality industrial goods are mainly transported by lorry, also due to the fact that railway transportation has reached the limits of its capacity. The connections from Germany to the Czech Republic and also the transit conditions through the Czech Republic have distinctly improved during the last years.

With the growth of macroeconomic production, of incomes and foreign trade, the transport performance will distinctly increase. Such an increase in trade always affects high-quality goods; transport performance will then be significantly below the growth rate of trade. It will depend on a series of political and economical factors as well as on the development of infrastructure how the individual modes of transport will be affected.

4 | Ports and their accessibility

4.1 | Overview on ports

A future growth of trade will entail an expansion of sea or inland water transportation and traffic. In the regions of the KEO there are plenty of sea and inland ports showing very different structures. Within the framework of this analysis all relevant sea ports of the KEO region including the ports of Gdansk and Gdynia will be considered. Although these ports are not located in the KEO area they represent the most important ports of Poland. Furthermore Gdansk is after St. Petersburg (Russia) the biggest container harbour of the Baltic Sea and therefore very important as a trans-shipment centre for the KEO area. The harbours considered here were selected according to their sizes and importance based on discussions with experts and actors from the KEO regions.

Figure 22 shows their locations and Table 8 lists economic indicators and data pertaining to handlings for the selected ports. Within this group Berlin and Hamburg are the port cities with the highest numbers of population, followed by the cities from the region Melnik und Prague and the city of Gdansk. Below some of these ports will be described in more detail.

Figure 22

Hamburg Harbour second biggest container harbour of Europe

With sea port Hamburg on the Elbe the KEO area features one of the biggest harbours of Europe. After Rotterdam (433 420 K t) and Antwerp (186 400 K t) Hamburg (132 200 K t) was the third biggest trans-shipment centre in Europe in 2011. Since 2000 Hamburg has developed most dynamically of the three. From 2000 to 2011 cargo handling grew by +43.3 % for Rotterdam, +60.7 % for Antwerp and +71.8 % for Hamburg (cf. Port of Rotterdam 2012).

The European container trade is marked by the dominance of the North Sea ports of Rotterdam, Hamburg and Antwerp. In 2011 9.0 m standard containers were handled in Hamburg; in Rotterdam they were 11.8 m and in Antwerp 8.4 m. Between 2000 and 2011 Hamburg experienced a growth of 112.2 % – like Antwerp – and Rotterdam one of 88.8 % (cf. Port of Rotterdam 2012).

Overview on ports

Port	Inland port handling	Seaport handling	Population[1]	Population density[1]
	2011	2011	2010	2010
	K t	K t	Inhabitants	Inhabitants/km²
Aken	172[2]		179,263	122.5
Berlin	3,702		3,460,725	3,881.7
Brunsbüttel	1,903	10,360[3]	135,279	94.6
Cuxhaven		3,102	201,188	96.9
Dresden	817		517,052	1567.6[4]
Eberswalde	316		176,904	120.2
Eisenhüttenstadt	96		185,062	82.2
Haldensleben	1,099		180,702	76.0
Halle (Saale)	n.a.		232,323	1,723.0
Hamburg	9,719	132,200	1,786,448	2,365.2
Kiel		6,293	238,281	2,013.5
Lübeck	434	26,570[3]	209,818	980.5
Lüneburg	250[2]		177,042	133.9
Magdeburg	2,336		230,456	1,150,5
Riesa	1,115		146,766	233.0[4]
Rostock		22,200	201,442	1,114.9
Sassnitz		4,910	68,126	69.4
Schwedt	143		131,115	42.6
Stade	420	5,217	196,952	155.6
Wismar		6,400	44,470	1,067.3
Wittenberge	15[2]		138,946	38.9
Gdańsk		25,300	514,420	116.7
Gdynia		15,911	514,420	116.7
Szczecin		7,969[2]	406,307	1,348.7
Wrocław			632,146	2,158.9
Swinoujscie		10,683[2]	320,388	60.0
Decin	33[2]		836,045	156.7
Lovosice	185[2]		836,045	156.7
Melnik	140[2]		1,247,533	116.3
Prag	n.a.		1,257,158	2,533.9
Usti nad Labem	180[2]		836,045	156.7

[1] The population data is based on the parent NUTS 3 level

[2] Figures for 2010

[3] Total cargo handling of the port operations

[4] Figures for 2009

n.a. = Not available

Sources: Eurostat (2012), Federal Statistical Office (2011, 2012); Ministry of Transport of the Czech Rep. (2012); Statistical Offices of Poland and the Czech Republic (2011); SBO (2012); Diverse ports (2012); HWWI.

Table 8

Adding to the success of Hamburg Harbour is its location at the edge of one of the most densely populated areas in Europe. Hamburg as the easternmost harbour of the North Range Ports connects the Federal Republic of Germany with Poland, the Czech Republic and the alpine regions through their respective trade channels. Hamburg Harbour is located in the inland (about 120 km from Elbe estuary) facilitating any further distribution into bigger markets. Furthermore Hamburg Harbour is located within a big inland market of about 4.3 m residents in the Hamburg metropolitan area.

High in-situ quota

The in-situ quota of Hamburg Harbour, which is the share of goods that do not leave the harbour or else its surrounding regions to be processed, upgraded or consumed but stay in-situ, is therefore nearly at 25 % (cf. Hafen Hamburg Marketing 2012). A high in-situ quota has a stabilizing effect on the number of handled goods because the companies situated on the harbour's region will use it to receive and ship their goods permanently (cf. Großmann et al. 2008). It has to be seen in context with a high in-situ quota that the share of container transport by truck was at 62 % in the modal split between 2009 and 2010. The share of rail transport or inland waterway transport was at 36 % and 2 % respectively.

From Hamburg Harbour about 140 weekly departures of Feeder Line Services to the states hemming the Baltic Sea are offered, 15 of them to Poland (cf. Hafen Hamburg Marketing 2012). Table 10 shows Hamburg's container hinterland traffic by transport modes. This shows distinctly that lorry is mainly used for local transport and cargo train for long-distance transport. Especially for transports to the Czech Republic bigger container trains are used within the public transport railway net. Transport by inland waterway vessel is of minor importance here.

Inland waterway transport of Hamburg Harbour and Berlin

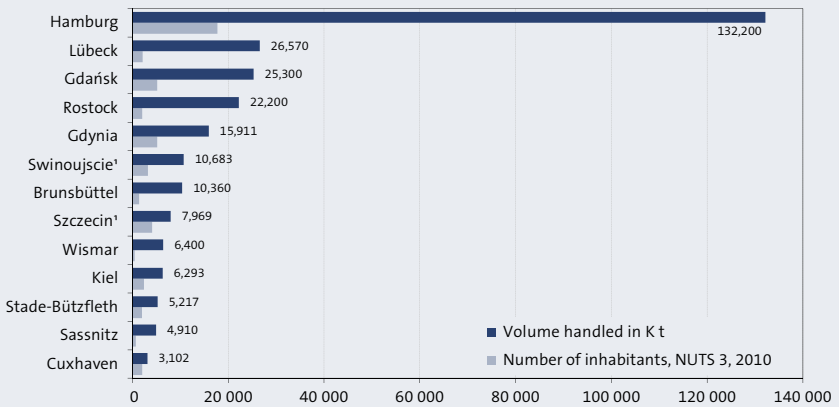
In 2011 overall cargo handling in Hamburg by inland waterway transport (9 719 K t) was at its highest within Germany, after Duisburg (51 999 K t) and Cologne (11 095 K t) (cf. Figure 24). Within the Elbe-Oder region and its waterway system it was the highest in front of Berlin. Nevertheless the share of inland waterway transport of the modal split is relatively little in comparison. Berlin Harbour (3 702 K t) with its Berlin/Brandenburg metropolitan area has a catchment area of about 5.9 m inhabitants and its potential as a regional inland water transport hub is relatively high.

Baltic Sea Ports Rostock and Lübeck

The sea ports of Rostock and Lübeck with 22 200 K t and 26 570 K t of cargo handling have been the biggest German sea harbours on the Baltic Sea in the KEO area (cf. Figure 23). They experienced a clear upswing in container handling of 221.7 % and 177.3 % respectively between 2005 and 2010, starting from a relatively low level (Rostock 686 TEU and Lübeck 60 401 TEU in 2000). In Rostock goods are delivered to or picked up from the harbour mostly by truck, whereas liquid goods are carried through pipelines to the inland harbour of Schwedt on the Oder.

The Port of Lübeck is specialized in trading paper and pulp from Finland, Sweden and Russia. Furthermore Lübeck offers a service of Roll-on/Roll-off ferries to these three countries and the Baltic States. Lübeck is after Dover and Calais the most important Ro-Ro ferry terminal of Europe and before Gdansk and Rostock the biggest port in the waterway transport system of the KEO area. On top of that it is the biggest harbour after St. Petersburg in the Baltic Sea region (cf. Stiller/Wedemeier 2011).

Volume handled in 2011 and the number of inhabitants 2010 of the seaports



¹ Figures for 2010

Sources: Eurostat (2012); Diverse ports (2012); Weser Kontor (2012); HWWI.

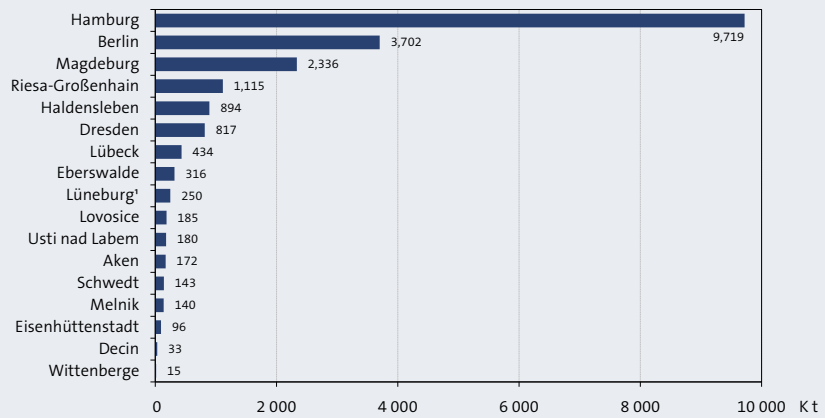
Figure 23

Axle gauge changeover points at the ferry terminal of Sassnitz

Ferry Terminal Sassnitz, the easternmost deep water port of Germany, has been dominated by Roll-on/Roll-off ferry transfer. Yet, Sassnitz has also been known as a specialized port through its immediate combination with railroad transportation. Next to changeover stations at the Belorussian and Ukrainian border to change over Russian track gauge standards to the European ones, there is an automated changeover point in Sassnitz to change over European track gauge standards to the Russian ones. In addition to that, the ferry terminal is the only German harbour with an axle gauge changeover point. As the Baltic States Estonia, Latvia and Lithuania also use the Russian broad track gauge, most of the trains to Russia (St. Petersburg) and into the Baltic States (Klaipeda, Lithuania) are handled via Sassnitz. The share of cargo handling on the rail was at 70 % in 2006 (cf. BAG 2007). Total cargo handling stood at 4 910 K t in 2011.

Magdeburg and Aken: Inland harbours with growth potential

In 2011 cargo handling in Magdeburg stood at 2 336 K t and in Aken at 172 K t (in 2010), whereby container handling plays an important role for both harbours. In the Hansehafen and the Handelshafen, the harbours of Magdeburg, ca. 10 K TEU were handled altogether (cf. Federal Statistical Office 2011). Prognoses indicate, that with a further expansion of the superstructure (installation of another gantry crane) container handling could be extended up to 55 to 60 K TEU by 2025 (cf. Uniconsult 2009). For the harbour of Aken handling volumes of about 40 K standard containers have been planned (cf. Uniconsult 2009) by 2015.



¹ Estimated figure

Sources: Eurostat (2012); Federal Statistical Office (2011); SBO (2012); HWWI.

Figure 24

The Saxony Upper Elbe harbours of Dresden and Riesa

The Sächsische Binnenhäfen Oberelbe GmbH (SBO) markets the harbours of Dresden and Riesa as well as those of Decin, Lovosice, Roßlau and Torgau. In the six harbours a total of 2.7 m t of goods were handled in 2011 (on the road and on inland waterways), 457.9 K t of which were handled on the inland waterways. This makes a share of an inland waterway transportation of 17 %. On the inland waterways only 5 K containers were transported. The majority of the 37 K containers was shipped by rail to the harbour of Riesa and was handled there. The containers are transported by regular container railway lines to the sea ports of Hamburg and Bremerhaven and are also received from there.

Dresden and Riesa: Tendency to develop to a regional hub at the Upper Elbe

In 2011, 816 K t of goods were handled at the harbour of Dresden, 10 % of which were shipped on inland waterways.

Dresden Harbour belongs next to Riesa (1 217 K t) to the most important harbours among the six of SBO. From and to Dresden and Riesa about 47 % (corresponding to 145.5 K t of the overall goods) were transported by inland waterway vessel in 2011. The share of road transport of the overall goods was 71.4 %. All harbours combined experienced in the segment of inland waterway transport a strong decline of 33.8 %. Only Dresden experienced an increase by 78.8 %. In the future the harbours of Dresden and Riesa shall function as regional hubs for the other four Upper Elbe harbours according to the development strategy.

Halle on the Saale Harbour: Important hub terminal for railway lines

The harbour of Halle on the Saale is a trans-shipment centre especially for containers linked to transportation on the rail and on the road. Containers are transported on the railway lines between Hamburg and Halle or Bremerhaven and Halle. The River Saale is unnavigable, so that the inland harbour of Halle does not allow much cargo handling from inland waterway vessel to any other means of transportation (cf. Hafen Halle GmbH 2012). In this Hub terminal about 70 K TEU were handled in 2011.

The harbour of the Tricity

After the harbours of Hamburg and Lübeck the Polish sea port of Gdansk is the biggest among all the sea ports considered in this report. Gdynia, Sopot and Gdansk form an urban area of three cities (Tricity), which is one of the most important centres of Poland and the Baltic Sea with their total of 750 000 inhabitants. In Gdansk 25 300 K t of goods were handled in 2011. Compared to 2001 these are 8 329 K t more corresponding to an increase by 50 %. Gdynia, a cargo handling port with ca. 15 911 K t of handled goods, represents the fifth-biggest port in the KEO area. Growth was at 91 % between 2001 and 2011.

High dynamic and catching-up process at the harbour of Gdansk

Figure 25 gives an overview on container handling at different ports and their growth for the period of 2000 to 2010. The graph clearly shows the high dymanic nature of the port of Gdansk, which exceeds by far that of the other harbours. Still, the gap to the performance of Hamburg harbour is considerable. The TEU-difference between Gdansk and Hamburg lay at 4.2 m TEU in 2000 and at 7.4 m TEU in 2010.

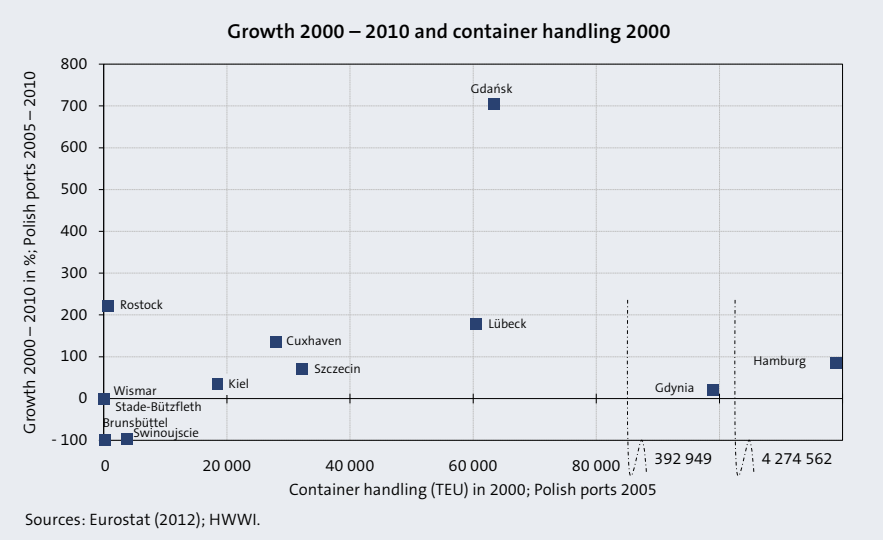


Figure 25

Difficult connection to the inland markets of the Tricity

By using direct services from Hamburg Gdansk has directly been connected to and involved in the world markets (cf. Hafen Hamburg Marketing 2012). However, the Polish ports show a lack of infrastructural connections into the hinterland, which might impede the future development of the ports.

The Polish sea ports of Szczecin and Swinoujscie

Gdansk and Gdynia function as a gateway for the region of Warsaw, but they have only limited access and connection to the western (e.g. Berlin) and eastern regions (e.g. Kaliningrad) or especially the southern regions of Poland, the Czech Republic or the Republic of Slovakia.

Swinoujscie and Szczecin together had an overall amount of cargo handling of 21 354 K t in 2011 (cf. Port of Szczecin and Swinoujscie 2012), which makes them runners-up to Gdansk and Gdynia (41 211 K t in 2011).
The port of Szczecin had a great decrease in cargo handling by -20 % (2 019 K t) from 2001 to 2010 (cf.Eurostat 2012) whereas Swinoujscie experienced a growth by 1 885 K t between 2001 und 2011. It has been specializing in Roll-on-/Roll-off ferrying. Until 2014 an investment of 700 m euros has been planned for a new gas terminal, which will increase the importance of this port for the whole KEO area (cf. Port of Szczecin and Swinoujscie 2012).

Szczecin's connection to the international waterways

Szczecin is situated on the Oder, which forms both an international (cross-border) and a national connection between Germany and Poland. The River Oder furthermore connects the Baltic Sea port of Szczecin with Greater Berlin via Schwedt and the Oder-Spree-Canal and the Oder-Havel-Canal (cf. BAG 2009). However, inland waterway transport has been relatively irrelevant in Poland so far. Cargo handling on inland waterways was at around 0.1 % in the modal split for domestic goods transport in Poland in 2010. Goods between Szczecin and Berlin therefore are mostly transported by rail. The locations of Poznan and Wroclaw also function mainly as hub terminals for transportation on the rail (cf. Polzug 2012).

The Czech harbours of the Upper Elbe, Decin and Lovosice, belong to the Sächsische Binnenhäfen Oberelbe GmBH (SBO). The harbours of Melnik and Usti nad Labem are subjected to regional administration.

The Czech inland habours of the Upper Elbe

In 2010 a total of 538 K t of goods was handled in the four Czech harbours. Neither the harbours of Decin and Lovosice, nor the harbours of Melnik and Usti nad Labem show much container handling. Most of the container handling is done at the Upper Elbe at the inland harbour of Riesa, which has a direct railway connection to Hamburg via regular line services (Albatros-Express) (cf. Uniconsult 2009; HHLA Intermodal 2012). The handling volume in these four Czech harbours refers mostly to loading and transporting shipments for projects, which explains the high fluctuation (cf. Figure 26) (cf. SBO 2012; Ministry of Transport of the Czech Republic 2012).

The development of cargo handling in the harbours has been mostly positive. Together these four harbours increased their volume of cargo handling by 14.9 % between 2008 and 2010. Yet, the development of the harbour of Decin proved to be less favourable. During the period of investigation it was affected by a decrease in cargo handling of 76.5 %. At the harbour of Decin next to project loads like machines and products of metal processing mostly products from forestry and agriculture are handled. By contrast, the harbour of Lovosice developed very dynamically. Cargo handling increased by 94.2 % from 2008 to 2010 (cf. Figure 26).

One of the biggest hub terminals of Europe: Prague

Prague is connected to the sea ports of Bremerhaven und Hamburg mostly by container railway lines. Between Hamburg and Prague there are 70 shuttle trains weekly to bundle and forward the quantities of goods in the region e.g. to the Czech terminal of Pilsen and Ostrava. This hub terminal is one of the biggest of its kind within Europe (cf. HHLA Intermodal 2012).

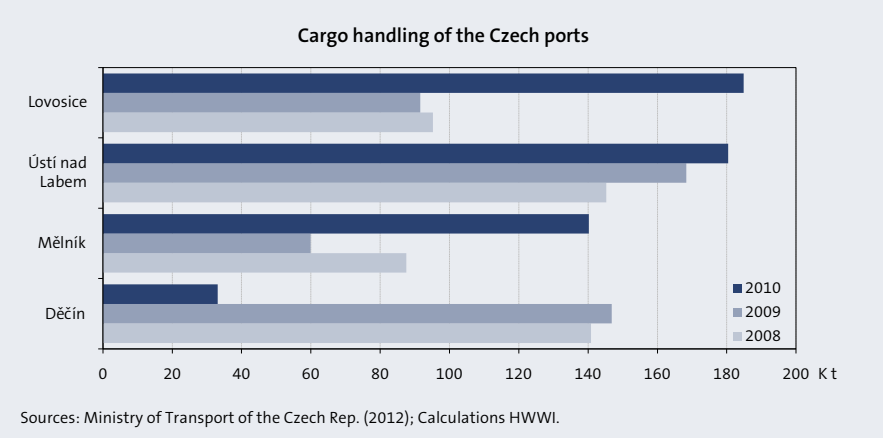


Figure 26

4.2 | Hinterland connections and transport routes

The examined sea ports, with the exception of Hamburg, indicate mostly intra-regional trade connections meaning that the exchange of goods takes mainly place directly by trading with the regional harbours on the Baltic and the North Sea, whereas the goods for world trade are handled mostly at the main harbours or hub ports (cf. Eurostat 2012).

Hub-and-spoke strategy

On the basis of a "hub-and-spoke strategy" so-called feeder ships carry the freight from the smaller to the bigger harbours (hubs) (and the other way round). After the goods have arrived they are re-arranged and loaded with goods from other harbours onto bigger ships. Feeder ships are the conveyors from nearby, whereas the long-distance goods transport is done by bigger ships. That way the bigger size of the ships helps to reduce the average transport cost for bigger quantities of goods. Transportation will also be reduced, as the big ships do not have to make that many port calls.

The hub-and-spoke strategy is required, because many of the smaller ports within the European waterway system do not feature an access for bigger ships or container ships. The same strategy also applies to incoming goods and their distribution. Feeders as well as deep-sea vessels are used for regular shipping line services between the harbours to regionally distribute the loads which arrive at the hub ports of Hamburg or Rotterdam (cf. Großmann 2008). This is how the goods are distributed in a regular feeder service between Hamburg and Gdansk. Similarly the goods are forwarded and distributed by a regular service of rail transportation between Hamburg (as a hub) and Poznan (as a regional hub terminal).

Hinterland connections as a competitive factor

Sea transport plays a paramount role especially for trans-continental trade. For the competitiveness of sea ports quantity and quality of the hinterland connections via rail, waterway or road is an important factor. The given infrastructure influences the costs of forwarding goods from the harbour as well as the time the transport needs to reach its destination. Therefore there is a lot of competition between the various modes of transportation in the hinterland and the ports which have good connections to their target and source markets have an advantage (cf. Großmann et. al. 2006).

Infrastructural bottlenecks

The European Commission, in its White Paper on Transport Policy points out the impending overload of hinterland transport and the trans-European transport networks as a serious threat to the competitiveness of the European

economy (cf. COM 2001, 2006, 2011). The congestion of certain infrastructure is related to the delay in the creation of the infrastructure of the trans-European network. To solve the problem, the European Commission in its White Paper proposes a number of measures for the development of the network by the year 2010 and beyond (cf. COM 2001, 2006, 2011). This includes the classification of the road (toll), the promotion of alternative modes of transport, and targeted investment in the trans-European network in order to reduce the bottlenecks, among others, between Poland and Germany.

Intermodal traffic

(Coastal) Sea shipping and inland waterway transportation are two key elements of intermodality, which help to prevent bottlenecks of goods transportation on the road. Additionally to the suggestions to connect sea ports to high-speed sea routes ("Sea Highways", EU TEN-T Project 21) there are targets in inland waterway transportation. These are among others the simplification of technical specifications and regulations, a harmonisation of ship patents and the development of navigation aids and systems (River Information Services, RIS) (cf. COM 2001, 2011). In connection with that the feasibility of an RIS System has been checked in a pilot phase from 2010 to 2013 for the stretch of the Oder between Szczecin and Schwedt. About 7 m euros have been invested for doing that (cf. TEN-T Executive Agency 2012).

Inhibitors for efficient traffic

The European Commission (COM) has stated so far that the statutory framework of local goods transportation on the rail has improved making it possible to establish inter-regional railway hubs. Yet there has still been only a low degree of coordination of the authorities for the endeavours to extend railway track infrastructure and there is still the occasional capacity overload of the system.

Similar aspects apply to inland waterway transportation. The statutory framework has evolved, but even today a ship going from Hamburg to Gdansk for example counts as coming from abroad and is subject to international traffic and security regulations. Therefore there is no complete integration of coastal sea transportation with inland waterway transportation and the logistics chain of cross-regional sea ports with the domestic inland (cf. COM 2006, 2011).

With inland waterway transportation there are similar legal problems as with coastal shipping. With inland waterway transportation there are even more distinct deficiencies as with other modes of transportation. The capacity reserves in (river and canal) corridors like the Oder or the Vistula have been estimated to be at 40 % (cf. COM 2006, 2011).

It is the aim of the European Commission now to connect all sea ports to an efficient inland waterway system and to a cargo railway net in order to reduce the bottlenecks for inland transportation and to increase the reserve capacity (cf. COM 2011).

The density of transport networks differs widely

Figure 27 shows a number of KEO harbours and how they are connected to the motorway net plus the harbours with ferry services, whereby the Germany-located ferry terminals of Kiel, Lübeck, Rostock and Sassnitz connect Denmark, Norway, Finland, South Sweden and Russia with the markets of Europe via road.

Hamburg, Berlin, Magdeburg, Prague, Poznan and Wroclaw can be identified as traffic hubs. Outside the KEO area, but still in its catchment area, it is Warsaw.

Moreover the Baltic Sea motorway A20 leads from Lübeck via Wismar and Rostock to Schwedt/Oder and from there directly to Szczecin (via the mo-

torway approach road A11). A plan approval procedure for the State of Schleswig-Holstein and Lower Saxony is conducted, to enable an extension of the motorway A20 from Bad Segeberg/Lübeck, via Hamburg (north west) and Bremerhaven (south), to Westerstede/Oldenburg (cf. Niedersächsische Landesbehörde für Straßenbau und Verkehr 2012).

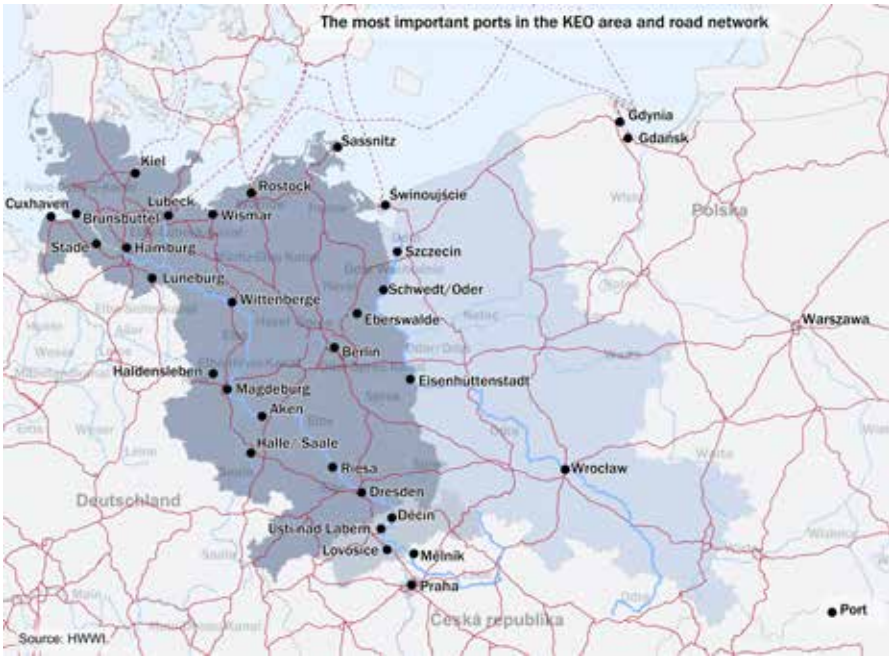


Figure 27

Table 9 illustrates the infrastructural distribution by transportation modes for the KEO area in km per 1 000 km². As it shows the road network is densest in the German regions of the KEO zone. Prague, too, is very well connected. On the other side, in the Czech part of the KEO area, transportation by rail is more developed (165.5 km per 1 000 km²) than in Germany (101.2 km per 1 000 km²) and in Poland (83.3 km per 1 000 km²). The infrastructures of Hamburg and Prague show a relative density of rail kilometres per 1 000 km². Furthermore both cities are relatively well-connected by rail, which explains the high figure of cargo handling on the rail and of trade for Hamburg with the Czech Republic (cf. Table 10).

The motorway network in the German KEO regions has changed tremendously from 2000 onwards. In Mecklenburg-Western Pomerania for example there was a growth of 64.3 % km road net per 1 000 km². This can be explained by the construction of the Baltic Sea motorway. The strongest growth of the motorway net happened in Poland (plus 109.7 %). Whereas there was a decline of the railway net in the Polish part of the KEO zone (-9.9 %), there was an increase of the Czech railway net to 165.5 km per 1 000 km (+ 8.9 %). Within the German part of the KEO area the railway net had stayed the same as in the comparative period of 2005.

Table 9

Route network according to modes of transport 2009

Regions	Navigable rivers	Change between 2000 and 2009	Motorway	Change between 2000 and 2009	Rail	Change between 2000 and 2009
	km/K km²	%	km/K km²	%	km/K km²	%
KEO area	:	:	15.9	26.8	99.1	:
German part	25.5	0.0	26.9	17.1	101.2	0.1
Berlin	126.7	-0.9	86.4	24.2	702.2	3.1
Brandenburg	28.3	0.0	27.0	3.8	93.5	-0.6
Hamburg	70.2	0.0	107.2	0.0	370.7	-0.7
Lüneburg	:	:	24.0	3.0	:	:
Mecklenburg-Vorpommern	35.6	0.0	23.8	64.3	68.7	3.2
Sachsen	9.7	0.0	28.8	17.5	123.2	-2.9
Sachsen-Anhalt	22.2	0.0	19.9	27.2	108.1	0.8
Schleswig-Holstein	20.6	0.3	33.7	10.9	81.7	0.5
Polish part	:	:	5.6	109.7	83.8	-9.9
Dolnoslaskie	:	:	10.0	31.8	88.5	-10.4
Lubuskie	:	:	0.0	0.0	68.6	-20.7
Opolskie	:	:	9.3	72.5	92.3	-3.0
Slaskie	:	:	8.1	300.0	175.5	10.7
Wielkopolskie	:	:	6.5	306.3	70.9	-16.6
Zachodniopomorskie	:	:	1.0	69.2	52.7	-20.2
Czech part	:	:	4.2	125.0	165.5	8.9
Severozápad (with Ustecky kray)	:	:	6.1	80.3	175.0	4.1
Praha	:	:	22.2	3.8	499.9	34.8
Severovýchod (with Liberecky kray)	:	:	2.1	[2]	145.5	10.3
Mazowieckie (PL)	*:*	*:*	*0.0*	*:*	*49.7*	*-9.3*

: = Not available

[1] For Germany change 2005 to 2009

[2] The motorway network was extended from 0 to 26 km

Sources: Eurostat (2011); Federal Statistical Office (2011); Statistical Offices of Poland and the Czech Republic (2011); Calculations HWWI.

Table 10

Hamburg's container hinterland traffic in 1.000 TEU by transport mode 2010

Regions	Road		Rail		Inland waterway
	Receipt	Delivery	Receipt	Delivery	Receipt/Delivery
Berlin	6.8	12.8	17	22	0.0
Brandenburg	29.3	32.9	31.1	31.8	0.0
Hamburg	448.3	448.3	2.4	0.1	0.0
Mecklenburg-Vorpommern	12.9	13.8	3.3	3.3	0.0
Niedersachsen	157.6	192.7	19.7	11.8	46.4
Sachsen	18.5	19.7	49.7	45.7	4.9
Sachsen-Anhalt	16.7	20.4	10.6	18.9	34.3
Schleswig-Holstein	130.7	138.2	0.4	0.5	0.0
Poland	86.3	91.8	26.1	38.4	0.0
Czech Republic	28.4	30.7	146.7	182.4	0.0
Total	1,575.4	1.689.5	862.6	1063.0	94.9

Sources: Hafen Hamburg Marketing (2010); HWWI.

Comparing the distances covered by rail inland between Hamburg and Prague contrasted to the competitor harbours of Rotterdam and Antwerp, Hamburg has a distance advantage. The immediate distance in kilometres between Hamburg and Prague (685 km) is tremendously shorter than the one between Rotterdam and Prague (1 044 km). In addition to that, the distance between Hamburg and Warsaw (890 km) is also shorter than between Rotterdam and Warsaw (1 339 km). The immediate and short distances are among the reasons, why Hamburg has had advantages to Rotterdam and Antwerp and can function as a hub port in the transport chain to Poland and the Czech Republic (cf. HHLA Intermodal 2012).

Quality deficiencies in the railway net

However, it is especially valid for Poland, that the extension of the railway net shows a lower quality and the state of the tracks has been evaluated as unfavourable, as it features a lot of low-speed tracks and weight limits (cf. BAG 2010). The overall number of cargo trains of east-west railway traffic between Germany and Poland fell from 29 790 cargo trains in 2006 to 22 584 trains in 2009. The exception is here the border crossing point Tantow, which experiences a higher frequency of (+1 470) of cargo trains through the corridor from Berlin to the sea port of Szczecin.

Compared to this the number of cargo trains from Germany to the Czech Republic increased from 2006 to 2009 by 502 to 22 827. The surplus was generated by the border-crossing point of Bad Schandau (Dresden/Decin) alone (+2 182 cargo trains), whereas the Bavarian border-crossing points of Schirnding und Furth im Wald experienced a decline in the number of cargo trains (cf. BAG 2010).

Natural transportation networks: Elbe and Oder

The navigability of the Rivers Elbe and Oder differs a lot in the various KEO regions. The River Oder is widely not navigable after Kostrzyn (33 km north of Frankfurt/Oder). In many areas along the river locks are missing to guide the boats either up or down the river through the gradient of the river. Furthermore the water level of the Oder fluctuates. It conducts only little water in summer. In winter it is not navigable due to the cold winters in Middle Europe and in spring the water level is too high. However, there is a positive side-effect with the flood protection measures for the winter. The ice-breakers which break the ice to prevent water from damming up, need a fairway of at least 1.80 m. From this inland waterway transportation can profit in other seasons. The River Oder is navigable only in autumn, which tremendously impedes any profitability and possibility to set up schedules for line services (cf. BAG 2009). Therefore inland waterway transportation on the Oder has only little importance (cf. BAG 2009).

Navigability differs regionally

Utilization of the Elbe for cargo transport differs a lot regionally. Lower Elbe and the Elbe lateral waterways (Elbe-Lübeck-Kanal, Elbe-Seitenkanal) are navigable. Yet the Middle Elbe and Upper Elbe (Schönebeck until Czech Republic) can be developed for navigation. There are two river narrows, one near Hitzacker/Dömitz, the other one near Coswig. Furthermore the fairways are not always deep enough (min. 1.60 m) and the height of the bridges is insufficient to let inland waterway vessels with a three-storey container load pass (cf. HHLA Intermodal 2012; VBW 2011).

Here, river compared to truck or rail transportation is more environmentally friendly. The CO_2 emissions of inland waterway vessels are 33.4 grams per tonne kilometre, compared to 48.1 grams per tonne kilometre by rail and 164 by truck. This also compared with the two means of transport, rail and

truck, leads to noise reduction. It must be remembered, however, that the expansion of the rivers, impacts on certain (environmental) influences (cf. Sye 2011). These measures could be adopted on the Elbe relatively cost effectively and environmentally friendly (cf. Hamburg Chamber of Commerce 2012).

The costs of transport for standard containers by inland waterway transport are lower compared to truck and rail transport (cf. Figure 28). Per TEU the distance from Hamburg to Berlin by boat is 25 % cheaper than by truck. For the transport of bulk cargo from Hamburg to Decin use of inland waterways compared to rail is about 60 % per ton cheaper. However, because of the differing navigability of the Upper Elbe, the assumption is not constant throughout the year. Furthermore, in the calculations no opportunity or time costs were included, which would change the cost ratios to the disadvantage of inland waterways (cf. Planco Consulting GmbH 2007).

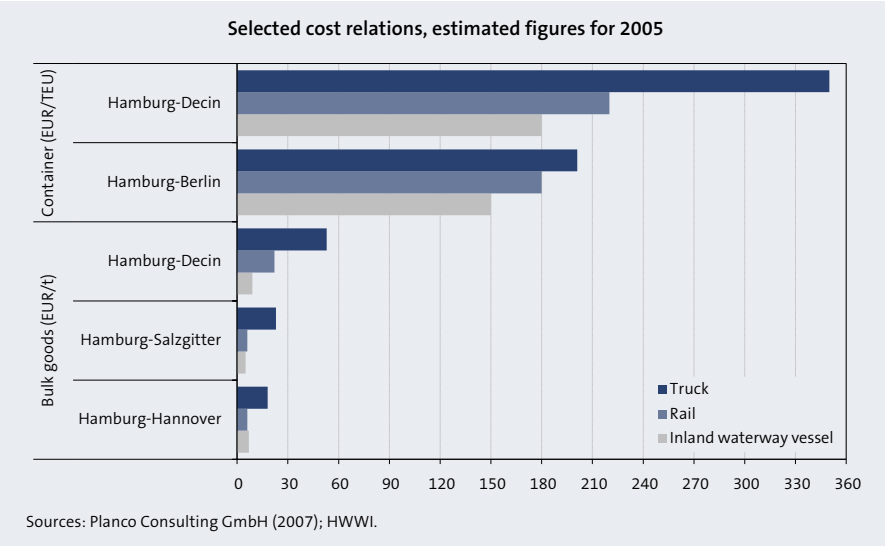


Figure 28

Regional focus of the Freight centres (FTC)

The quality and regional availability of freight centres (FTC) is important for the efficiency of supply chains, especially in the combined transport between rail and trucks. Since there is EU wide no uniform definition of FTC, in what follows the combined transport between truck and (inland) ports or also airports with facilities for cargo handling are rated as freight terminals. Within the KEO area, Berlin exhibits the highest number of logistic hubs (12 FTC), before Kiel (9 FTC) and Hamburg (8 FTC). This is followed by Lübeck (8 FTC) and Prague (6 FTC) (cf. Büro für Raumforschung, Raumplanung und Geoinformation 2012).

It should thereby be noted that the number of the FTCs says nothing about the importance or magnitude of the centres. Often, however, the FTCs are located near conurbation areas in order to forward or else carry away goods in combined transport by rail to and from the relevant conurbation area. Exceptions are the freight centres in Kiel, Lübeck or the Oder-Spree region (3 FTC). Here the transport-connections play a special role.

Infrastructure bottlenecks in the hinterland

Good hinterland logistics are prerequisite for no bottlenecks to arise, to avoid jams and thus maintain the transport times and costs between the ports and the destinations of the goods as low as possible. Depending on the natural environment and infrastructural conditions of a port location, the modal split

with respect to the further transport of goods to their destinations is very different. This leads to different costs in the case of the further transport of goods to markets in the hinterland, because the characteristics of the modes of transport by road, rail and waterways are different.

The connection of the ports to the hinterland is dominated by road transport, whereby the congestion of certain roads, is increasingly manifesting itself as a bottleneck. Rail transport is an alternative especially over long distances and bundling opportunities in the hinterland. The HHLA (Hamburger Hafen- und Logistik AG) sees reasons for bottlenecks in the rail transport among others in the common usage of the infrastructure of rail freight and passenger services, lack of connections to the European TEN-T networks, overloaded compensation networks, for example over Rotenburg / Wümme – Verden – Hanover, and the congested north-south corridor (cf. HHLA Intermodal 2012).

International accessibility

For the integration into the European transport network, it is moreover important that the KEO area has international accessibility over large airports with intercontinental flight connections in Berlin, Hamburg and Prague. In the extended study area is also located the major international airport Warsaw Chopin Airport. In addition to these airports, there are some regional airports with European or national direct connections, among others in Dresden, Gdansk, Leipzig/Halle, Lübeck, Magdeburg, Poznan, Szczecin and Wroclaw with destinations such as, Gdansk-Hamburg, Gdansk-London Stansted or Dresden-Munich. The passenger figures at airports of the KEO area are on growth course. These have increased for example in Hamburg from 9.1 million in 2002 to 13 million in 2010 (+43.5 %), in Prague from 6.3 million in 2002 to 11.5 million in 2010 (+ 83.4 %) and in Gdansk from 1.2 million in 2006 to 2.2 million in 2010 (+ 75.4 %) (cf. Eurostat 2012).

4.3 | Accessibility and market potential

The quality and quantity of the transport infrastructure are the key determinants of transportation accessibility of sales and procurement markets, which are important aspects of the location selection of companies in numerous industries (cf. Niebuhr/Stiller 2004). The regional competitiveness is influenced by the respective achievable market potential, which is largely determined by the spatial distribution of the population, their income as well as the transport infrastructure conditions.

Market potential promotes location attractiveness

The attractiveness of a location increases with its market potential, thus the achievable purchasing power. Agglomeration areas thus usually have a location advantage over less populated regions. They attract companies, suppliers and potential customers, what promotes the economic growth of a region. Empirical analysis based on the new economic geography (cf. Redding 2010) show that the level of market potential positively affects the per capita income and the density of economic activity in regions.

Figure 29 shows the reachable population of the European regions within two hours driving time in intermodal freight. It thus measures how high this accessibility of markets is according to the colouring of the respective regions.

This varies significantly between regions even within the KEO area (cf. Figure 29). The reachable population within two hours is greatest from Magdeburg, Halle on the Saale and Hamburg. Large parts of Germany, the Czech Republic and Poland exhibit a higher accessibility as the KEO area. Low levels are found in the regions of Mecklenburg-Western Pomerania , Saxony-Anhalt and Brandenburg as well as in the voivodeships Zachodniopomorskie and Lubuskie.

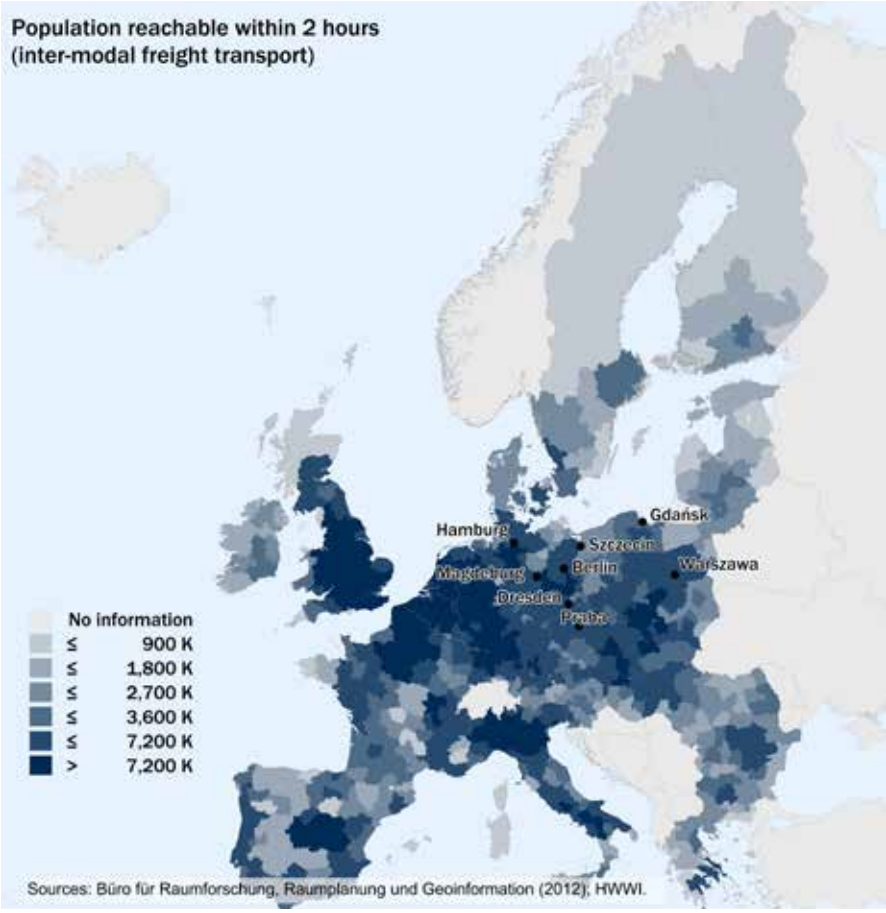


Figure 29

The competitiveness of the ports in the KEO area is highly relevant for the population that can be reached. Figure 30 shows the accessibility of selected major cities and port locations in the KEO area as well as the city triangle of Gdansk, Gdynia and Sopot as well as of Warsaw.

Numerous port locations with high market potential

The top four spots are hereby occupied of German cities, whereby especially Magdeburgs's accessibility is remarkable with respect to the two most populous German cities of Berlin and Hamburg. This is related to the fact that an international waterway crossing was built in Magdeburg in 2003. For the Polish KEO area, the economically significant Warsaw likewise performs well and as such illustrates its potential as a business location. It has to be noticed that the population reachable from Gdansk is significantly lower than from Hamburg. On top of that the market potential of the port location Gdansk/Gdynia/Sopot is even lower than that of the less populous cities of Wismar and Poznan.

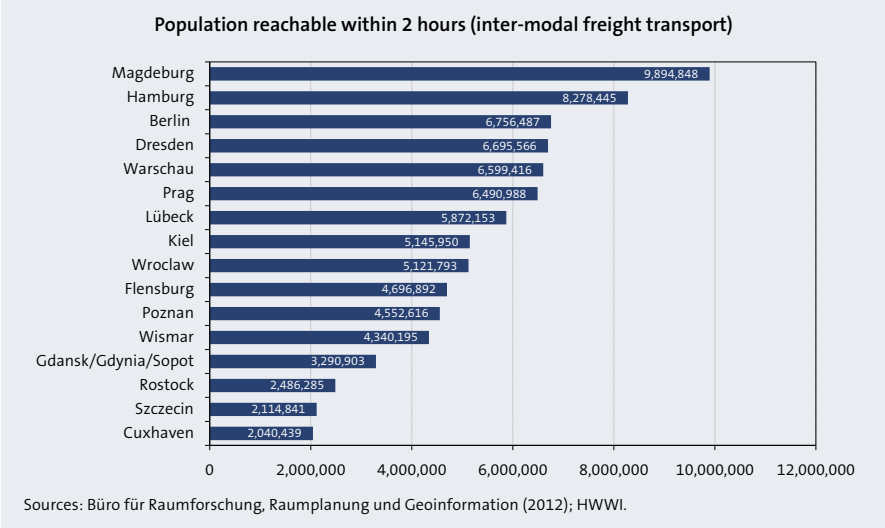


Figure 30

4.4 | TEN-T and Pan-European infrastructure projects

As the transport infrastructure represents a key determinant for the accessibility and thus the market potential of regions, changes in this area can have a major impact on the economic strength and the competitive situation of locations.

In the EU, it is primarily the investments within the framework of the projects of the Trans-European Transport Network TEN-T that will sustainably influence the infrastructure and thus the traffic and volume of trade up to 2030. The KEO area is also thereof affected, since its large-scale accessibility in the EU is relevant to its location attractiveness.

The basic idea of the 2011 adopted TEN-T core network is to bridge existing gaps between national transport systems and the concentration on main transport routes. Figure 31 shows the TEN-T priority projects with their connections to the economic centres.

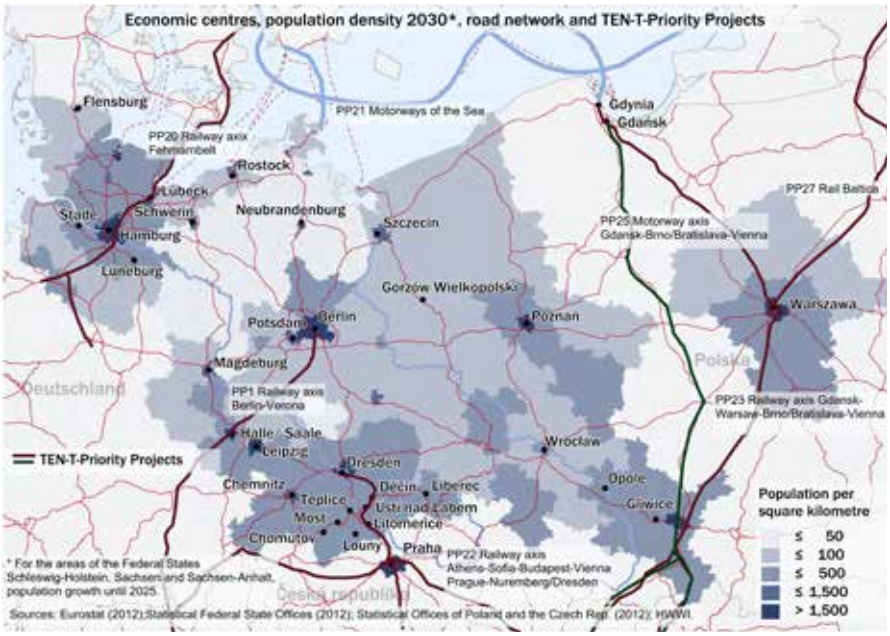


Figure 31

Expand the interfaces between traffic networks

Currently, the missing interfaces mainly have a development impairing effect on the transport networks between East and West Europe as well as the cross-border infrastructure. A further problem is posed by capacity bottlenecks, especially in rail transport. For this reason, this mode of transport is given special attention within the framework of TEN-T. Table 11 illustrates the directly and indirectly affected priority projects within the core network of the KEO area.

TEN-T-Priority Projects in the KEO area

Project no.	Designation	Affected countries	Main modes of transport	Completion	Costs in m Euro
PP1	Railway axis Berlin-Verona/Mailand-Bologna-Napoli-Messina-Palermo	DE, AT, IT	Rail	2022	51.849,97
PP15	Galileo	all	(Satellite systems)	2012	2.333,50
PP20	Fehmarn Belt railway axis	DE, DK	Rail	2020	7.363,64
PP21	Motorways of the Sea (including the North Sea-Baltic Sea Canal)	four corridors	Sea	-	-
PP22	Railway axis Athens-Sofia-Budapest-Vienna-Prague-Nuremberg/Dresden	RO, BG, AT, HU, CZ, DE, EL	Rail	2020	13.953,09
PP23	Railway axis Gdansk (Danzig)-Warszawa (Warsaw)-Brno (Brünn)/Bratislava-Vienna	PL, CZ, SK	Rail	2025	4.450,15
PP25	Motorway axis Gdansk(Danzig)-Brno(Brünn)/Bratislava-Vienna	PL, CZ, SK, AT	Road	2018	10.455,69
PP27	Rail Baltica: Railway axis Warsaw- Kaunas - Riga - Tallinn - Helsinki	LT, PL, LV, EE	Rail	2020	2.590,38

Sources: TEN-T Executive Agency (2012); HWWI.

Table 11

The connection of Central Europe with the Nordic countries will by 2020 be improved through the construction of the fixed Fehmarn Belt link (PP20), through which the stimulation of trade in the Baltic region and in passenger traffic is expected. Potential thereby especially arises for the North German ports (cf. TEN-T Executive Agency 2012). At the end of 2008, the Federal Republic of Germany and Denmark signed an agreement on the fixed Fehmarn Belt link. In early 2011, the Danish government decided to favour the construction of a (lowered) tunnel over a bridge for rail and road traffic between the island of Fehmarn in Schleswig-Holstein and Lolland in Denmark. Through the construction of the fixed link, a north-south axis should be developed in the Trans-European transport network – starting from Helsinki over Stockholm, Malmö and Copenhagen, Rodby and Puttgarden, up to Munich, Milan, Rome and Sicily (cf. Shah/Baumann 2012). The respective connections should hereby allow for the expansion or creation of four lanes for road traffic and two lanes for the electrified rail. With the construction of the land bridge, travel time from Copenhagen to Hamburg will be reduced from 4.5 to 3 hours and from Stockholm to Hamburg from 10 to 8 hours.

High-speed maritime traffic in the Baltic sea area

The "Motorways of the Sea" (MoS) (PP21) will affect the KEO area via the Baltic sea. They should provide an alternative to the over-frequented transport over land. This affects the KEO area especially in the context of the mainly outbound feeder traffic from Hamburg to the Baltic Sea ports (Corridor: Motorway of the Baltic Sea). The MoS pertains to a trans-national high-speed maritime transport routes that similar to motorways should handle high transport volumes (cf. COM Mobility and Transport 2012). Their performance capability

also depends on their integration in intermodal transport chains in the KEO-area especially in the rail network. In combination with hubs in the hinterland, so called Dry ports, this sea-based network can relieve conventional roads, without increasing the traffic within the port areas despite increasing volumes of goods.

PP22, which should connect Southeast Europe with the centre of the EU, plays with respect to the KEO area especially with the improvement of the rail connection from Prague to Dresden an important role. Given the role of Germany, especially the Port of Hamburg for the Czech import and export, the expansion of this important trade route represents a major improvement.

Expansion of the hinterland connections

The TEN-T projects, PP23 and PP25 are intended to strengthen the port location Gdansk/Gdynia especially its connection to the Czech Republic, Austria and Slovakia. The motorway axis PP25 is, although some of its part routes have already been completed, currently excluded from further investments within the framework of the TEN-T. The further development of this project is therefore uncertain. The population currently reachable from Gdansk/Gdynia will be increased by the infrastructure measures in the field of rail, whereby the market potential of the region will be increased and the competitive position with other Baltic and northern ports will be strengthened. Since Gdansk/Gdynia represents an important hub for Poland's foreign trade, this development is important for the entire KEO area.

The same applies for the Rail Baltica (PP27), which represents an important connection for Poland over the Baltic area to Finland. The ports of Tallinn, Riga and Helsinki will dispose over a direct railway link and the connection of the Baltic Sea port of Klaipeda into the hinterland will be improved (cf. TEN-T Executive Agency 2012). Through ongoing convergence processes, their economic growth and the geographical proximity to the Baltic area, the former Baltic Soviet Union countries are interesting trading partners for the KEO area. The growing infrastructure accessibility will increase this potential (cf. TEN-T Executive Agency 2012).

Faster transport on the rail

Additional considerations for the railway transport are taking place on the Pan-European level and focus on the improvement of the rail link between Berlin and Kiev (Project 3, TEN-R), which runs over Cottbus and Wroclaw. Currently the direct passenger train between the two KEO cities, Berlin and Wroclaw, requires 5.5 hours, whereas in the 1930s, the train connected the two cities in 2.5 hours.

The connection of this pan-European TEN-R project of the UN Economic Commission for Europe, would as a whole positively affect the economic development between the two cities (cf. Dornier Consulting 2007) and improve the transit through the KEO area.

Cross-national, pan-European projects, such as "Amber Coast Logistics", attempt to improve the intermodal freight transport connection between the south-eastern Baltic regions (among others Belarus, Russia, Ukraine) and Central Europe (cf. Box).

Box
EU- Project „Amber Coast Logistics"

The "Amber Coast Logistics" (ACL) that is managed by the Hafen Hamburg Marketing e.V. (Port of Hamburg Marketing) is funded within the framework of the INTERREG IV B Baltic Sea Region Programme of the EU and runs from October 2011 to March 2014. It has a total budget of 2.8 m euros and includes 20 project partners from 6 different countries. ACL is a collaborative project to promote multi-modal freight transport connections between the south-eastern Baltic region and Central Europe. The main objective of the project is to promote the flow of goods both over sea as well as over land and as such step up the economic relations between the emerging East European countries such as Belarus, the Russian Federation, Ukraine and the EU Member States in the Baltic region. Through ACL those involved in the transport sectors should be brought together in order to promote the interaction and the exchange of experiences as well as to promote the mutual understanding and awareness. The expected results include knowledge transfer between the partners and the trans-national market participants. This project is an added value for customers (better services), business (better and sustainable business relationships) and regions (location attractiveness).

4.5 | Development perspectives

For the future, a continuation of the catching-up process for many regions in the KEO area is expected, in the course of which an increase in per capita income and on account of economic structural change, an increase in productivity of the work places is expected. The HWWI forecast for the growth of the gross domestic product in Poland up to 2030 is 93.8 %, 59.3 % for the Czech Republic and 32.9 % for Germany. This momentum of economic growth will also affect the KEO regions and there will be a further convergence of per capita income between the Polish, Czech and German regions.

Spatial polarization

Despite the favourable macroeconomic outlook there is however the risk of a future intensification of the spatial polarization, in the course of which rural regions, but also structurally weak cities are disconnected from the economic catching-up process. Whereas in numerous, in particular rural areas of the KEO, the per capita income is significantly below the EU average, the cities and their suburbs are developing as regional growth centres in many places already very dynamically.

Pronounced regional disparities can also be discerned from a demographic development perspective. The recent past has shown that many regions in the KEO area have experienced a population loss. Demographic projections imply that this downward trend especially in economically weaker regions could worsen due to migration. Overall, the population in the KEO area is projected to decline by 6 % from 2010 to 2030.

Heterogeneous settlement structure

There are already pronounced disparities in the settlement structure of the KEO area. The major cities of Berlin, Hamburg and Prague are important core centres of growth in terms of population development and economic growth. This is accompanied by an increasing urbanization, due to migration

to the cities and their suburbs. Against the background of these developments, the future growth poles of traffic are expected here.

The growth of freight transport critically depends on the development of the gross domestic product, the foreign trade links as well as the settlement structure. The dynamic of the developments poses a number of challenges for the transport routes and logistic centres in the KEO area. Firstly, there are already capacity constraints in many places, especially in the northwest of the KEO area. It is expected that this will increase due to the discrepancy between trade growth and the hesitant, gradual infrastructure improvements.

In addition, through the dynamic development of Central and Eastern Europe the transit traffic through the KEO area will increase, for example from Russia through Poland to Germany and vice versa. As a result the burden on the rail freight as well as the motorway freight will continue to increase.

Furthermore, and this is directly related to the bottlenecks, the expected economic and demographic changes will partly lead to the creation of new regional growth centres and thus to logistic centres. This represents new challenges, but also provides an opportunity for new developments in transport and logistics services.

Poles of growth determine transportation

In the context of transport infrastructure improvements, these economic developments will be flanked by the quantitative and qualitative development of transport infrastructure, particularly in cross-border traffic (cf. Figure 31). Both at national as well as at EU level, the goal of a better networking of the European trading centres is being pursued. This raises the question as to what impact these traffic policies along with the economic development of European regions, will have on the location of the Elbe/Oder region.

The main markets of the KEO are mainly in the larger cities – Berlin, Dresden, Hamburg, Poznan, Prague, Szczecin and Wroclaw – and their metropolitan areas (cf. Figure 32). This can be mainly attributed to the high local purchasing power and the positive population development in the city centres and suburbs. Moreover, the major transport routes of the KEO area cross here.

In addition, in the ferry ports of Lübeck, Rostock or Sassnitz, there is also an incoming and outgoing freight by rail or containers are loaded on ships over a roll-on and roll-off system, so that large hubs will still exist by 2030. Via these

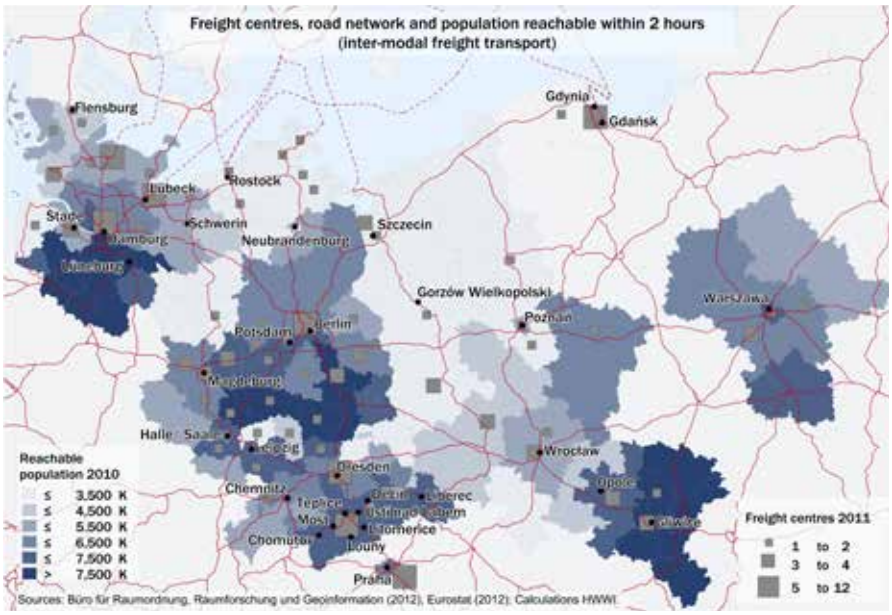


Figure 32

peripheral transport hubs, the freight is transported to and from Scandinavia and Russia in metropolises. With regard to the transport routes it is therefore expected that the traffic in and out of the metropolitan areas will increase further, which in turn leads to an expected increase of the existing incoming and outgoing freight to the coast. This increase will further challenge the capacity of inland barge, rail and road traffic.

Port locations take care of growing regions

The seaborne trade is determined by the global economic growth in national economies. The driving factors are among others the international division of labour and the growth of the national populations. Other aspects that influence the trade are the distances between the economies and the costs of overcoming these distances. It can be reckoned with that the seaborne trade will increase by 2030, since the pattern of specialization, the population and the national gross domestic products worldwide, will continue to grow.

The growth prospects of the ports in the KEO area are therefore heavily dependent on the development of international trade and in which competitive position the ports stand in competition with other ports. The ports that will mainly develop well will be those that focus on the trade with a booming region, such as Szczecin and Berlin or Hamburg and Prague.

Competition among ports

The competitive position is influenced by many factors from which the development prospects of a port location by 2030 are determined (cf. Table 12).

Table 12

Location factors for ports	
Geographical location	Distance to the open sea, tides and tidal range, market proximity, (natural) water depth
Infrastructure	Shipping channel - and basin depth; land provisioning; hinterland connections (waterway, rail, maritime, pipeline); capacities
Superstructure	Surface pavering (road paving, bollards, etc.); High constructions (warehouses, buildings, etc.); Handling equipment (tractors, container bridges, cranes, etc.); Provision and disposal connections
Costs	Port development and plan implementation; port charges and other port call costs, labour costs, strike rate

Sources: Großmann et al. (2006); HWWI.

The individual port locations hereby exhibit specific factors which have shaped their development in the past and will also have an impact on their future growth rates. The competition intensity to which the ports are exposed is dependent on the spatial distance to other competing ports and the geographical conditions (for example, natural water depth). It is thereby clear that especially the major North Sea ports due to their location in the North Range and their markets with access to the inland barge have an advantage. This direct access facilitates the distribution of goods to the hinterland. The advantage of the Port of Hamburg in contrast to the Adriatic ports, is the Alps, which limit the transport of goods into the European hinterland (cf. Figure 33). In addition to these factors, further location factors influence the competitive position of a port. These mainly include infrastructure, suprastructure and costs, which are important for the volume of goods handled.

A critical location factor that is highly significant for the competitiveness of all ports and the port's economic development is the infrastructural hinterland connection of the port. Seaports are intermodal transportation hubs for

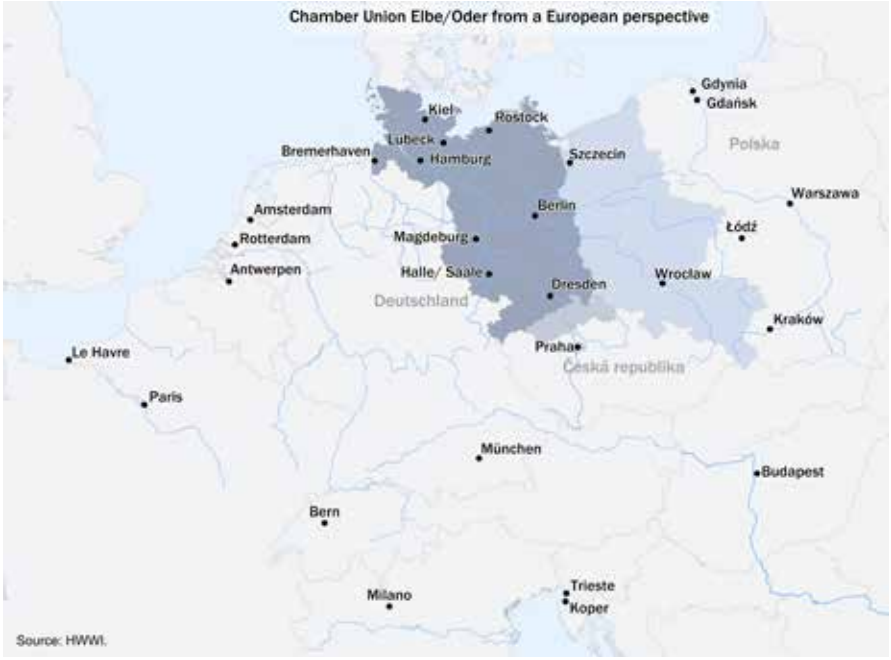


Figure 33

international and domestic freight. Goods are transported further from here with various means of transport to their destination regions.

Integration into the TEN-T is of high importance

Against the background of scarce transport capacity, it is crucial how individual locations of the KEO area are connected to the European transport network. In the TEN-T core network, in addition to some major seaports, many inland ports will profit from the planned investments in the transport infrastructure by 2030. However, there are TEN-T priority projects not only in the KEO area, but also in the regions of competing port locations.

The KEO Baltic ports, such as Lübeck, Gdansk or Rostock will to the most part be greatly influenced by the development of intercontinental trade of the Port of Hamburg, but also by the competing ports Rotterdam or Antwerp. In Hamburg goods are traded in the intra and extra-EU trade and are handled and trans-shipped in feeder transport of regular services further shipped in the Baltic Sea or by rail among others to the Czech Republic.

Especially in rail transport, Hamburg has a strategic role, since the port is connected with Central and Eastern Europe over a relatively dense rail network. On the other hand this competitive advantage of Hamburg will be diminished if the goods are trans-shipped directly via Rotterdam to Gdansk and there is hereby a rapid implementation of the TEN-T priority project PP23 (Railway axis Gdansk-Vienna) by 2018.

5 | Fields of action

The basic prerequisite for a sustained positive economic development of the regions in the KEO is the general strengthening of their competitiveness and the continuation of structural change. The further evolvement of more competitive economic structures is thereby conducive for the intensification of the integration of the KEO regions in the regional and international division of labour.

Against the background of strengthening the competitiveness of these regions, many fields of action can be identified among which the expansion of education and research capacities, the reduction of transaction costs for cross-border economic activities, the qualitative and quantitative improvement of the transport infrastructure and dealing with demographic challenges are particularly relevant.

Expand the networking in research and development

The expansion of the education and research landscape strengthens the innovation capability of the regions in the KEO and creates the foundation for further development of knowledge-based economic structures. The public R & D expenditure in Poland and the Czech Republic continues to remain relatively low, which illustrates the need for action with regard to the strengthening of this investment area. This is especially true because in many places in the Czech and Polish regions are deficits with regard to innovation capacity and thus to technological capabilities.

Particularly investments in research and development capacities that deal with networking opportunities between the companies in the regions and public research institutions, can contribute to the continuation of technological progress and the positive development of the economic basis in regions. Corresponding measures are conducive for applied orientated research activities.

Promote education

The intensification of large-scale cross-border cooperation between universities and educational institutions promotes the expansion of the knowledge base. Skilled labour is the basic premise for the development of knowledge-intensive service sectors and industries. That is why the quality of academic and vocational education plays an important role for the development prospects of the KEO. The improvement of the cross-border recognition of qualifications can thereby help to promote the exchange of knowledge between Germany, the Czech Republic and Poland

In general, the potential for the development of large-scale research and educational initiatives in the KEO and the emergence of cross-border knowledge regions exists. Starting points to this end are for example, the education locations Berlin, Frankfurt/Oder, Hamburg, Dresden, Prague, Poznan, Szczecin and Wroclaw that on account of their size have supra-regional charisma and exhibit potential for cross-border activities in education and research.

Accelerate the reduction of transaction costs

The reduction of transaction costs, which are relevant for international trade relations, is conducive both for the cooperation in education and research as well as for the further integration of the regions in the KEO area and the large scale integration into the international division of labour. Exemplary are hereby the reduction of disparities in the legal regulations and the promotion of multilingualism among the population and in particular the labour force.

At the same time, appropriate activities could support the international orientation of the companies in the KEO, which helps to improve their position in the international location competition.

An important policy area that is also in the field of the activities of the KEO's chamber districts, which is of particular importance, is the qualitative and quantitative development of the transport infrastructure. In the KEO there are currently distinct spatial disparities with regard to the quality and quantity of road networks, navigability of inland waterways and the rail infrastructure. Investments in the transport infrastructure can therefore help to improve the overall location quality of the KEO.

Reduce deficits in the transport infrastructure

The quality and quantity of the transport infrastructure are important factors for the location decisions of companies. The analysis has shown that there is in this respect need for action in many regions of the KEO. This for example concerns the Polish rail and road network. Here there is potential, which can help to strengthen the economic development of the regions. Exemplary are hereby the rail and road corridors from Gdansk to southern Poland (among others TEN-T project 23 and 25) or from Gdansk to Szczecin.

Expand the infrastructure between urban centres

A crucial field of action is the traffic-connection between the urban centres, both in terms of passenger as well as freight transport. The good accessibility of the centres is for example important for the transmission of spatial growth momentum, the efficient spatial exchange of goods and services as well as labour market linkages. The goal is not only to further strengthen the links between the urban economic regions but also to make them more powerful, because in the future a strong increase in traffic is expected here due to spatial and structural development trends.

Strengthen the position of ports

Examples to this are investment requirements in rail passenger traffic on the routes between Berlin-Cottbus-Wroclaw, Berlin-Szczecin, Berlin-Warsaw, Dresden-Wroclaw and Dresden-Prague. In addition, there is demand arising from the growing goods (transit) transport volume, for example, between Berlin and Szczecin.

There is a number of major projects that should improve the transportation by rail and road in the KEO area, which are already in the implementation and planning. This applies for example to the TEN-T Priority Projects. These positively influence also the attractiveness and competitiveness of the ports in many regions of the KEO, because they improve their infrastructural links. Their timely implementation is therefore conducive to the improvement of location conditions in the KEO.

In Germany there is with regard to freight transport, for example, need for action with respect to the port link road in Hamburg in the wake of the A 26 and the implementation of the connection to the Fehrmarn belt-crossing (rail and road transport). Moreover, the conditions for an improved handling of rail based hinterland traffic of the Port of Hamburg into the KEO have to be created. These projects also have a national significance to relieve the transit freight of the KEO area.

There are relevant plans to relieve the rail traffic towards Hanover through the planned construction of the Y-route (Hamburg, Hanover and Bremen). However, the Y-route stands in the draft framework investment plan 2011 to 2015 for the Federal transport infrastructure (IRP) in the lowest category D (cf. BMVBS 2011). However, a new demand estimate is needed in order to continue to provide relief for the rail transport.

Converging of transport systems

With regard to the rail infrastructure, there are different, partly systematic, bottlenecks, which often result from the joint use of infrastructure of rail freight and passenger services. The goal should be to build relief routes. Relevant in this respect is also the expansion of existing routes, for example between Berlin and Szczecin, or the connection in the East corridor with a node Uelzen/Stendal between Berlin, Bremen and Hamburg.

Important for the KEO is also a better transport connection in pan-European traffic of the ports and urban centres of Central and Eastern Europe to the West European centres.

The introduction of a standard command and control system in the KEO would strongly improve the conditions for freight transport in the KEO area and lead to significant time savings. The implementation of the standardization of traffic management systems in rail transport (European Rail Traffic Management System, ERTMS) within the framework of TEN-T projects is therefore an important field of action.

Use the potential of inland waterway craft

The two waterways Elbe and Oder differ in their navigability. The Oder is for the most part of the year, not navigable, which is problematic for regular services. The goal should be to increase the navigability of the Oder through innovative measures, for example through new types of ships. Account has thereby to be taken for the regional natural features in the course of the river and to consider which measures appear appropriate.

The Elbe is in contrast capable of being used in very different ways for the inland waterway craft. The Lower Elbe and the Elbe side waterways are relatively well navigable, whereas the navigability of the Middle and Upper Elbe is less developed. In addition, there are many bridge heights on the waterways in the Elbe-Oder region particularly unsuitable in the case of the transport of three-layer containers. Within the framework of the TEN-T projects, the goal is to improve the navigability of the Elbe waterway. In addition, the inland waterway craft on the Elbe is regarded as a priority project of the Commission (TEN-T network characteristics) so that EU funds are earmarked for the improvement of the barge traffic on the Elbe River. This could improve the potential of the barge traffic on the Elbe over the medium term.

Within the framework of "German Unity Transport Projects" (Verkehrsprojekte Deutsche Einheit, VDE) there is also a waterway project (VDE 17) that provides for the expansion of the Mittelland Canal and the Havel between Hanover via Magdeburg and Berlin, as well as the side canals to Berlin (among others the Elbe Lateral Canal, Havel Canal, Oder-Havel Canal). The water corridor has thereby hitherto been completed for the limited two-layer container traffic. Nevertheless, some of the sections are still under construction, including the floodgate at Wusterwitz and Zerben as well as the expansion of the Berlin route. The goal of this measure is to relieve the road infrastructure as of 2015.

Potential river cruise tourism

River cruise tourism also represents a potential for regional tourism in the Elbe-Oder region, since this pertains to a relatively strong growth market. Thus, for example, on the Elbe route Melnik (Prague) and Magdeburg such a form of tourism is already offered. This should be considered in the development of infrastructure measures.

The coordination of transport infrastructure measures across borders, contributes to the efficiency enhancement of infrastructure projects. This could reduce the costs for the provision of public transport infrastructure and speed up the compilation of services. In this way natural varieties in the region can also be better preserved and protected.

Regional differences are relevant

Generally, the design of policy measures has to take into account the fact that the regions of the KEO are very heterogeneous. Whereas in numerous, especially rural areas, the per capita income is well below the EU average, cities and their suburbs are as regional growth centres in many places already developing very dynamically.

Demographic projections imply that this downward trend especially in economically weaker regions could worsen due to migration, which would lead to a decline in their workforce potential. Population losses in regions are thereby often associated with a reduction in the supply of infrastructure, which can further reduce the quality of life of the affected regions and contribute to accelerate the migration. Therefore, the preservation of the quality of life in many regions of the KEO represents a major challenge.

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