



D.T1.1.5 BASELINE STUDY - CETC

Work Paper

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1. Introduction

This study was commissioned by the Central European Transport Corridor European Grouping of Territorial Cooperation with limited liability (hereinafter also referred to as: the Ordering Party or CETC-EGTC)

The study was carried out in connection with the implementation of the international project REIF-REGIONAL INFRASTRUCTURE FOR RAILWAY FREIGHT TRANSPORT – REVITALISED (hereinafter referred to as REIF) – INTERREG CENTRAL EUROPE 2014-2020, with the financial contribution of the European Regional Development Fund.

Freight transport today plays a huge role as one of the basic elements of the economy. Rapid development of other branches of the transport industry have caused the railway transport to deal with the problem of competitiveness over recent years. The development and modernisation of road networks constitutes a certain threat – albeit also a challenge – for modern Polish and European railways, which – in order to keep up with the changes – must allocate increasingly more funds to restructure the existing infrastructure.

In many European regions industries with a high flow of goods (e.g. wood, paper, metal, chemicals, etc.) as well as industrial parks and zones frequently have no direct access to the railway network and due to this fact companies abandon the use of rail transport.

The main objective of the REIF project is the promotion and support of the regional rail freight transport in Central Europe.

2. International legal conditions in rail freight transport

The key European legal act establishing the requirements in the area of railway safety is the Convention on International Carriage by Rail (COTIF) of 1980. This agreement was enforced in 1985 with the appointment of the Intergovernmental Organisation for International Carriage by Rail (OTIF).

Another legal act regulating the carriage of goods by rail is the Agreement on the International Goods Transport by Rail (SMGS), developed by the Organization for Cooperation of Railways (OSJD). This agreement establishes the rules of direct international service for goods transport by railways between states in Europe and Asia.

3. The analysed area

The Central European Transport Corridor is the implementation of the interregional agreement which has been signed by: Skåne Region (Sweden), West Pomeranian Region, Lubusz Region, Lower Silesian Region, Opole Region (Poland), Komitat Vas and Zala, representing West Transdanubian Region (Hungary), Primorje-Gorski Kotar and Varazdin County (Croatia).

The corridor runs from Skåne (southern Sweden), via the Baltic Sea (Świnoujście-Ystad Maritime Link project), Central Europe, as far as southern Europe – to the Adriatic Sea. The corridor includes important economic centres, transport hubs, transport routes connecting Europe with the Middle East and Central Asia. The axis of the Corridor is the international route E65, which begins in Malmö in Sweden and finishes in Chaniá, Crete. The Corridor comprises main north-south railway routes and the Oder Waterway.

Figure 1 below shows the Central European Transport Corridor.

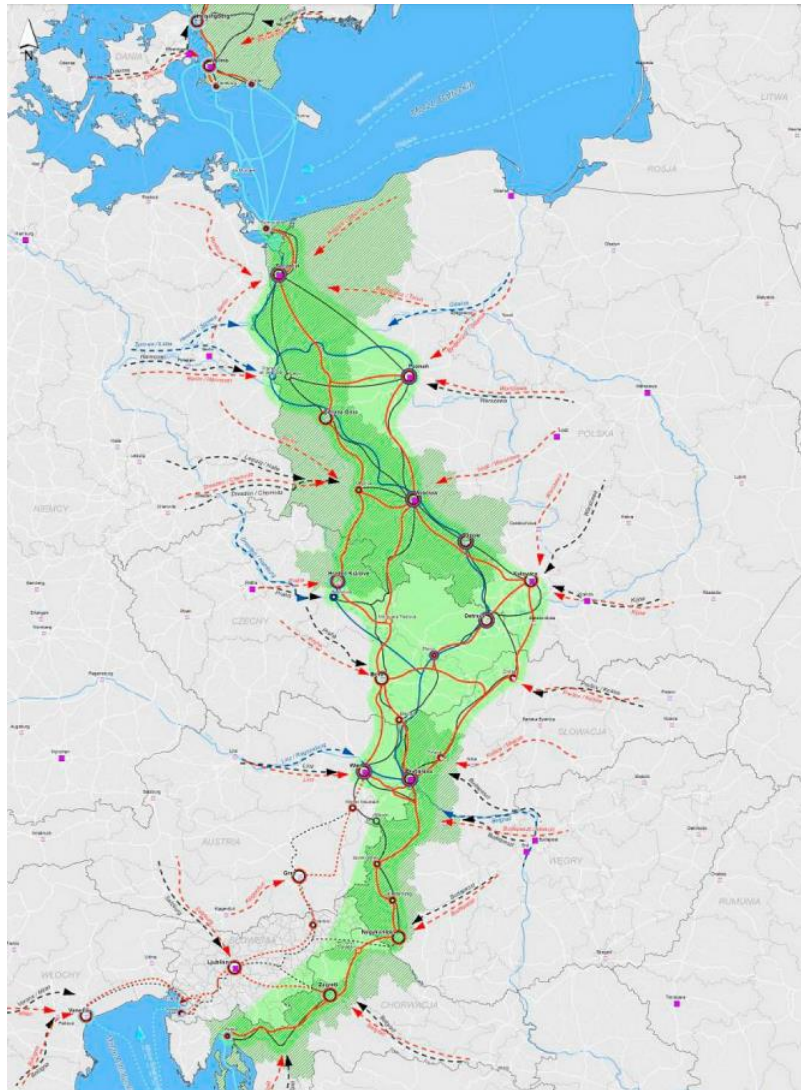


Figure 1 Central European Transport Corridor running, inter alia, through the territory of Poland: West Pomeranian, Lubusz and Lower Silesian Regions

Source: Andrzej Jakubowski, presentation „The role of the European Grouping of Territorial Cooperation (EGTC) for Central European Transport Corridor”

The analysis of the existing conditions of rail freight in the Central European Transport Corridor has been made for the following regions:

- West Pomeranian, Lubusz and Lower Silesian Regions (Poland),
- Primorje-Gorski Kotar and Varazdin County (Croatia)
- Komitat Vas and Zala (Hungary)

4. The TEN-T network and the Central European Transport Corridor

The TEN-T core network corridors were established in order to create efficient transport across Europe. They are intended to coordinate various projects at the supranational level, contribute to the development of the core network infrastructure in order to solve bottleneck issues, intensify cross-border connections and improve the efficiency and sustainability of the transport system. The individual corridors also contribute to improving the cohesion of EU regions through better territorial cooperation. As intended by the EU, the core network corridors are to be implemented by 2030.

The creation of the TEN-T core network corridors has been regulated by two regulations of the European Parliament and of the Council:

No 1316/2013, establishing new financial instrument – the Connecting Europe Facility (CEF) (OJ UE L of 20 Dec 2013), the annex to which specifies the course of these corridors and a list of projects to be financed in the first place from the CEF; the regulation also sets out the rules determining the functioning of the Connecting Europe Facility (CEF) instrument, whose aim is to finance investments in the TEN-T core network corridors;

No 1315/2013 on Union guidelines for the development of the trans-European transport network (OJ EU L of the 20 Dec 2013), regulating organizational issues in the functioning of the TEN-T core network corridors.

List of TEN-T core network corridors

Nine corridors were established that replaced the previous 30 TEN-T priority projects:

- Baltic Sea – Adriatic Sea
- North Sea – Baltic Sea
- Mediterranean Sea
- Eastern Mediterranean
- Scandinavia – Mediterranean Sea
- Rhine – Alps
- Atlantic
- North Sea – Mediterranean Sea
- Rhine – Danube

The corridors that most closely follows the route of the Central European Transport Corridor (CETC) are the Baltic Sea-Adriatic Sea and part of Mediterranean Sea corridors.

The Baltic-Adriatic corridor runs through six Member States (Poland, the Czech Republic, Slovakia, Austria, Italy and Slovenia) and it connects the Baltic ports in Gdynia/Gdańsk and

Szczecin/Świnoujście with the Adriatic ports in Trieste, Venice, Ravenna and Koper. It is approx. 1 800 km long.

Possible routes between the basins of the Baltic Sea and the Adriatic Sea from north to south begin in ports in Szczecin and Świnoujście, through Poznań and Wrocław, or in ports in Gdynia and Gdańsk directly to Katowice or through Warsaw and Łódź. The corridor connects Polish urban and logistics core network hubs with hubs located in the Czech Republic, Slovakia and Austria, reaching Vienna via Bratislava or Ostrava. Road and rail corridor connections continue from Austria towards the ports of the Adriatic Sea: Koper, Trieste, Venice and Ravenna, via Ljubljana in Slovenia or via Udine, also running through Venice and Bologna in Italy.

The Baltic-Adriatic Corridor includes rail infrastructure approx. 4,200 km long, with a standard width of 1,435 mm. With the exception of two sections in Austria (Koralmbahn line, section Wettmannstätten-Grafensteen as part of the wider section Graz-Klagenfurt and Semmering Base Tunnel Gloggnitz-Mürzzuschlag), the corridor rail infrastructure is continuous and functioning.

The figure below shows the Baltic-Adriatic Corridor for rail traffic. The colours represent the volume of rail traffic on the given sections in 2014.

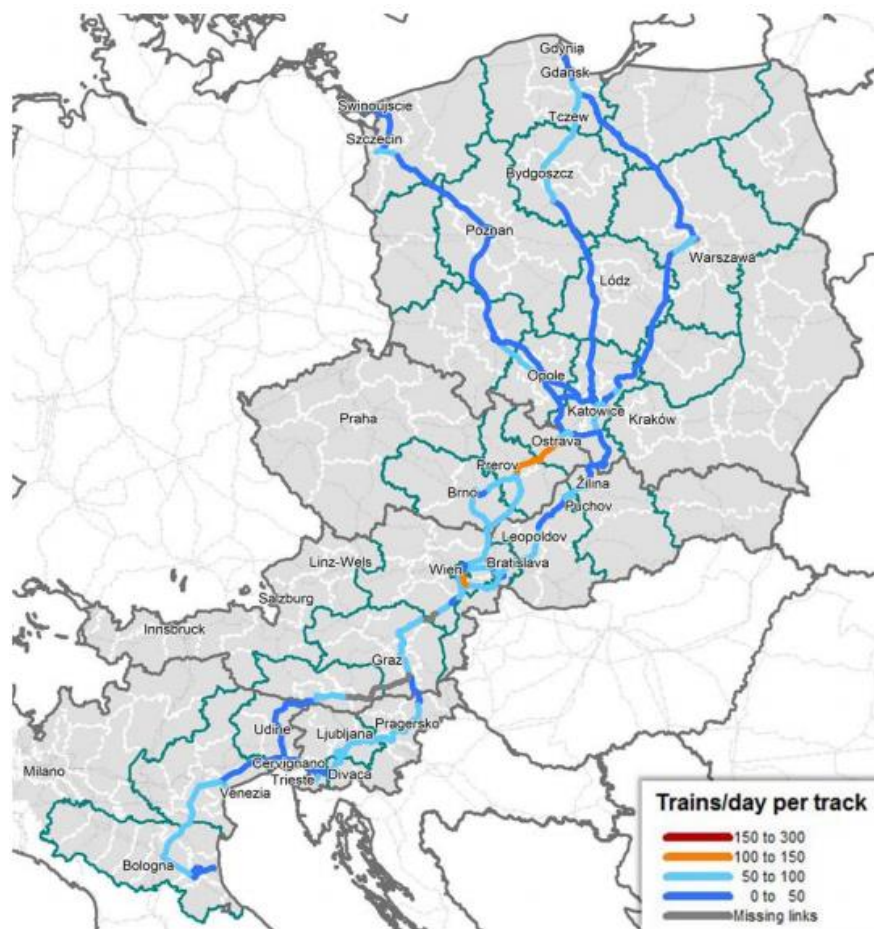


Figure 2 Baltic-Adriatic Corridor, rail transport

Source: consortium for the study of the Baltic-Adriatic corridor; based on data and sections from TENtec

Out of the areas analysed a part of this study, regions included in the TEN-T Corridor of the Baltic-Adriatic Corridor are:

- West Pomeranian, Lubusz and Lower Silesian Regions (Poland),

The other analysed regions located in Croatia (Primorje-Gorski Kotar and Varazdin County) and Hungary (Komitat Vas and Zala) are in direct influence of the Baltic-Adriatic Corridor established within the TEN-T network and are a direct alternative to the designated route of the Baltic-Adriatic Corridor.

The Mediterranean Corridor established within the TEN-T network also plays an important role for the development of the regions of Primorje-Gorski Kotar, Varazdin County and Komitat Vas and Zala. It runs through:

- Algeciras – Bobadilla – Madrid – Zaragoza – Tarragona
- Seville – Bobadilla – Murcia
- Cartagena – Murcia – Valencia – Tarragona
- Tarragona – Barcelona – Perpignan – Marseille/Lyon – Turin – Novara – Milan – Verona – Padua – Venice – Ravenna/Trieste/Koper – Ljubljana – Budapest
- Ljubljana/Rijeka – Zagreb – Budapest – UA border

(this alignment is specified in REGULATION (EU) No 1316/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2013 establishing the Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010)

The other TEN-T corridors are also important for the development of the analysed areas and for European transport in general. Uniform development of all planned corridors will create a coherent transport network, which will also benefit the regions analysed herein.

5. West Pomeranian, Lubusz and Lower Silesian Regions (Poland)

Data published by the Office of Rail Transport and Central Statistical Office of Poland, as well as materials and information gathered directly from managers and entities operating on the rail freight market were used to describe the situation on the territory of Poland.

5.1. Territorial Analysis

Three regions in the territory of Poland were analysed: the West Pomeranian (Zachodniopomorskie), Lubusz (Lubuskie) and Lower Silesian (Dolnośląskie) Regions (highlighted in colour on the map below). Those regions are located in the western part of the country and border with the Federal Republic of Germany and the Czech Republic; their western border constitutes also the state border.



Figure 3 Map of Poland with West Pomeranian, Lubusz and Lower Silesian regions highlighted in colour
Source: authors' own work

5.1.1. West Pomeranian Region

The West Pomeranian Region is located in the north-west of Poland; it borders on the west with Germany, in the south with the Lubusz and Greater Poland Regions, and in the east with the Pomeranian Region.

The region covers an area of 22,922.48 km² and according to 2018 data it was inhabited by about 1.7 million people, with the population density of 74.2 people/km².

In the region there are three city counties: Koszalin, Szczecin and Świnoujście; 18 land counties (powiat): Białogard, Choszczno, Drawsko, Goleniów, Gryfice, Gryfino, Kamień, Kołobrzeg, Koszalin, Łobez, Myślibórz, Police, Pyrzyce, Sławno, Stargard, Szczecinek, Świdwin, Wałcz; 11 urban municipalities, 55 urban-rural municipalities and 47 rural municipalities.

5.1.2. Lubusz Region

The Lubusz Region is located in the western part of Poland; it borders in the west with Germany, in the north with the West Pomeranian Region, in the east with the Greater Poland Region and in the south with the Lower Silesian Region.

The region covers an area of 19,946.74 km², which according to 2018 data was inhabited by about 1 million people and the population density was 73 people/km².

In the region there are two city counties: Gorzów Wielkopolski and Zielona Góra; 12 land counties (powiat): Gorzów, Krosno, Międzyrzecz, Nowa Sól, Słubice, Strzelce-Drezdenko, Sulęcín, Świebódzin, Wschowa, Zielona Góra, Żagań, Żary; 9 urban municipalities, 34 urban-rural municipalities and 39 rural municipalities.

5.1.3. Lower Silesian Region

The Lower Silesian Region is located in the south-western part of Poland; it borders in the west with Germany, in the north with the Lubusz Region, in the east with the Greater Poland Region, in the south-east with the Opole Region and in the south with the Czech Republic.

The region covers an area of 13,987.93 km², which according to 2018 data was inhabited by about 2.9 million people and the population density was 146 people/km².

In the region there are four city counties: Wrocław, Legnica, Jelenia Góra and Wałbrzych; 26 land counties (powiat): Bolesławiec, Dzierżoniów, Głógów, Góra, Jawor, Jelenia Góra, Kamienna Góra, Kłodzko, Legnica, Lubań, Lubin, Lwówek Śląski, Milicz, Oleśnica, Oława, Polkowice, Strzelin, Środa Śląska, Swidnica, Trzebnica, Wałbrzych, Wołów, Wrocław, Ząbkowice Śląskie, Zgorzelec, Złotoryja; 35 urban municipalities, 56 urban-rural municipalities and 78 rural municipalities.

5.2. Economy

In 2018 the weight of goods transported by rail in Poland did not increase; however, the structure of the groups of goods transported changed. Intermodal transport, carried out by a larger number of rail carriers, gained relevance. Some carriers also provided transport services which involved taking over part of the load from another railway operator on a commercial route.

In 2018, the following groups of goods had the largest share in rail transport in Poland in terms of transport weight:

- black coal, lignite, oil and natural gas – 39.2% (over 98 million tonnes);
- metal ores and other mining products (including iron ore and aggregate, sand, gravel and clay) – 28.3% (70.7 million tonnes);
- coke, briquettes, refined petroleum products, gases produced by industrial methods – 11.2% (28 million tonnes).

In total, these three groups accounted for over 78.6% of the cargo transported by rail carriers in Poland in 2018.



In terms of the mass of transported loads, the most significant increase was recorded in the metal ore group and mining products – by over 8.4 million tonnes, with the aggregate subgroup noting an increase of 9 million tonnes and iron ore – nearly 0.5 million tonnes; there was a decline in other subgroups.

The next groups of goods, whose absolute transport weight increased in comparison to the previous year, were: black coal, lignite, oil and natural gas (by 0.9 million tonnes), as well as metals and metal products (0.8 million tonnes). In total, the increase in mass as compared to 2017 amounted to over 10 million tonnes.

The data gathered by the Office of Rail Transport points also to the dynamic development of intermodal transport in 2018, with all its parameters increasing in comparison to 2017. Data analysis shows a growing interest in intermodal transport. In 2017 there were 18 entities providing intermodal transport services, in 2018 the number reached 21. Compared to all freight companies, this is still not much. It should be noted, however, that in 2012 there were only 9, and in 2016 – 13 entities.

In 2018, around 17 million tonnes of cargo were transported via intermodal transport, while in 2017 it reached 14.7 million tonnes. This means an increase of 2.3 million tonnes (about 15.6%). Thus, the share of intermodal transport in the rail transport market measured by the weight of transported cargo reached 6.8% and was higher by 0.7 percentage point than in 2017.

5.2.1. West Pomeranian Region

Information and data presented below come from the document called Development Strategy of the West Pomeranian Region until 2030 (Strategia Rozwoju Województwa Zachodniopomorskiego do roku 2030).

The factors affecting the economy of the region are: border and coastal location, development potential of the main centres and their functional areas – the Szczecin Metropolitan Area and the Koszalin-Kołobrzeg-Białogard Functional Area with attractive investment areas for the location of new enterprises and industrial processing concentrated mainly in economic activity zones. The high economic activity of the inhabitants means that West Pomerania has a good starting position for development in the Baltic Sea region and the macroregion of Western Poland. Specific natural conditions determine the development of certain areas of the economy, especially those based on the blue economy, covering all activities related to maritime economy (manufacturing activities and related transport branches) and the green economy, aimed at improving the quality of human life while reducing threats to the natural environment, including tourism, agriculture and forestry, producing energy from renewable sources – which are in all aspects different than the same industries in the rest of the country.

The fall of many industrial plants important for the region's economy, including the Szczecin Shipyard, meant that at the beginning of the 21st century Western Pomerania was the slowest-developing Polish region. In 2000, the GDP per capita in the region was equal to the national average, while in 2013 it constituted only 84%. Only in 2014 the increase in GDP in the region was the 3rd highest in the country.



Investment per capita in West Pomeranian Region is one of the lowest in Poland. The amount of investment, especially low in the private sector, is one of the major challenges for the local governments of West Pomerania and an area that could potentially be subject to public intervention.

The development of the region's economy depends to a large extent on properly functioning transport, especially on the transport crossing land-sea borders. The region is seriously affected by poor intra-regional and interregional transport accessibility (which has already been pointed out in national documents), caused by the peripheral location relative to the capital and other national regions. At the same time, access to major European growth centres is one of the best in Poland.

In recent years, transshipments of Polish ports have been growing dynamically. This also applies to the Szczecin-Świnoujście port complex, whose cargo segment has been steadily improving its performance. In 2017, about 25.4 million tonnes of cargo (including the unladen weight of cargo units) were reloaded at the ports of Szczecin and Świnoujście. In connection with the fact that the investments related to the deepening of the fairway up to 12.5 m are entering the implementation stage and projects related to the construction or modernization of the shore access infrastructure are under way, the development of the port complex will continue to accelerate. The port in Świnoujście plays the leading role in ferry transport (mainly due to the short distance to Swedish Skåne). The ferry traffic in this port constitutes 2/3 of Polish ferry traffic in the north-south direction. The region has the most convenient system of inland waterways in Poland, connecting the ports of the Oder estuary with European Union countries, especially with Germany. However, the current state of hydrotechnical facilities as well as the infrastructure crossing the Oder Waterway (road and rail bridges) do not allow to fully use the Oder's potential for transport to the south of the country.¹

The West Pomeranian Region has various investment areas, including ones with the status of a special economic zone, which are:

- Pomeranian Special Economic Zone,
- Słupsk Special Economic Zone,
- Kostrzyn-Słubice Special Economic Zone,
- Mielec Special Economic Zone.

¹ Strategia Rozwoju Województwa Zachodniopomorskiego do roku 2030.

Table 1 Economic zones operating in the West Pomeranian Region

| Pomeranian Economic Zone |
|---|
| <p>Special Economic Zone, with 35 subzones. It operates in the Pomeranian, Kuyavian-Pomeranian, West Pomeranian, Greater Poland and Lublin Regions, and it covers an area of 2246.2929 ha.</p> <p>In the West Pomeranian Region there are:</p> <ul style="list-style-type: none"> - Subzone Stargard, in the municipality of Stargard, with an area of 586.2502 ha, - Subzone Police, in the municipality of Police, with an area of 50.9674 ha. |
| Słupsk Economic Zone |
| <p>Special Economic Zone, with 15 subzones. It operates in the Pomeranian and West Pomeranian Regions, and it covers an area of 816.7878 ha.</p> <p>In the West Pomeranian Region there are:</p> <ul style="list-style-type: none"> - Subzone Kalisz Pomorski, in the municipality of Kalisz Pomorski, with an area of 9.3866 ha, - Subzone Karlinko, in the municipality of Karlino, with an area of 180.0846 ha, - Subzone Koszalin, in the municipality of Koszalin, with an area of 105.0450 ha, - Subzone Laski Koszalińskie, in the municipality of Biesiekierz, with an area of 17.5800 ha, - Subzone Polanów, in the municipality of Polanów, with an area of 37.0116 ha, - Subzone Szczecinek, in the municipality of Szczecinek, with an area of 95.5132 ha, - Subzone Tychowo, in the municipality of Tychowo, with an area of 5.0448 ha, - Subzone Wałcz, in the municipality of Wałcz, with an area of 56.7961 ha. |
| Kostrzyn-Słubice Economic Zone |
| <p>Special Economic Zone, with 29 subzones. It operates in the Lubusz, West Pomeranian and Greater Poland Regions, and it covers an area of 1868,0492 ha.</p> <p>In the West Pomeranian Region there are:</p> <ul style="list-style-type: none"> - Subzone Barlinek, in the municipality of Barlinek, with an area of 33.75 ha, - Subzone Białogard, in the municipality of Białogard, with an area of 514.4 ha, - Subzone Dębno, in the municipality of Dębno, with an area of 3.66 ha, - Subzone Goleniów, in the municipality of Goleniów, with an area of 64.78 ha, - Subzone Gryfino, in the municipality of Gryfino, with an area of 57.59 ha, |

- Subzone Kamień Pomorski, in the municipality of Kamień Pomorski, with an area of 44.8 ha,
- Subzone Karlino, in the municipality of Karlino, with an area of 56.26 ha,
- Subzone Łobez, in the municipality of Łobez, with an area of 24.19 ha,
- Subzone Nowogard, in the municipality of Nowogard, with an area of 20.19 ha,
- Subzone Pelczyce, in the municipality of Pelczyce, with an area of 23.14 ha.

Mielec Economic Zone

The oldest Special Economic Zone in Poland, created in 1995. It operates in the Lublin, Lesser Poland, Subcarpathian, Silesian and West Pomeranian Regions and covers an area of 1362.9864 ha.

In the West Pomeranian Region there is:

- Subzone Szczecin, within the municipality of Szczecin, with an area of 93.8439 ha.

Source: authors' own work

There are also institutions supporting operating companies in the West Pomeranian Region:

- Chambers of Commerce:
 - Northern Chamber of Commerce,
 - Scandinavian-Polish Chamber of Commerce in Szczecin,
 - Koszalin Chamber of Commerce and Industry.
- Business associations and centres:
 - West Pomeranian Regional Development Agency,
 - Association of Polish Municipalities of the "Pomerania" Euroregion,
 - Business Center in Koszalin.
- Business incubators:
 - Academic Business Incubator of the University of Szczecin,
 - business incubator at the Szczecin Centre for Enterprise and consulting centres, e.g. the Polish Entrepreneurs Foundation.
- Others:
 - Regional Centre for Innovation and Technology Transfer in Szczecin,
 - Koszalin Regional Development Agency,
 - West Pomeranian Centre for Advanced Technologies in Szczecin,
 - Innovation and Entrepreneurship Center foundation in Koszalin.

5.2.2. Lubusz Region

Despite the systematic increase in the value of GDP per capita in consecutive years and good growth dynamics, its level expressed as a percentage to the national average over the years 2012-2017 slightly decreased, and the region's contribution to the national GDP was relatively low. The situation in the Gorzów and Zielona Góra subregions is not significantly differentiated. The value of GDP per capita in 2017 was 57% of the EU average, with the average for Poland at 70%.

The region is favourably located at the border with Germany, which is the most important trade partner of the Lubusz Region. Almost 50% of goods and services exported by Lubusz companies go to the German market. Other important export destinations are Italy, the Netherlands and Denmark. Cross-border economic links with Brandenburg are not fully utilized. The investment attractiveness of the region is confirmed by the significant share of entities with foreign capital. Entrepreneurship is developing strongly in the urban centres; significant numbers of economic entities can be located especially in Zielona Góra and Gorzów Wielkopolski. The micro-enterprise sector employing up to nine people is definitely dominating in the region – they constitute almost 96% of all registered entities. The number of large enterprises employing over 1,000 people is small (8 in 2018). In recent years, the role of industry in the Lubusz economy has clearly increased. The high share of industry in gross value added creates a good basis for strengthening this sector in the regional economy for each of the developing industries. The leading industry in the Lubusz economy is the production for the automotive industry, followed by the wood, food and paper industries, the production of metal products and the production of machinery and equipment, as well as furniture. Almost ¾ of industrial production is exported (74.3% in 2017), and export in the Lubusz Region has been continuously higher than import since 2010. The services sector is dominated by trade and repair of motor vehicles, real estate and transport services as well as warehouse management. The main economic centres are the four largest cities of the region: Gorzów Wielkopolski, Zielona Góra, Żary and Nowa Sól.²

There are two special economic zones in the Lubusz Region:

- Kostrzyn-Słubice Special Economic Zone,
- Wałbrzych Special Economic Zone „INVEST-PARK”

Table 2 Economic zones in the Lubusz Region

| Kostrzyn-Słubice Economic Zone |
|--|
| <p>Special Economic Zone, with 29 subzones. It operates in the Lubusz, West Pomeranian and Greater Poland Regions, and it covers an area of 1868,0492 ha.</p> <p>In the Lubusz Region there are:</p> <ul style="list-style-type: none"> - Subzone Bytom Odrzański, in the municipality of Bytom Odrzański, with an area of 13.27 ha, - Subzone Czerwieńsk, in the municipality of Czerwieńsk, no data as to the area of the subzone, - Subzone Dobiegniew, in the municipality of Dobiegniew, with an area of 7.5 ha, - Subzone Drezdenko, in the municipality of Drezdenko, with an area of 7 ha, - Subzone Gorzów Wielkopolski, in the municipality of Gorzów Wielkopolski, with an area of 86.49 ha, |

² Strategia Rozwoju Województwa Lubuskiego 2030 – projekt.

- Subzone Gubin, in the municipality of Gubin, with an area of 8.57 ha,
- Subzone Kargowa, in the municipality of Kargowa, no data as to the area of the subzone,
- Subzone Kostrzyn, in the municipality of Kostrzyn nad Odrą, with an area of 226.63 ha
- Subzone Koźuchów, in the municipality of Koźuchów, with an area of 27 ha,
- Subzone Krosno Odrzańskie, in the municipality of Krosno Odrzańskie, no data as to the area of the subzone,
- Subzone Lubsko, in the municipality of Lubsko, with an area of 40 ha,
- Subzone Międzyrzecz, in the municipality of Międzyrzecz, with an area of 11.50 ha,
- Subzone Rzepin, in the municipality of Rzepin, with an area of 4.52 ha,
- Subzone Skwierzyna, in the municipality of Skwierzyna, with an area of 12 ha,
- Subzone Słubice, in the municipality of Słubice, with an area of 169.78 ha,
- Subzone Strzelce Krajeńskie, in the municipality of Strzelce Krajeńskie, with an area of 14.5 ha,
- Subzone Sulechów, in the municipality of Sulechów, with an area of 44.0383 ha,
- Subzone Sulęcín, in the municipality of Sulęcín, with an area of 10 ha,
- Subzone Zielona Góra, in the municipality of Zielona Góra, with an area of 57 ha.

Wałbrzych Economic Zone „INVEST-PARK”

Special Economic Zone, with 51 subzones, is the largest of the 14 special economic zones in Poland. It operates in the Lower Silesian, Opole, Greater Poland and Lubusz Regions, and it covers an area of 3500 ha.

In the Lubusz Region there are:

- Subzone Szprotawa, in the municipality of Szprotawa, with an area of 34.40 ha,
- Subzone Świebodzin, na terenie gminy Świebodzin, with an area of 5.8 ha.

Source: authors' own work

5.2.3. Lower Silesian Region

Information and data presented below come from the document called Development Strategy of the Lower Silesian Region until 2030 – project (Strategia Rozwoju Województwa Dolnośląskiego do roku 2030 – projekt).

In 2015, the GDP in the Lower Silesian Region amounted to PLN151,668 million, which constituted 8.4% of the value for the whole country and gave it the 4th place among Polish regions. Compared to 2010, the total GDP increased by 23%. However, since this trend was also characteristic of the entire country (an increase of 24.5%), it meant that the region's share in the state's GDP did not increase. On the other hand, the GDP per capita in the region was higher than the national average both in 2010 and 2015, amounting to 112.7% and 111.6% respectively. Within the intra-regional structure, the city of Wrocław had the highest GDP per capita (164.5% of the average value for Lower Silesia), and the lowest GDP per capita was recorded in the Wałbrzych subregion (73.7%). In the years 2010-

2015, the majority of subregions noted a significant (similar to or higher than the average value in the country – amounting to 24.7%) GDP per capita increase: Wrocław (by 39.4%), the city of Wrocław (31.9%), Jelenia Góra (24.9%) and Wałbrzych (23.3%). In the analysed period, only the Legnica-Głogów subregion had similar index values (an increase of only 0.9%).

At the same time, taking into account PPS, the GDP per capita in Lower Silesia constituted 76.4% of the European average (EU-28), which classified the region in the 2nd place in the country after the Masovian Region (109.3%). Compared to neighbouring regions, only Saxony had a higher GDP value than Lower Silesia (93% of the EU-28 average), and other regions recorded a lower value: Hradec Králové (76%), Greater Poland (75%), Pardubice (70%), Liberec and Olomouc (67% each), Lubusz (57%) and Opole (55%).

In 2016, over 361.3 thousand entries were made into the REGON register in Lower Silesia. There were 1244 economic entities per 10,000 people in the Lower Silesian Region entered into the REGON register, i.e. above the national average of 1103.

In terms of industry structure, the largest number of Lower Silesian enterprises conducted business in wholesale and retail trade and repair of motor vehicles (23.2%). In 2016, new entities were mainly registered in the following sections: trade, repair of motor vehicles, construction, as well as professional, scientific and technical activities.³

There are four special economic zones in the Lower Silesian Region:

- Wałbrzych Special Economic Zone "INVEST - PARK",
- Kamienna Góra Special Economic Zone for Small Entrepreneurship,
- Legnica Special Economic Zone (LSSE),
- Tarnobrzeg Special Economic Zone.

Table 3 Economic zones operating in the Lower Silesian Region

| Wałbrzych Special Economic Zone "INVEST - PARK" |
|---|
| <p>Special Economic Zone, with 51 subzones, is the largest of the 14 special economic zones in Poland. It operates in the Lower Silesian, Opole, Greater Poland and Lubusz Regions, and it covers an area of 3500 ha.</p> <p>In the Lower Silesian Region there are:</p> <ul style="list-style-type: none"> - Subzone Wałbrzych, in the municipality of Wałbrzych, with an area of 203.42 ha, - Subzone Nowa Ruda, in the municipality of Nowa Ruda, with an area of 29.18 ha, - Subzone Kłodzko, in the municipality of Kłodzko, with an area of 17 ha, |

³ Strategia Rozwoju Województwa Dolnośląskiego 2030- projekt.

- Subzone Dzierżoniów, in the municipality of Dzierżoniów, with an area of 79.42 ha,
- Subzone Żarów, in the municipality of Żarów, with an area of 118.29 ha,
- Subzone Jelcz-Laskowice, in the municipality of Jelcz-Laskowice, with an area of 61 ha,
- Subzone Kudowa-Zdrój, in the municipality of Kudowa Zdrój, with an area of 8.44 ha,
- Subzone Świdnica, in the municipality of Świdnica, with an area of 148.98 ha,
- Subzone Wrocław, in the municipality of Wrocław, with an area of 189 ha,
- Subzone Oława, in the municipality of Oława, with an area of 178.96 ha,
- Subzone Strzelin, in the municipality of Strzelin, with an area of 13.46 ha,
- Subzone Strzegom, in the municipality of Strzegom, with an area of 9.8 ha,
- Subzone Brzeg Dolny, in the municipality of Brzeg Dolny, with an area of 43.92 ha,
- Subzone Bolesławiec, in the municipality of Bolesławiec, with an area of 39.91 ha,
- Subzone Wiązów, in the municipality of Wiązów, with an area of 4.67 ha,
- Subzone Wołów, in the municipality of Wołów, with an area of 11.2 ha,
- Subzone Ząbkowica, in the municipality of Ząbkowice Śląskie, with an area of 6.39 ha,
- Subzone Syców, in the municipality of Syców, with an area of 9.79 ha,
- Subzone Świebodzice, in the municipality of Świebodzice, with an area of 1.3 ha,
- Subzone Bystrzyca Kłodzka, in the municipality of Bystrzyca Kłodzka, with an area of 11 ha,
- Subzone Twardogóra, in the municipality of Twardogóra, with an area of 4.39 ha,
- Subzone Góra, in the municipality of Góra, with an area of 15 ha,
- Subzone Bielawa, in the municipality of Bielawa, with an area of 12 ha,
- Subzone Oleśnica, in the municipality of Oleśnica, with an area of 22.08 ha,
- Subzone Kobierzyce, in the municipality of Kobierzyce, with an area of 84 ha,
- Subzone Jawor, in the municipality of Jawor, with an area of 420 ha,
- Subzone Dobromierz, in the municipality of Dobromierz, with an area of 78.20 ha,
- Subzone Wądroże Wielkie, in the municipality of Wądroże Wielkie, with an area of 79.64 ha.

Kamienna Góra Special Economic Zone for Small Entrepreneurship

Kamienna Góra Special Economic Zone for Small Entrepreneurship operates in the Lower Silesian and Greater Poland Regions in the area of 540.83 ha in the following cities: Jawor, Jelenia Góra, Kamienna Góra, Mirsk, Lubań, Lwówek Śląski, Ostrów Wielkopolski, Piechowice, Zgorzelec and in the municipalities of: Gryfów Śląski, Janowice Wielkie, Kamienna Góra, Lubawka, Nowogrodzic, Prusice, and Żmigród

Legnica Special Economic Zone (LSSE)

Special Economic Zone, with 18 subzones, located in the central part of the Lower Silesian Region, covers an area of 1200 ha.

Subzones of the Legnica Economic Zone:

- Subzone Legnica, in the municipality of Legnica, with an area of 20.60 ha,
- Subzone Polkowice, in the municipality of Polkowice, with an area of 72.16 ha,
- Subzone Krzywa, in the municipality of Krzywa, with an area of 52.26 ha,
- Subzone Lubin, in the municipality of Lubin, with an area of 12.08 ha,
- Subzone Legnickie Pole, in the municipality of Legnickie Pola, with an area of 19.71 ha.
- Subzone Środa Śląska, in the municipality of Środa Śląska, with an area of 2.19 ha,
- Subzone Chojnów, in the municipality of Chojnów, with an area of 5.47 ha,
- Subzone Głogów, in the municipality of Głogów, with an area of 11.51 ha,
- Subzone Prochowice, in the municipality of Prochowice, with an area of 8.09 ha,
- Subzone Przemków, in the municipality of Przemków, with an area of 7.08 ha,
- Subzone Środa Śląska-Miękinia, in the municipality of Środa Śląska and Miękinia, with an area of 454.60 ha,
- Subzone Okmiany, in the municipality of Chojnów, with an area of 91.78 ha,
- Subzone Kostomłoty, in the municipality of Kostomłoty, with an area of 80.43 ha,
- Subzone Miłkowice, in the municipality of Miłkowice, with an area of 31.57 ha,
- Subzone Zgorzelec, in the municipality of Zgorzelec, with an area of 70.59 ha,
- Subzone Iłowa, in the municipality of Iłowa, with an area of 52.83 ha,
- Subzone Wilków, in the municipality of Świdnica, with an area of 16.98 ha,
- Subzone Zgorzelec, in the municipality of Zgorzelec, with an area of 70.5 ha.

Tarnobrzeg Special Economic Zone

Special Economic Zone, with 20 subzones. It operates in the Subcarpathian, Lesser Poland, Świętokrzyskie, Masovian, Lower Silesian, Podlaskie and Lublin Regions and covers an area of 1632 ha.

In the Lower Silesian Region there are:

- Subzone Wrocław-Kobierzyce which have investment areas of about 410,6 ha.

Source: authors' own work

5.3. National legal conditions for rail transport

The process of creating documents determining the rules for the use of railway infrastructure, its management, maintenance and modernization took many years and resulted in the creation of a

large number of legal provisions, which are being constantly updated to meet the challenges and threats.

All documents regulating the area of rail transport may be divided into national and international legal provisions. National law is made up of acts, regulations and resolutions, while international legal acts include international conventions and agreements, as well as EU regulations and directives.

The supreme national law, strictly applicable to rail transport, is the Act of 23 March 2003 on rail transport (Journal of Laws Dz. U. 2003, No. 86, item 789). This document regulates matters in the field of:

- creating, maintaining, managing and operating railway infrastructure,
- the mode of organizing rail traffic and carrying out passenger and freight transport,
- principles of using rolling stock on railways,
- ways of investing in railway infrastructure and acquiring real estate,
- protecting the rights of persons using this transport mode.

In addition to the Act on rail transport, the national legal acts regulating the issue of transport of goods by rail include:

- Act of 16 December 2010 on public collective transport (Journal of Laws Dz. U. 2011, No. 5, item 13),
- Act of 19 August 2011 on the transport of dangerous goods (Journal of Laws Dz. U. 2011, No. 227, item 1367),
- Act of 16 December 2005 on the Railway Fund (Journal of Laws Dz. U. 2005, No. 12 item 61, as amended),
- Act of 16 December 2005 on financing of land transport infrastructure (Journal of Laws Dz. U. 2005, No. 267, item 2251),
- Act of September 8, 2000 on the commercialization, restructuring and privatization of a state-owned enterprise „Polskie Koleje Państwowe” (Journal of Laws Dz. U. 2000, No. 84 item 948, as amended).

5.4. Railway infrastructure

Transport is one of the most important sectors of the national economy and a significant element of the national security system. The transport system consists of six basic types of transport: road, rail, air, pipeline, maritime and inland waterway. The volume of transport is measured by means of two basic indicators: the mass of goods transported (in tonnes) and transport performance (expressed in tonne-kilometers).

Efficient and effective rail infrastructure strengthens the role of rail transport in the integrated transport system by increasing competitiveness against other modes of transport. The National Railway Program up to 2023 regarding rail infrastructure managed by PKP Polskie Linie Kolejowe S.A.

is a continuation of the Multi-Annual Railway Investment Program until 2015. Poland received a declaration of railway support from the EU budget in the 2014-2020 span in the amount of PLN 42.8 billion. The financing of investments related to railway infrastructure will take place within the framework of national resources (state budget and Railway Fund) and EU funds (Cohesion Fund, European Regional Development Funds, Regional Operational Programs).

Railway lines which are part of the international rail transport corridor E59 on the section Świnoujście-Szczecin-Bierzwnik and CE59 on the section Szczecin-Namyślin go the areas of West Pomeranian, Lubusz and Lower Silesian Regions.

On 10 November 2015, two freight corridors running through Poland were launched: freight corridor No. 5 Baltic Sea-Adriatic Sea on the north-south axis and latitudinal freight corridor No. 8 North Sea-Baltic Sea. Thus, Poland joined the group of countries which have operating freight corridors.

Freight corridors are a European venture which aims to increase the attractiveness of rail transport relative to other modes of transport. The obligation to implement them was imposed on Poland by Regulation (EU) No. 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight.

5.4.1. West Pomeranian Region

The coastal location of the region and the existence of transport routes of international importance determine the development of the region and the arrangement of external rail connections. In the West Pomeranian Region rail lines of fundamental importance are included in the main international rail lines of the Trans-European Transport Network. E59 and CE59 main lines are covered by the European agreement AGC on the main international rail lines and the European agreement AGTC55 on the main international combined freight lines.

The E-59 line consists of two sections: Świnoujście-Szczecin Dąbie and Szczecin-Poznań-Wrocław and the AGTC CE-59 system includes the sections of the line: Świnoujście -Szczecin (which overlaps with the AGC system) and the line Szczecin-Kostrzyn-Zielona Góra-Wrocław.

The AGC and AGTC lines form a land-sea transport link to Ystad, Malmö and Copenhagen. The conditions for the strategy of the West Pomeranian Region in the regional transport development, which imply cross-border cooperation, arise from the fact that inter-regional lines intersect within its territory, which results from the transit location and the need to ensure the Euroregion's transport coherence.

The main supra-regional rail lines running through the "Pomerania" Euroregion are:

a) on the north-south axis:

- Malmö – Sassnitz – Stralsund – Grimmen – Neubrandenburg – Berlin,
- Malmö/Ystad – Świnoujście – Szczecin – Kostrzyn – Zielona Góra – Wrocław,
- Malmö/Ystad – Świnoujście – Szczecin – Stargard Szczeciński – Poznań

b) on the west-east axis:

- Hamburg – Schwerin – Neubrandenburg – Pasewalk – Szczecin – Poznań,
- Berlin – Eberswalde – Szczecin – Koszalin – Gdańsk.

The requirements for the region's communication integration indicate it is necessary to improve the rail and point infrastructure of rail transport to ensure an appropriate level of its modernization and adaptation to relevant parameters. Further development of railway connections from Szczecin to Hamburg, Lubeck and Bremen is anticipated. Świnoujście has been connected by a railway line with the railway network on the island of Usedom.

The following entities manage the rail transport:

- The infrastructure manager is PKP Polskie Linie Kolejowe S.A. (PKP PLK S.A.), which manages the network of railway lines and is responsible for maintaining and modernizing the railway infrastructure. The planning of the railway network development is the task of the Regional PKP PLK S.A. Branch in Szczecin, and infrastructure maintenance is managed by: Railway Infrastructure Office in Szczecin and Railway Infrastructure Office in Koszalin.
- PKP S.A. manages railway stations through two organizational units:
 - PKP S.A. Dorce Kolejowe in the management of the largest railway stations, which include: Szczecin Główny, Szczecin Dąbie, Stargard Szczeciński, Białogard, Koszalin, Kołobrzeg,
 - PKP S.A. Nieruchomości – Oddział Gospodarowania Nieruchomościami w Szczecinie, which manages the remaining railway stations.

In freight transport, PKP CARGO S.A. is the main entity on the rail market. Zakład Przewozów Towarowych Cargo S.A. in Szczecin operates freight border crossings with Germany (Szczecin Gumieńce/Grambow, Szczecin Gumieńce/Tantow) and Sweden (Świnoujście/Ystad), and also provides transport services to and from seaports in Szczecin, Świnoujście and Kołobrzeg.

In addition, the region has narrow gauge railway lines that require revitalization:

- Gryfice – Rewal – Trzebiatów – Gryfice,
- Koszalin – Manowo – Świeleno,
- Stargard Szczeciński – Stara Dąbrowa – Ińsko – Dobra.

The spatial arrangement of the region's railway network is special due to a high concentration of lines going towards the Szczecin agglomeration located in the western part of the region, directly at the border with Germany.

The main railway lines in the region are:

- E-59 (AGC) line Świnoujście - Poznań with a branch to Szczecin Główny, which includes lines:
 - No. 401: Świnoujście - Szczecin Dąbie, which is electrified and for the most part two-track. The line is adapted to a maximum speed of 120 km/h, with local speed limits. The average technical speed in passenger traffic is 98-99 km/h, and in freight traffic 63-66 km/h.
 - No. 351 - Szczecin Dąbie - Szczecin Główny - Poznań Główny. It is a two-track, electrified main line. The technical condition of the line is good. The line has the maximum speed of 140, 130 and 120 km/h. The average technical speed in passenger traffic is 115-120 km/h, and in freight traffic 85-90 km/h.
 - No. 857 which is 2.34 km long and allows direct trains from Poznań to Świnoujście to bypass the Szczecin Dąbie and Szczecin Główny stations.

In addition, the main line includes sections common with the CE-59 line, i.e. line No. 273 on the section Szczecin Główny - Szczecin Port Centralny and line No. 855 Szczecin - Port Centralny – Regalica, with a length of 0.878 km.

It can be stated that the parameters of the lines included in the E-59 line meet the requirement of the permissible load of 22.5 tons/axle. The reduction of permissible load occurs on the 401 Szczecin Dąbie - Świnoujście line.

- The CE-59 line (AGTC) Świnoujście - Wrocław, with a branch towards Szczecin-Główny and Port Centralny. The CE-59 main line comprises of lines:

- No. 273 Szczecin Port Centralny SPB - Wrocław Muchobór: double track, electrified, classified as a national line,

- No. 428 Szczecin Zdroje- Szczecin Podjuchy, 2.998 km long: single track, electrified, not classified as a national line.

The CE-59 Wrocław-Szczecin line has low traffic parameters, caused by the following factors: the average age of rails and railroad ties is about 23-25 years; poor technical condition of the railway surface, level crossings and engineering structures. As a consequence, the train timetable speed is reduced on this line. Work is underway to modernize the line.

- No. 202 Gdańsk Główny - Stargard Szczeciński – national line, electrified, single-track on the section from Runowo Pomorskie to the border of the region, and double-track on the section from Stargard Szczeciński to Runowo Pomorskie. Regional, inter-regional and Inter City trains run on the line, there are speed limits for trains.

- No. 402 Koszalin – Goleniów – a railway line in the north-west of Poland connecting Koszalin with Goleniów through Kołobrzeg, Gryfice and Nowogard. Entirely located in the West Pomeranian Region and in the area of the Regional Branch of PKP PLK in Szczecin. Single-track line, electrified since October 29, 1988 only on the Koszalin-Kołobrzeg section. Open throughout.

- No. 403 Piła Północ – Ulikowo - single track, non-electrified. The surface has been replaced on the section:

- Recz Pomorski - Tarnowo Pomorskie,

- Prostynia - Ulikowo,

timetable speed 100 km/h,

- No. 404 Szczecinek – Kołobrzeg – single track, electrified and adapted to train speeds of 70-100 km/h. Regional and inter-regional trains run on the line. The line is characterized by large passenger flows, especially during the summer season.

- No. 409 Szczecin Gumieńce – State Border (towards Berlin; it is the Polish section of the Szczecin - Berlin line), is a single-track and non-electrified line. The speed of freight trains is 70 km/h.

- No. 408 Szczecin Gumieńce – State Border/Grambow is a single-track, non-electrified line. The speed of freight trains is 60 km/h.

In addition to the lines which are part of the E-59 and CE-59 lines, the 202 railway line in the Szczecin - Koszalin - Gdańsk rail route is of great significance, since it is part of the corridor and Rail Baltica development strategy.

5.4.2. Lubusz Region

The Lubusz Region has a developed railway network which can be accessed by most urban centres. It should be stipulated, however, that this access varies greatly depending on the technical condition of

the railway infrastructure. A number of sections are of local significance only and despite their formal existence in the infrastructure manager's registers (PKP PLK, i.e. those contained in: Instruction Id-12 - list of lines managed by PKP PLK S.A), some of them are currently not in operation. On the other hand, some lines passing through the region are of supra-regional or even international importance, being part of the Trans-European Transport Network (TEN-T) corridors. Two of them are included in the TEN-T core network:

- E 20 (No. 3), connecting, among others centres such as Słubice, Świebodzin (seats of counties) and Zbąszynek with Poznań (from the east) as well as Frankfurt (Oder) and Berlin (from the west);
- E 59 (No. 351, Poznań-Szczecin), running through a small fragment in the north-eastern part of the province (the municipalities of Dobiegniew and Drezdenko), connected to the other network of the region through the junction in Krzyż, located in the Greater Poland Region.

The C-E 59 line (No. 273, the so-called "Nadodrzancka") is part of the comprehensive TEN-T network, connecting, among others, Zielona Góra (the capital of the region and its most attractive labour market), Nowa Sól (seat of the county) and Kostrzyn nad Odrą with Wrocław (from the south-east) and Szczecin (from the north). It is also important from the point of view of international freight. It is the north-west arm of No. 5 Baltic-Adriatic corridor, which is part of the pan-European rail freight transport network – Rail Freight Corridors (RFC) coordinated by the association of European infrastructure managers RailNetEurope (RNE). The line enables connections between the port complex of Szczecin and Świnoujście and the south of Europe, including Adriatic ports in Venice, Trieste and Koper. In the Lubusz Region, near the Rzepin railway junction, the C-E 59 line crosses the freight No. 8 North Sea-Baltic corridor (line E20).

Interconnections between the centres within the region are also provided by lines of lower categories, including numerous non-electrified single-track sections. Two main cities of the region – and at the same time the two largest labour markets – Zielona Góra and Gorzów Wielkopolski are connected by the sections of railway lines: No. 273 (Zielona Góra - Czerwieńsk), No. 436 (new route in Czerwieńsk South - Czerwieńsk East), No. 358 (Czerwieńsk - Sulechów - Zbąszynek) and No. 367 (Zbąszynek - Międzyrzecz - Gorzów Wielkopolski). Gorzów Wielkopolski itself is located on a two-track non-electrified line No. 203, running from the junction station in Krzyż in the direction of Kostrzyn nad Odrą and further Berlin. The third important urban area, consisting of Żary and Żagań, is connected to the central part of the region by two parallel single-track lines - No. 370 (Żary - Zielona Góra) and No. 371 (Żagań - Nowa Sól; currently not in use). Both cities are connected by a two-track (between Żagań and Sieniawa Żarska) non-electrified line No. 14, which runs from Głogów in the Lower Silesian Region to the border station Zasieki/Forst.

In freight traffic, the region plays mostly a transit role. In 2015, corridor lines (E 20, E 59 and C-E 59) and lines No. 203 and 358 had a traffic volume of 15-50 trains a day, with the heaviest traffic (30-50 trains) on "Nadodrzancka" – on the section from the border of the region to Czerwieńsk, where the streams were separated (Fig. 4.12). Some transport is directed in Czerwieńsk to line No. 358 leading towards the border station Gubin. This is the section used only for freight traffic.

The analysis of changes in the volume of freight traffic shows a decreasing capacity of the C-E 59 main line as a result of decapitalization. However, an average decline of several trains per day does

not mean that the line has lost its importance as a freight corridor. At the same time, the E 20 line has been gaining importance, with an average increase in traffic of 2.5-10 trains; this has been the most apparent on the border section between Rzepin and Frankfurt (Oder).

It is directly related to the development of international intermodal connections (including Far East - Western Europe transport), which on the E 20 line reach the highest level in the country, exceeding 30 trains a week. This has been favoured by the location of several intermodal terminals in the vicinity of Poznań. With this type of transport becoming increasingly popular, it would also be advisable to open a new terminal in Rzepin – the node connecting the E 20 main line with "Nadodrzanek", which also services intermodal trains.

5.4.3. Lower Silesian Region

There are many sections of the rail network out of service or decommissioned in Lower Silesia, which can be revitalized or rebuilt. The total length of closed or decommissioned railway lines amounts to over 930 km, most of which maintain spatial and often surface continuity. The rail network of the Lower Silesian Region includes railway lines of international importance. The length of the railway lines along the AGC line is 268.7 km, and AGTC – 355.4 km (sections of the AGC line not included), which makes the total length of the AGTC railway lines of 526.5 km. The total length of the AGC and AGTC railway lines amounts to 624.1 km of national lines and there are also 24 other local (regional) lines. It should be emphasized that the Lower Silesian Region is one of the pioneers in taking over disused railway lines. The region's local government has taken over, renovated and launched regular rail transport on two local rail lines: No. 326 Wrocław Zakrzów –Trzebnica and line No. 311 on the section Szklarska Poręba Górna – State Border (Harrachov).

There are currently seven railway border crossings in the region. From the region's perspective, the most important lines constituting the transport backbone of the region are: E30, 274, 137, 289 and 276. Lines 271 and 273 may be slightly less important in regional transport, but still significant in national and international transport. The technical condition of the lines can be described as sufficient and significant improvements have been seen in recent years. The basic problems of railway infrastructure in Lower Silesia are: poor technical condition of the track surface and engineering facilities, a large number of local speed restrictions, insufficient capacity of railway lines, especially in agglomeration areas, track works (in particular modernization works), which are time-consuming and constitute a nuisance for passengers. The international E30 main line running from Opole through Wrocław and Legnica to Zgorzelec has the best technical parameters, with passenger trains allowed to travel at speeds up to 160 km/h. Lines from Wrocław towards Wałbrzych and Jelenia Góra and Głogów have worse technical parameters. The maximum speeds there vary wildly; on selected sections the permissible speed exceeds 100 km/h and on other amounts to 70-90 km/h. The situation seems even worse on secondary lines, where the speeds often do not exceed 40 km/h.

The highest design speeds are on railway lines from Wrocław towards: Oleśnica, Opole (through Oława), Poznań, Świebodzice, Zgorzelec (through Legnica) and Zielona Góra. Most of the listed sections of railway lines are part of the European TEN-T network.



The permissible axle load is another key factor for the movement of freight trains. Greater permissible axle load allows heavy freight trains to run, which is very important when transporting raw materials such as rock aggregates, metal ores, and black coal.

On most sections of the TEN-T network, on lines No. 143 and 281, and on the section of the railway line No. 274 the permissible load is 221 kN/axle, so these sections can service the heaviest freight trains in the region. On most other railway lines, the permissible load ranges from 196 kN/axle to 220 kN/axle. There are also sections with permissible axle load below 177 kN/axle, which are usually located on inactive lines. Low allowable axle load on some sections negatively affects the capacity of the line and limits the possibility of routing freight trains throughout the region.

The total length of electrified railway lines in the Lower Silesian Region is 1053 km, which constitutes almost 60% of all operating railway lines.

5.5. Intermodal terminals in Poland

In 2018, there were 37 terminals transshipping intermodal transport units in Poland:

- 6 ports: Gdynia, Gdańsk, Szczecin, Świnoujście;
- 25 domestic terminals, including:
 - 1 terminal located in Silesia, which connects standard gauge and broad gauge infrastructure PKP LHS (Euroterminal Sławków);
 - 3 terminals which were not operationally active in 2018 (OT Port Świnoujście, GCT - Gdynia Container Terminal, Lubelski Container Terminal - Drzewce);
 - 1 terminal which ceased operations in 2018 (Loconi Intermodal Poznań Górczyn).
- 6 border terminals – 5 on the border with Belarus and 1 on the border with Russia.

Intermodal terminals in Poland cover an area of approx. 490 ha. Their annual estimated capacity in 2018 was 8 547 720 TEU, including:

- ports represent a potential of 5,126,000 TEU (approx. 60.5%);
- border terminals located on the New Silk Road – 663 830 TEU (approx. 7.5%);
- domestic terminals – 2 757 890 TEU (approx. 32.5%).

The supply of intermodal terminal loading space in 2018 stood at 170,949 TEU, of which ports were at 97,000 TEU, border terminals – 16,300 TEU and domestic terminals – 57,649 TEU.

The supply of warehouse and production space in Poland in 2018 was 15.7 million m².

Listed below are intermodal terminals in Poland in the following regions: West Pomeranian, Lubusz and Lower Silesian.



Table 4 Intermodal terminals in Poland located in the following regions: West Pomeranian, Lubusz and Lower Silesian.

| Terminal | Region | Total area of the terminal [ha] | Storage area [TEU] | Annual capacity [TEU] |
|--|-----------------|---------------------------------|--------------------|-----------------------|
| Schavemaker Kąty Wrocławskie | Lower Silesian | 5 | 3 700 | 180 000 |
| DB Port Szczecin Sp. z o.o. | West Pomeranian | 12.7 | 3 500 | 150 000 |
| PCC Intermodal - PCC Brzeg Dolny | Lower Silesian | 9 | 2 464 | 110 000 |
| OT Port Świonujskie | West Pomeranian | 20 | 2 000 | 70 000 |
| Rail Terminal Rzepin | Lubusz | 1.6 | 500 | 40 000 |
| Container Terminal Siechnice - Baltic Rail | Lower Silesian | 10 | 1 445 | 15 00 |

Source: authors' own work

5.6. The freight carrier market in Poland (2014-2018)

PKP Cargo is the leader of the Polish freight market, as it has a 43.57% market share, calculated by the weight of the goods transported. In 2018, the company transported over 109 million tonnes of goods, which meant an increase in transported weight by almost 3 million tonnes compared to 2017. For other carriers, the largest increase was noted by PCC Intermodal (by 0.6 percentage point, which translates to an increase of 1.6 million tonnes), Captrain Polska (0.4 percentage point, which amounted to 1.1 million tonnes) and Orlen KolTrans (0.3 percentage point, which amounted to 0.9 million tonnes).

The table below shows the structure of the freight carrier market by transported weight in Poland (2014-2018) – data for carriers with a market share of over 0.5% at the end of 2018.

Table 5 The structure of freight carriers by transported weight of goods in Poland

| | Carrier | 2014 | 2015 | 2016 | 2017 | 2018 |
|----|-----------------|--------|--------|--------|--------|--------|
| 1 | PKP Cargo | 47.94% | 47.48% | 43.87% | 44.24% | 43.57% |
| 2 | DB Cargo Polska | 18.55% | 17.71% | 17.99% | 17.88% | 16.41% |
| 3 | Lotos Kolej | 4.65% | 5.61% | 5.70% | 5.56% | 5.00% |
| 4 | PKP LHS | 4.66% | 4.30% | 4.48% | 4.20% | 4.28% |
| 5 | CTL Logistics | 3.11% | 3.58% | 4.31% | 3.84% | 4.12% |
| 6 | PUK Kolprem | 2.44% | 2.23% | 2.73% | 2.87% | 3.03% |
| 7 | Freightliner PL | 2.92% | 2.52% | 2.27% | 2.27% | 2.47% |
| 8 | Orlen KolTrans | 1.24% | 1.45% | 1.61% | 1.81% | 2.08% |
| 9 | Pol-Miedź Trans | 2.34% | 2.33% | 2.26% | 2.20% | 1.82% |
| 10 | Rail Polska | 1.28% | 1.39% | 1.61% | 1.68% | 1.70% |
| 11 | CD Cargo Poland | - | 0.15% | 0.95% | 1.33% | 1.53% |
| 12 | KP Kotlarnia | 1.21% | 1.36% | 1.13% | 1.12% | 1.26% |
| 13 | Ciech Cargo | 0.65% | 1.02% | 1.23% | 1.26% | 1.20% |



| | | | | | | |
|----|-------------------|---------|-------|-------|-------|-------|
| 14 | Captrain Polska | 0.34% | 0.42% | 0.64% | 0.77% | 1.18% |
| 15 | Inter Cargo | - | 0.23% | 0.63% | 0.78% | 0.85% |
| 16 | STK | 0.94% | 0.75% | 0.90% | 1.03% | 0.81% |
| 17 | PKP Cargo Service | 0.43% | 0.20% | 0.30% | 0.54% | 0.74% |
| 18 | PCC Intermodal | 0.0001% | - | - | 0.04% | 0.68% |
| 19 | HSL Polska | 0.17% | 0.29% | 0.22% | 0.26% | 0.58% |
| 20 | Ecco Rail | 0.37% | 0.36% | 0.60% | 0.65% | 0.55% |
| 21 | JSW Logistics* | 0.25% | 0.41% | 0.66% | 0.63% | 0.54% |
| | Rest | 6.68% | 6.50% | 6.13% | 5.05% | 5.61% |

Source: Developed based on data from the Office of Rail Transport

5.7. Clusters operating in the analysed area

The following clusters operate in various industries, some of them are not directly related to rail freight transport or transport at all. However, because they are active associations, it is possible to cooperate with them in order to learn about new solutions.

5.7.1. West Pomeranian Region

The table below presents industry clusters operating in the West Pomeranian Region.

Table 6 Industry clusters operating in the West Pomeranian Region.

| | |
|---|--|
| West Pomeranian Chemical Cluster „Green Chemistry” (Zachodniopomorski Klaster Chemiczny „Zielona Chemia”) | Chemical industry, material engineering, fertilizers, packaging, energy efficiency, recovery of raw materials |
| Maritime Cluster of West Pomerania (Klaster Morski Pomorza Zachodniego) | Maritime economy, logistics |
| West Pomeranian Maritime Cluster (Zachodniopomorski Klaster Morski) | Maritime economy, in particular offshore industry and marine construction |
| Metal Cluster Metalika (Klaster Metalowy Metalika) | Metal, machine and automotive industry, metalworking |
| Cross-border Waterway Cluster Berlin-Szczecin-Baltic (Transgraniczny Klaster Szlak Wodny Berlin-Szczecin-Bałtyk) | Tourism |
| ICT Cluster West Pomerania (Klaster ICT Pomorze Zachodnie) | Telecommunications, IT, multimedia |
| West Pomeranian Creative Cluster (Zachodniopomorski Klaster Przemysłów Kreatywnych) | Advertising industry, printing, multimedia, design, culture and art. |
| Szczecinek Furniture Cluster (Szczecinecki Klaster Meblowy) | Wood and furniture industry |
| West Pomeranian Construction Cluster (Zachodniopomorski Klaster Budowlany) | Construction |
| West Pomeranian Medical Cluster iSynergia (Zachodniopomorski Klaster Medyczny iSynergia) | Medicine, pharmacy, food supplements |
| SEaNergia Baltic Cluster (Bałtycki Klaster) | Renewable energy sources, tourism |

| | |
|--|---|
| sEaNergia) | |
| West Pomerania eBusiness Cluster (Klaster eBiznesu Pomorza Zachodniego) | E-commerce |
| Polish Sailing Cluster (Polski Klaster Żeglarski) | Maritime economy, tourism |
| West Pomeranian Development and Business Support Cluster (Zachodniopomorski Klaster Wsparcia Rozwoju i Biznesu (PIG)) | Business support services, technology, R&D |
| Process Management Practice Cluster (Klaster Praktyki Zarządzania Procesowego (PIG)) | Process management |
| West Pomeranian Chemical Cluster „Green Chemistry” (Zachodniopomorski Klaster Chemiczny „Zielona Chemia”) | Chemical industry, material engineering, fertilizers, packaging, energy efficiency, recovery of raw materials |

Source: authors' own work

5.7.2. Lubusz Region

The table below presents industry clusters operating in the Lubusz Region.

Table 7 Industry clusters operating in the Lubusz Region

| | |
|--|--|
| Lubusz Metal Cluster - Gorzów Wlkp. (Lubuski Klaster Metalowy – Gorzów Wlkp.) | Metalworking, metal products |
| Digital Archiving Cluster - Nowa Sól (Klaster Archiwizacji Cyfrowej - Nowa Sól) | Telecommunications and IT services industry and products in the area of protection and security, as well as the efficiency of electronic data management. |
| Lubusz Renewable Energy and Energy Efficiency Cluster – Sulechów (Lubuski Klaster Energetyki Odnawialnej i Efektywności Energetycznej – Sulechów) | Renewable energy sources and energy efficiency |
| Education Cluster Lubusz Brandenburg – Gorzów Wlkp. (Klaster Edukacji Lubuskie Brandenburgia – Gorzów Wlkp.) | The objective of the cluster members is to adapt the educational offer to the changing conditions on the labour market (e.g. planning vocational paths, apprenticeships), so that after completing their education students are ready to take up work without further training or acquiring professional qualifications. |
| Transport, Forwarding and Logistics Cluster (Klaster Transportu, Spedycji i Logistyki) | Forwarding and logistics; there is a group in the cluster working on adapting educational |



| | |
|---|---|
| | programs to the needs of the labour market. |
| Centre for Lubusz Agrotechnical Innovations, Żary (Centrum Lubuskich Innowacji Agrotechnicznych, Żary) | It brings together trading companies, agricultural and food processing plants, organizes business environment, as well as R&D units, and the "Żarski Len" Group of Agricultural Producers supported by GS Żary. |
| Western Tourist and Medical Cluster (Zachodni Klaster Turystyczno-Medyczny) | The goal of the activity is to promote a new product – medical tourism. |
| Lubusz Cluster of Electrical Engineering, Computer Science and Telecommunications - Zielona Góra (Lubuski Klaster Elektrotechniki, Informatyki i Telekomunikacji - Zielona Góra) | Cluster members deal with the delivery and implementation of IT solutions, ERP and CRM information systems for business, GIS systems as well as digital data protection and archiving systems, production of measuring equipment, electronic devices and control systems. |

Source: authors' own work

5.7.3. Lower Silesian Region

The table below presents industry clusters operating in the Lower Silesian Region.

Table 8 Industry clusters operating in the Lower Silesian Region

| Lower Silesian Raw Material Cluster (Dolnośląski Klaster Surowcowy) | Established for the rational management of raw materials in the region |
|--|---|
| National e-Health Cluster (Ogólnopolski Klaster "e-zdrowie") | Implements initiatives to create a telemedicine network and computerization of health centres. |
| Lower Silesian Eco-energy Cluster EEI (Dolnośląski Klaster Ekoenergetyczny EEI) | Activities in the field of renewable energy sources |
| Lower Silesian Renewable Energy Cluster (Dolnośląski Klaster Energii Odnawialnej) | The youngest cluster in the region in the field of renewable energy and environmental protection. |
| Lower Silesian Metal Cluster (Dolnośląski Klaster Metalowy) | A group of companies in the metal industry, cooperating with each other on various levels, assisted by scientific and research units and business environment institutions. |
| Lower Silesian Tourism Cluster (Dolnośląski Klaster Turystyki) | Currently associates 16 entities from the SME and NGO sector, mainly from the hotel and tourism industry. |



| | |
|---|---|
| ICT cluster (Klaster ICT) | The Knowledge and Innovation Community in the Field of Information and Communication Technologies is a joint initiative of IT and telecommunications companies for the development and implementation of innovative products and services. |
| Innovative Cluster of Generation and Energy Use at Mega and Nano Scale (Innowacyjny Klaster Generacji i Użytkowania Energii w Mega i Nano Skali) | Cluster in the energy industry, concerned with renewable energy sources and their use. |
| Innovative Cluster „Dla Zdrowia-Sudety” (Klaster Innowacyjny „Dla Zdrowia-Sudety”) | Is a cooperation platform for diversified business entities, organizations and universities, created to exchange and use a common knowledge base and shape skills. This cooperation is focused in the area of health services and spa treatment, tourism and education. |
| Cluster of Innovative Technologies in Manufacturing (Klaster Innowacyjnych Technologii w Wytwarzaniu) | The idea is to strengthen the competitiveness of enterprises operating in the manufacturing industry. Contact: Dolnośląski Park Innowacji i Nauki S.A. |
| NutriBiomed Cluster (Klaster NutriBiomed) | Created on the basis of a scientific and economic network, combines medicine and food industry by developing technologies for the production of dietary supplements and healthy food. |
| Regional Manufacturers' Cluster (Klaster Wytwórców Regionalnych) | Established by the Association of Local Activity Forum, Sudetes Entrepreneurship Incubator, to support entrepreneurs and activities for the development of the region |
| Polish Biotechnology Cluster (Polski Klaster Biotechnologiczny) | Supports cooperation within a group of enterprises, research centres and industry associations to commercialize the latest scientific achievements which use healing properties. |
| Side Cluster | The purpose of its operation is rational wood management, promoting wood as a building material and reducing energy consumption in homes. |

Source: authors' own work

5.8. SWOT analysis for the West Pomeranian, Lubusz and Lower Silesian Regions

The table below presents a SWOT analysis for all three regions in the territory of Poland.

Table 9 SWOT analysis for the area of Poland

| Strengths | Weaknesses |
|--|--|
| <ul style="list-style-type: none"> Well-developed rail network, good national and international connections Good rail connections with major cities in Poland Lines E 59 and CE 59 are covered by the AGC and AGTC agreements and their modernization is a priority of the state's transport policy Inclusion of lines E 59 and CE 59 Increased safety of rail traffic as compared to other means of transport Large diversity of rail transport Integrating the development of rail transport into the Regional Operational Program Low external costs and low environmental impact Attractive location – on the state border West Pomeranian Region – the access to the Baltic Sea – ports | <ul style="list-style-type: none"> Obsolete and worn out rolling stock, Low standard and relatively low speed of trains Poor condition of station infrastructure and railroad infrastructure on local lines. Insufficient transport offer and frequency of trains, Limited level of financing of rail transport from the state budget Poor technical condition of railway transport facilities Insufficient capacity of railway station nodes |
| Opportunities | Threats |
| <ul style="list-style-type: none"> European integration policy and the development of international transport corridors Changes in the state transport policy towards greater support for rail transport Increased state involvement in financing the development of lines of state importance Liberalization of the transport market, development of new entities and marketization of rail transport activities Developing the market offer of rail operators by optimizing the communication | <ul style="list-style-type: none"> Incorrect course of the state transport policy in relation to railways A drop in demand for rail freight transport to and from ports Liberalization and displacement of carriers from the railway market Deteriorating condition of linear infrastructure Insufficient funds allocated for the modernization of rail transport Experienced staff leaving railway transport and the insufficient training system for new staff |



| | |
|---|---|
| <p>of transport systems</p> <ul style="list-style-type: none"> • Effective use of EU funds • Electrification of railway lines and the inclusion of certain sections of the lines into the system of railway lines of national importance • Introducing modern technologies based on the use of the latest solutions in the field of telecommunications and IT • Reducing construction and modernization times of railway lines • Increasing financial resources allocated for repairs/modernizations/construction of railway lines | <ul style="list-style-type: none"> • Increase in operating expenses and rising electricity costs • Much faster development of the road network than the railway network |
|---|---|

Source: Authors' own work

6. Primorje-Gorski Kotar and Varazdin County (Croatia)

The figure below shows the location of the analysed areas in the country.



Figure 4 The location of the analysed areas in the country

Source: www.ju-priroda.hr

6.1. Primorje-Gorski Kotar County (Primorsko-Goranska Županija)

6.1.1. Territorial analysis

Primorje-Gorski Kotar County is situated in the western part of Croatia. Its total land surface area is 3,588 km², which is 6.3% of the total Croatian territory. The length of the coastline is 1,065 km and the number of islands is 55. The county is unique because of its convenient geostrategic position and natural diversity (islands, coastal areas and mountain areas).

The county plays a significant national and international role since it connects Central and Eastern Europe via the Danube and Adriatic areas. The Port of Rijeka is the largest and most important Croatian port. Because of its excellent geostrategic position, the Port of Rijeka is especially important as a final point of the shortest maritime route between the Far East and Europe. Compared to the distance of Northern European ports and depending on the port of departure, the travel time can be up to 7 days shorter. In terms of administrative activities, the County has 36 local government units – 14 cities and 22 municipalities.

Rijeka is the hub of the Primorje-Gorski Kotar County and the third largest Croatian city; it covers an area of 44 km² and has a population of approximately 145,000. Its population density is the highest in Croatia and amounts to 3,274 inhabitants/km². Rijeka is a social, economic, transport, cultural, educational and political centre of the region. The Port of Rijeka is the largest sea port in Croatia and the European gateway to the Far East.

NAPA (North Adriatic Ports Association) has been granted 50% funding for its ITS Adriatic Multi-Port Gateway project thanks to applying for the European Union's call for project proposals in its co-financing of TEN-T links.

Used as a transit port for countries of Central and Central-Eastern Europe, the port of Rijeka is the most convenient transit hub for Croatia, Hungary, Austria, the Czech Republic, Slovakia, the western part of Ukraine, the southern part of Poland and the southern part of Germany.

Table 10 Primorje-Gorski Kotar County – basic data

General Information

| | |
|----------------------------|---------|
| Capital | Rijeka |
| Cities | 14 |
| Municipalities | 22 |
| Population | 296.195 |
| Most Population-Rijeka | 128.624 |
| Average population density | 85,2 |

Territory

| | |
|------------------------------|-------|
| Land area (km ²) | 3.588 |
| Sea coast length (km) | 1.065 |

Economy

| | |
|------------------------------|----------|
| GDP in total (mil. €) | 3,685 |
| GDP per capita | 12.548 € |
| Exports of Goods (mil. €) | 477 |
| Registered unemployment rate | 13% |
| Average gross salary | 1.063 € |

Source: https://www.pgz.hr/EN/General_information/About_the_County

Demographics

Primorje-Gorski Kotar County has a population of 296,123, which constitutes 6.9% of the total Croatian population. The gender breakdown is 51% female and 49% male. The largest number of inhabitants live in urban areas (Rijeka, Opatija, Mali Lošinj, Crikvenica, etc.).

6.1.2. Economy

The GDP per capita is EUR 14,139 and along with the City of Zagreb and the Istrian County, the Primorje-Gorski Kotar County is one of the most developed counties of the Republic of Croatia. The unemployment rate in 2018 was 16%. The average gross monthly salary is HRK 7,000.00 (EUR 946).

Education

The University of Rijeka has ten faculties and three departments with over 19,000 students; part of the student population is enrolled in neighbouring universities (Zagreb, Trieste, Padova, etc.). Rijeka also offers graduate, postgraduate and doctoral courses and a number of elementary schools, including four Italian ones. There are vocational high schools, grammar schools, music schools, design schools and one Italian high school.

Work force

Work force makes up 66% of the whole population, some of which are highly qualified professionals. Approx. 70% of the work force has high school education, college or university degrees, while 19% are qualified professionals. Women make up 48% of the working population.

R&D

Research and development companies may be found in the ship building, petrochemical, pharmaceutical and ICT industries. There is a Technology and Science Park in Rijeka, at the University of Rijeka, along with development agencies, business incubators and business centres, and a very strong community of innovators.

Table 11 Structure of revenue based on economic branches

| | |
|--|--------|
| Trade | 37.94% |
| Processing industry | 18.47% |
| Transport, warehousing and communications | 9.92% |
| Construction industry | 7.99% |
| Tourism | 7.06% |
| Expert, scientific and technical industry | 6.01% |
| Real estate services | 1.03% |

Source: https://www.pgz.hr/EN/General_information/About_the_County

The most important areas for investment in the region are:

- Development of the Port of Rijeka
- High-efficiency Botovo-Rijeka railway line
- Restoration, modernization and development of the Rijeka Airport
- Extending the runway, expansion of airport apron and construction of the terminal
- County sports centre Platak
- Automotodrom Grobnik – Superbike World Championships
- Health care centre Veli Lošinj
- Miklavja Intermodal Logistic Centre
- Industrial Zone Bakar
- LNG terminal on the Island of Krk
- Wind energy in Primorje-Gorski Kotar County
- Solar energy in Primorje-Gorski Kotar County.

Industrial zones

Commercial zones (production and business) are one of the pillars of economic development.

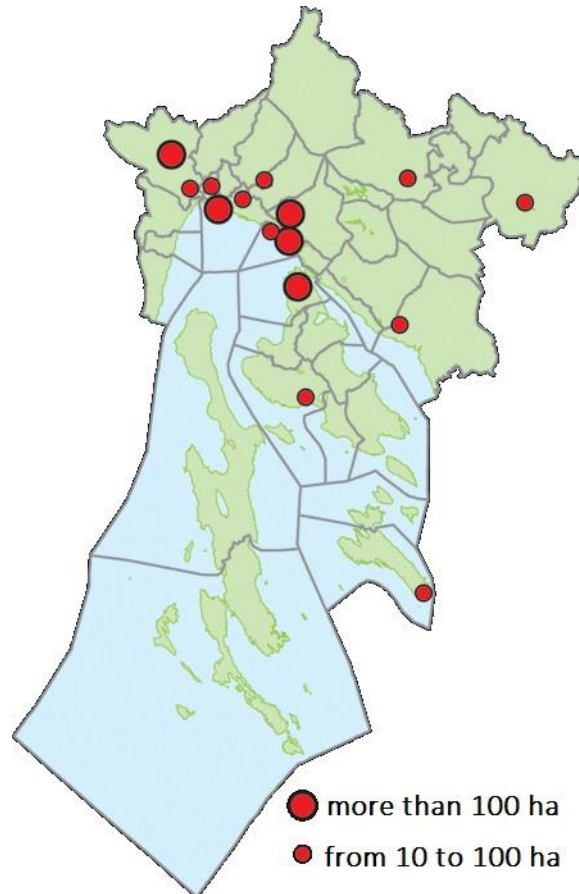


Figure 5 Industrial zones

Source: http://www.zigo.hr/pgz/html_2014/04_Business_Zones/001_Network/Network.html

Commercial zone network development in the Primorje-Gorski Kotar County is based on the following nationally significant zones:

- Miklavija Business Zone (Matulji)
- Kukuljanovo Production Zone (Bakar)
- Seashore Production Zone in the West part of Rijeka – 3. Maj
- Urinj Production Zone – primarily a role in the oil industry
- Petrokemija Production Zone in Omišalj.

Alongside the network of zones of national significance, a complementary network of regionally (area of 10-100 ha) and locally (area less than 10 ha) significant zones is being planned. Planning documents provide for a total of 41 production zones and 168 business zones, including 5 zones of national significance (over 100 ha), 43 medium-sized zones of regional significance (10-100 ha) and 161 small zones of local significance (up to 10 ha).

Together with the above network of commercial zones, there is exceptional potential for the development of zones by the sea, primarily for ship building purposes (shipyards, small shipyards etc.).



The table below shows the network of business zones in the Primorje-Gorski Kotar county

Table 12. The network of business zones in the Primorje-Gorski Kotar county

| Local government unit | Business zone | Estimated surface (m ²) |
|-----------------------|--|---|
| Kraljevica | "Žlibina" "Vukotinovo" "Vrtača" | 55,000 |
| Krk | "Krk" "Curicta" | 110,000 5,000 |
| Rijeka | "Bodulovo" | 94,000 |
| Delnice | "I 2-7 Javornik" "I 2-8 Kendar" "I 1-4 Javornik" "I 1-3 Lučice" "K1 Podrebar-Delnice" "K2 Kolodvor Delnice" | 28,800 88,000 440,300 171,100 45,800 13,460 |
| Cres | "Volnik" | 37,000 |
| Crikvenica | "K 3" | 10,000 |
| Vrbovsko | "K i I" | 140,000 |
| Rab | "Mišnjak" | 167,000 |
| Kastav | "Žegoti" | 276,000 |
| Fužine | "K1-3 Lič" | 301,400 |
| Viškovo | "RZ-5" "RZ-7" "RZ-8" | 75,000 |
| Jelenje | "Jelenje" | 30,000 |
| Čavle | "RZ-19 Soboli" "R-26 Gorica-Mavrinci" "K1-Cernik" | 205,000 |
| Omišalj | "Pušća" | 247,800 |
| Matulji | "R1" "R2" "RZ-10" "Miklavja" | 110,000 166,000 2,000,000 |
| Mrkopalj | "Poljice" "Poljice2" | 30,000 |
| Vrbnik | "Zabrdi" | 23,500 |
| Skrad | "Zeleno srce" | 2,000 |
| Klana | "I1-Mariščina" "K1-Klana" "K2-Liskovac" "K3-Pod klanac" "K4-Kunfin" "K5-Klana-pilana" "K6-Škalnica" | 100.000 45.000 15.200 27.500 103.200 101.900 79.200 |

| | | |
|------------------------|-----------------------------|-----------|
| | "K7-Breza-pilana" | 12.600 |
| | "K8-Breza" | 15.400 |
| Lokve | "Sleme" | 30,000 |
| Vinodolska | "Barci" | 20,000 |
| Novi Vinodolski | "Kargač" | 166,000 |
| Kostrena | "Šoići" | 160,000 |
| Bakar | Kukuljanovo Industrial Zone | 5,000,000 |

Source: Poslovne zone, stanje i perspektive (Business Zones, Situation and Perspective), RRA PORIN Ltd.

Industrial zone Bakar is the most developed commercial zone in the Republic of Croatia. It has a total area of 500 ha (with 40% of it still open for new possibilities) and 130 operational business entities which employ more than 3500 workers. The zone has an excellent geostrategic position (short distance to Slovenia, Italy and Austria), has a direct connection to the Zagreb-Rijeka highway, is close to the ports of Rijeka and Bakar and the Rijeka Airport on the island of Krk which is 20 km away. Railway tracks pass through the industrial zone. Its location and infrastructure create opportunities for increasing competitiveness of regional economy by attracting investors to the commercial zone in order to increase production capacity, provide new employment options, apply new technologies, export, etc. by launching new business initiatives.

Business zone K1-3 Lič (production and services), with the total surface of 30.14 ha, comprises three zones specified in the development plan. The part of the zone including halls constructed for the purpose of a farm is in the extra-register ownership of the Fužine Municipality. The zone includes utility infrastructure – water and power supply. The railway station Fužine and part of the Rijeka-Zagreb railway are approx. 2 km away, and the Vrata junction on the Rijeka-Zagreb motorway is 2 km away.

Business zone Žegoti K1 with the total surface area of ca. 30 ha, designated as a construction area, is intended for economic activities which require the use of larger areas: service, trade, warehousing, service, craft facilities. The zone is located in the vicinity of the historical centre of the town of Kastav, along the Kastav-Viškovo regional road.

The business/production zone Miklavija, Matulji (158.5 ha) is located in the northern part of the Matulji municipality, on the natural traffic route from Rijeka towards Trieste and Ljubljana, near the Slovenian border. It is the largest work zone of the zones planned for the area between Matulji and Rupa and one of the larger zones in the Primorje Gorski Kotar county. The main railway Rijeka-Šapjane-Ilirska Bistrica and the 110 kV distribution power transmission line Matulji-Ilirska Bistrica run through the Zone. It goes approximately 2800 m in the south-east – north-west direction, between public motorway D8 to the north-east and the new Rijeka-Rupa motorway to the south-west. The size of the zone and its advantages enable the organization of various activities – with similar functional and technical features.

Thanks to its position, spatial potential and its direct connection to European transport routes, the logistic centre provides development of various business projects (logistics and distribution centres, production facilities, business services, transport etc.) to a wide circle of investors.

The Matulji Municipality has numerous other work and business zones, including:

- Mučići II (13.4 ha; services-production)



- R-1 Matulji (14.5 ha; commercial-services)
- R-2 Matulji (19.8 ha; services-commercial)
- K11 Rupa (10.3 ha; service activities – commercial, warehousing, service, maintenance and trade activities)
- K3 Jučići (6.4 ha; services-production utility).

The Matulji Municipality is located between the railway line in the north-west (Rijeka-Šapjane-Ilirska Bistrica railway line) and the D8 state road (Adriatic coastal road) in the south-east. The municipality is connected to the Rupa-Rijeka highway by the Jurdani junction and is 12 km away from the port of Rijeka and 40 km from the Rijeka airport.

Conclusions

Studying the business zones in the county, the observed pattern is the dispersion of business zones. Development plans need to be better managed. Strategic decisions must be made in order to consolidate business activities in one terminal area.

6.1.3. Railway infrastructure

The Port of Rijeka is the main Croatian port within the TEN-T network. The city of Rijeka, the largest Croatian port and third largest city in Croatia is connected with the rest of Croatia and Europe by M202 Zagreb-Rijeka main railway line (which is part of the Mediterranean corridor RH2). The line capacity is limited to approx. 5 million tonnes per year, which results from its poor technical and technological features, which are mostly a direct consequence of rolling terrain of Rijeka hinterland from Ogulin to Škrlevo. It is set out in the Port of Rijeka development plans, whose implementation is under way, that the importance of this railway line for freight traffic should increase significantly. A number of solutions to increase the capacity of the Ogulin-Škrlevo railway section have been proposed during the last decades. However, they have not yet been developed beyond the stage of studies and preliminary designs.



Figure 6 Main railway lines: M202 and M502

Source: http://www.zigo.hr/pgz/html-2016/images/karte/Botovo-Rijeka_EN.png

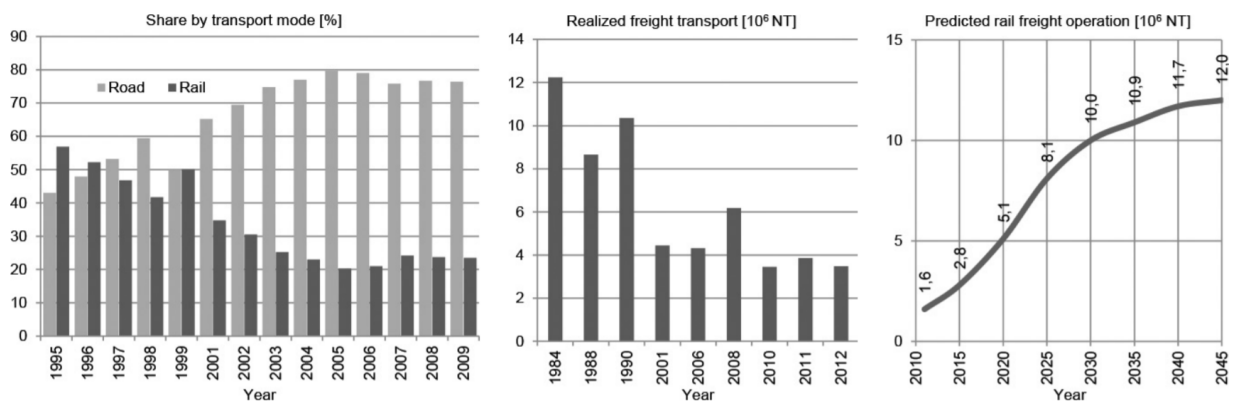


Chart 1 Share of land transport (left) in container transshipment in the port of Rijeka (middle), realised freight (right)

Source: <https://master.grad.hr/cetra/ocs/index.php/cetra4/cetra2016/paper/viewFile/634/387>

The high-efficiency railway line Botovo-Rijeka, which is currently being designed, is a 269 km long Botovo-Zagreb-Rijeka railway line that will connect the port of Rijeka with Zagreb and thus with Central European countries. The estimated value of the project is 4.7 billion €.

The development and modernization of the Port of Rijeka is not accompanied by concurrent development of road and railway infrastructure in Rijeka hinterland. This can be proven by following



historical data on the amount of freight rail transport. The share of railway cargo transport with the source and destination in the Port of Rijeka in the 1990s amounted to about 90%. However, the construction of the new motorway diverted much of the cargo to road transport. Today, the railway's participation in delivery/dispatch of goods amounts to approx. 20-25% (Chart 1, left), and realized freight transport on the Ogulin-Rijeka rail section has dropped to a third of the value achieved thirty years ago (Chart 1, middle).

The Port of Rijeka development strategy was to increase the port's capacity of about 10 million tonnes of dry cargo to around 20 million tonnes by the year 2017. Together with planned liquid cargo capacity, the port's capacity should amount to 45 million tons. 2030 plans of major investments in the Port should further increase its capacity to over 30 million tons of dry cargo, i.e. to a total of over 55 million tons. For the purpose of this analysis, it can be assumed that the cargo operations in port's railway stations (Rijeka, Rijeka Brajdica, Bakar, Figure 5), will amount to 12 million tons by the year 2045 (Chart 1, right).

The existing railway line servicing the Port does not have sufficient capacity to accept the above mentioned maximum traffic volumes. The line was built in 1873 and its capacity is limited by technical and technological features characteristic of the time and rolling terrain of Rijeka hinterland: it is a single track line for mixed traffic with small curve radii and steep slopes, which in some parts limit train speeds to 40 km/h. The line capacity amounts to approx. five million tons per year, mostly because of the poor operation characteristics of section from stations Ogulin to Škrlevo. 50 km of continuous maximum slope from Rijeka (Škrlevo) towards inland make this particular rail section one of the most challenging railway lines in Europe.

The much needed increase of the capacity on this railway line has been discussed basically since the day of its construction, but only in the last few years there has been a serious shift in the investment focus from road to railway sector in this area. A number of activities including design, construction, reconstruction and modernization of the complete corridor RH2 have been carried out (Figure 6).

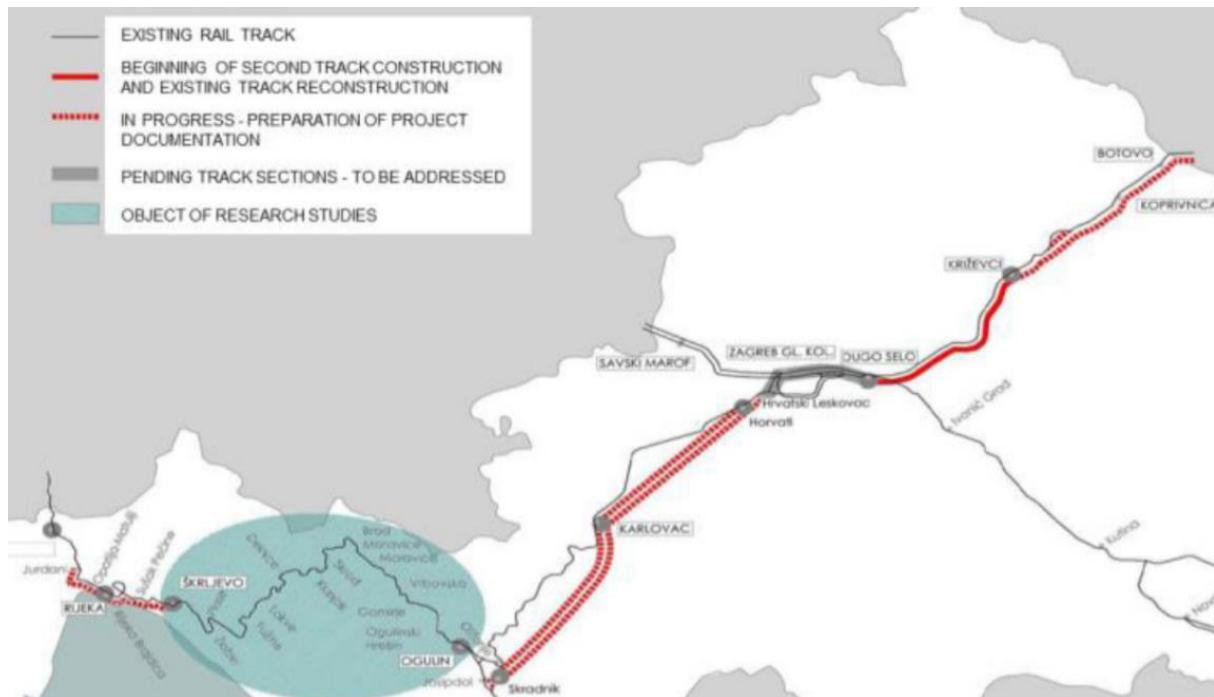


Figure 7 Activities on design of construction, reconstruction and modernization of the corridor RH2, State
Source: <https://master.grad.hr/cetra/ocs/index.php/cetra4/cetra2016/paper/viewFile/634/387>

Figure 6 shows that the modernization of the railway line section Ogulin–Škrlevo is still in the research phase. To date, measures to increase the capacity of the said section are limited to periodic modernisation of interstation sections, upgrading the existing signalling system, and modernisation of electric traction system. Possible design and construction solutions to increase the capacity of the railway section, whose first variants are more than 50 years old, can be divided into three basic groups:

- construction of a new double-track high-performance line,
- reconstruction of the single-track line and introducing more favourable horizontal and vertical elements,
- upgrading by constructing a second track on the most critical subsections together with a partial reconstruction of the existing track.⁴

The M502 railway or the Rijeka–Šapjane–State border railway (Slovenian: Pruga Rijeka–Šapjane-state border) is a 30.9-kilometre (19.2 mi) long, single-track railway line, which is operated by HŽ Infrastruktura. M502 connects Rijeka to the Slovenian railway network north of Šapjane and to the

⁴ <https://master.grad.hr/cetra/ocs/index.php/cetra4/cetra2016/paper/viewFile/634/387>

Zagreb via M202 east of Rijeka. It is electrified with 25 kV AC from Rijeka to Šapjane and 3 kV DC from Šapjane to the national border.

Generally, the lines are old and in poor condition, which results in a reduction in the permitted speeds of trains and prolongs journeys (National Programme for Railway Infrastructure 2016-2020, OG 13- 2007/2015). Since 2007 the length of the lines has not essentially changed, and in 2015 as much as 26% of local and 10% of regional railways was out of order because of maintenance problems (HŽ Putnički prijevoz, 2015).

The average speeds of trains are low, particularly when compared with road traffic speeds. In the last 11 years, the speed of freight trains has fallen by about 2 km/h, while the speed of passenger trains has remained at the same level as in 2005.

The share of passengers and goods transported by rail has fallen, and road transport has taken the lead. When the country entered the EU, new operators appeared in the rail freight market. This change has not resulted in any rise in the amount of freight transported by rail compared to road transport. The situation in the passenger transport is similar. Reasons for the reduction in the number of passengers can be traced to traffic problems caused by reconstructions of lines and the use of buses as substitutes for trains (HAKOM, 2015). Apart from that, the age of the rolling stock causes deviations from the planned and the actually implemented timetable, and therefore travellers tend to avoid railway transport and use other means of transport instead.

International and transit transport accounts for 70% of the goods transported, and 99% passengers were carried by internal traffic. In the last ten years, significant amounts have been put into the modernisation of ports and the improvement of services, primarily in the Port of Rijeka. However, the limited accessibility of railway infrastructure, the absence of cooperation with neighbouring countries and the underdevelopment of intermodal transport reduce the quality of services offered by domestic operators, which results in diminished traffic.

The overall condition of national rolling stock is not adequate to modern transport needs, including both passenger and cargo rolling stock. To increase the competitiveness of passenger and freight rail transport in comparison with other transport modes it is necessary to modernize the rolling stock in coordination with the foreseen improvements to the infrastructure. The first step should be to perform a comprehensive analysis of the current organizational, operational and maintenance setup of the railway operator (the existing and future transport requirements, operational and maintenance plan). Once the real needs are identified, further studies should define the specific technical requirements for the rolling stock.

Unsatisfactory maintenance level of the infrastructure, which causes limitations in operation, together with low security standards on rural stations prevent passengers from using the railway system.

There is a problem with the environmental impact of railway operations along the Zagreb-Rijeka corridor. A set of measures consisting of infrastructure renewal (closed drainage system), rolling stock purchase, noise barriers construction, etc. should be implemented to solve this problem.

6.1.4. Network classification (core network, comprehensive network, additional network for freight transport)

TEN-T Mediterranean corridor (Pan-European Corridor Vb), Budapest-Rijeka, which passes through the territory of the Primorje-Gorski Kotar County, is of extreme importance to the traffic and economic system of Croatia and the wider European area.

The railway cargo traffic on the Pan-European Corridor V.s. is closely connected to the development of the Port of Rijeka, which generates about 90% of the overall railway traffic in the Rijeka junction. Therefore, the development concept of railway and port needs to be harmonised and in compliance with market requirements.

The Port of Rijeka generates ca. 90% of the entire transit railway traffic. Austria, the Czech Republic, Slovakia and Hungary are of great significance as part of the traffic via the Port of Rijeka. The structure of transport consists mainly of bulk cargo (ca. 80% of the entire transit). This confirms the significance of the port and the traffic route in the Pan-European Corridor V.s. in providing port services for Central European countries. Transit traffic is of special significance in the economy of every country, since it indicates the level of direct integration into the international traffic and exchange. It also determines the level of integration with the world economy. Such traffic increases the international significance of individual ports and the competition in attracting cargo outside the borders of one's own country. The main advantage for the national economy lies in substantial foreign exchange earnings, efficiency, rationalization, and optimization of transport on the main traffic routes, through improved usage of transport capacities. It is the transit traffic via seaports which allows the usage of the entire traffic system of a country, allowing faster accumulation of capital, and therefore serving the entire economy. The role of the Port of Rijeka needs to be considered in the long run as one of the most important North Adriatic ports within the European traffic corridors. Croatian economy and its traffic system have formally been part of the European Union traffic system since Croatia became an EU member. In the future, the European countries will look for solutions which yield the highest profit at the lowest cost. This means that ports will have to get connected and specialize in order to establish an optimal ratio of costs (investments and maintenance costs) and profits, with restrictions imposed by EU regulations. Therefore, consistent plans need to be developed and maritime, port, road, river and railway connections have to be harmonized in both design and in the implementation phase.

6.1.5. Intermodal facilities

Intermodal facilities (access points of rail freight, e.g. loading tracks, feeder/connecting tracks, terminals, train formation depots/yards, etc.)

The port of Rijeka, the largest port in Croatia, intends to enlarge the intermodal facilities of the Zagreb Deep Sea Container Terminal. To this end, the port authorities are investing in the development of the railway infrastructure. The modernisation project will increase the capacity of the port to handle containers and make the intermodal terminal the largest in the Northern Adriatic. The project costs 31.6 million euros, of which 85% (26.8 million euros) is funded by the Connecting Europe Facility (CEF), an EU fund for transportation projects. The civil works will be performed by SŽ-Železniško gradbeno podjetje Ljubljana (SŽ-ŽGP), a Slovenian contractor specialising in track maintenance and construction. The modernisation project consists of three stages. The first one

provides the reconstruction of the cargo section of Rijeka railway station. The works at this stage include the upgrade and extension of 12 tracks as well as the installation of the cable drainage, telecommunication and power cables along the tracks. In the second phase, SŽ-ŽGP will construct the rail connections between the modernised railway lines and install the cable drainage. The final stage includes the construction of four 400-metre tracks on an extension of the container terminal and two tracks for port cranes. All this is aimed at removing the railway bottlenecks in the port of Rijeka and stimulating the road-to-rail shift.

6.1.6. Freight transport flows

Freight transport flows (shipping, receiving, transshipment) are closely related to structure and geographical dispersion of industrial sites described in sections above.

Table 13 Freight operation volumes in Port of Rijeka rail stations

| Year | Cargo [NT] | Passenger |
|-------------|------------|-----------|
| 2006 | 10,887,048 | 221,860 |
| 2007 | 13,212,464 | 211,988 |
| 2008 | 12,391,591 | 217,324 |
| 2009 | 11,238,154 | 203,954 |
| 2010 | 10,183,304 | 186,376 |
| 2011 | 9,390,380 | 171,396 |
| 2012 | 8,554,001 | 169,190 |
| 2013 | 8,687,679 | 173,062 |
| 2014 | 9,022,776 | 159,607 |
| 2015 | 10,900,421 | 153,304 |

Source: https://www.kormany.hu/download/9/9f/11000/00_HR_kozlekedesfejlesztési_strategia_EN.pdf

The freight modal split between rail and road is in favour of road transport, even on corridors where a developed railway alternative exists and the railway freight market has been opened. For instance, modal split concerning the cargo going from/to the Port of Rijeka is in favour of road transport (80% of the cargo is transported by road and only 20% by rail).

The source of the problem is that rail track maintenance and renewal projects and operations are not well coordinated with current and/or planned freight and passenger transport. To improve the efficiency and effectiveness of the railway system towards a more sustainable setup, changes in the organisation and better coordination between HZ Infrastructure Ltd, HZ Cargo Ltd., and HZPP Ltd. are required (improvements in the production chain such as modalities for operating services, maintenance, offering added value services in a more user-oriented approach, etc.).

Adequate structures and organisation for maintenance, modernisation, planning and construction activities must be put in place to provide an efficient and effective/sustainable rail service. The concept must derive from an adequate and specific joint analysis by the HZ Infrastructure Ltd, HZ

Cargo Ltd. and HZPP Ltd., considering technical, financial and user requirements, the indications from Directive 2008/57/EC on the interoperability of the rail system respecting HR and EN Standards, laws, regulations, internal technical specifications and other applicable provisions.

6.1.7. Policy analysis

6.1.8. Entities responsible for rail freight transport and services in the region

HŽ Cargo and HŽ Putnički Prijevoz were up to 2013 the only rail carriers in the Croatian market. When the country entered the EU, the market was liberalised and new competitors appeared. Liberalisation was mostly apparent in freight transport, which could now be conducted by foreign carriers. Foreign companies had, indeed, been present on the market much earlier, via logistic companies. For example, Austrian State Railways (ÖBB) had been present on the freight market from 2010 through the company Express-Interfracht Croatia (today: Rail Cargo Logistics Croatia).

Most railway carriers have subsidiaries responsible for the organisation of carriage and logistic services. Logistic support for ÖBB is provided by the subsidiary Rail Cargo Group². PPD Transport, SŽ Tovarni Promet, and Train Hungary Magansvasut Ipari have been on the market since 2013.

Because of the complex process of accessing infrastructure, foreign rail carriers have not taken any great strides in taking shares of the Croatian market. In Croatia it is permitted to operate only vehicles licensed by the Agency for Safety of Railway Traffic (the same holds true for staff) and every company has to obtain a Safety Certification issued by the Agency. Thus SŽ Tovarni Promet acquired a safety decision for Croatian lines as late as May 2016. Even though, since 2015 the activity of foreign carriers has been gradually on the rise. Foreign carriers who do not have a company seat in the Republic of Croatia are not allowed to carry passengers, but only to use the infrastructure for the purpose of international passenger carriage. This limit will not last long and in the foreseeable future it is expected that the passenger transport market will be fully liberalised.

6.1.9. The analysis of Development Strategy of Primorje-Gorski Kotar County 2016-2020

Development Strategy of Primorje-Gorski Kotar County 2016-2020 (DS PGC)

The County Development Strategy is the basic strategic planning document which sets out the objectives and priorities of development with the purpose of strengthening its developmental potentials, with a special emphasis on the role of large towns and central cities of counties in the stimulation of the development of poorly developed areas. One of the fundamental principles of the policy, in line with Article 5 of the Regional Development Act of the Republic of Croatia, is the principle of partnership and collaboration between the public, private and civil sectors. It involves the cooperation between units of state administration, regional government, local government, economic entities, the scientific community, civil partners and organisations of the civil society. Following on from this, in the drafting of the 2016-2020 Development Strategy, representatives of the significant shareholders, i.e., public, private and civil sectors were present at all phases of the drafting.

6.2. VARAŽDIN COUNTY

6.2.1. Territorial analysis

The present-day borders of Varaždin County comprise the area between the Drava River to the north, the Slovenian Hills and the Macelj Hills to the west, and Kalnik Mountain to the east and southeast. Varaždin County is situated in the north-western part of Croatia with a total land surface of 1261.29 km², which constitutes 2.23% of the total Croatian territory. The county has a population of 175 951, with population density of 139.42 inhabitants/km². In terms of administration, the County has 30 local government units – 6 cities and 22 municipalities.

The Varaždin County is amongst the oldest Croatian Counties and was one of the first organised administrative territorial units. It was mentioned on 20th August 1181 in the Charter of the Croatian-Hungarian King Bela III, together with Varaždin County Prefect Belec, who had been mentioned since 1131. Throughout most of its history the Varaždin County included much of what is today Krapina-Zagorje County and parts of Koprivnica-Križevci and Međimurje Counties. Until 1848 the County was divided into four judicial-administrative districts, and in 1925 it comprised the following districts: Ivanec, Klanjec, Krapina, Ludbreg, Novi Marof, Pregrada, Varaždin and Zlatar, with 35 municipalities. According to the first systematic census of 1785/1787 the Varaždin County had 87,000 inhabitants.

During the period of the Independent State of Croatia, the Great Zagorje Parish was established as a state administrative unit on the territory of the former Varaždin County, but it had no judicial powers. The county system was restored with Croatian independence in the 1990s. On the basis of the 1993 Local Self-government Act, the Varaždin County's borders were re-established. The territory is considerably smaller than those of the old Varaždin County, as it no longer includes the area of Croatian Zagorje. Today the Varaždin County stretches between the Drava River in the north, the slopes of the Slovenske gorice and Macelj hills in the west and Kalnik and its slopes in the east and south-east. It covers an area of 1228 km² and is both one of the territorially smallest and most densely inhabited Croatian Counties.

Varaždin is the hub of the Varaždin County. With 46,946 inhabitants and the average annual temperature of 10°C, the city of Varaždin is one of the most attractive destinations to live in or to visit in Croatia. It is the tourist, cultural, economic, educational and sporting centre of north-western Croatia.

Demographics

The Varaždin County has a population of 175,951, which constitutes 2.23% of the total Croatian population. The gender breakdown is 53% female and 47% male. The largest number of inhabitants live in urban areas (Varaždin, Novi Marof, Ivanec, Lepoglava, Ludbreg, etc.).

6.2.2. Economy

The GDP per capita is EUR 10,583. The unemployment level is the lowest in the entire Republic of Croatia and in 2018 it amounted to 4%.

Workforce

Workforce makes up 68% of the whole population, including highly qualified professionals. Approximately 75% of the work force has high school, college and university degree, while 15% are qualified professionals. Women make up 48% of the working population.

R&D

R&D companies can be found in the manufacturing and ICT industry. Today the Varaždin County is an important Croatian region with intense industrial and commercial activities and a strong financial sector. The high quality of products and services provided by county's firms guarantee its successful economic development on the global market in the future.

The economy of the Varaždin County is focused on the manufacturing industry, particularly on: milk products processing, beverage production, meat packaging industry, clothing and textile industry, metal manufacturing industry, leather footwear industry, manufacturing of high-quality wood furniture and other wood products. The Varaždin County is one of the few Croatian counties in which export is higher than import.

Industrial clusters/branches

In Varaždin, as the main urban centre, textile, food, construction material and wood industries developed gradually. The mining industry developed at sites of coal deposits and the industry of construction materials at the deposits of other raw materials.

The region has recently become an interesting investment zone thanks to its favourable transport and geographic position at the intersection of the main European corridors and the vicinity to the border. Currently, there are 27 business zones in the Varaždin County, some of which are functional, while others, partly equipped with utility infrastructure, are awaiting new investments. A total number of 57 business zones with a total area of 1400 ha are being planned. Operational business zones occupy 1083 ha and are mostly under construction. The most successful business zones are situated in the towns: Varaždin, Ludbreg, Ivanec, Lepoglava and Novi Marof, and in the municipalities: Breznički Hum, Ljubeščica, Jalžabet, Gornji Kneginec, Trnovec-Bartolovečki, Jalkovec, Brezje, Beretinec, Sračinec, Petrijanec, Selnik-Maruševac, Cestica.

Therefore, a strong transport position has become one of the basic features of the county's economy, enabling the establishment of economic and cultural connections with both Central and Eastern European countries and the Adriatic Sea.

Industrial sites

The Varaždin county, in addition to being the most competitive county in Croatia, works continuously on its economic development through investing in the economic development of business zones, the use of EU funds, the improvement of labour-intensive industries, raising the level of education all over the county, and above all, through attracting high-quality domestic and foreign investment in order to preserve existing jobs and create new ones.

In recent years, the Varaždin county has been at the top of the rankings regarding competitiveness as well as being among the regions with the largest export and is one of the few counties which have a positive balance of the import/export in favour of export, which – according to the latest data –



amounts to more than 2.9 billion kuna. The unemployment in the county is below the national average. The biggest “resources” in the region are in fact entrepreneurs, who alongside their employees, have managed to achieve outstanding business results, especially taking into consideration salaries which are 18.3% lower than the national average. The Varaždin county offers many advantages to the investors, such as: educated labour force in the county with the longest tradition of industrial production, regulated ownership, spatial documentation, building permits being issued as soon as possible, all the necessary municipal infrastructure – all this allows to carry out any investment in a very short period of time. The county attracts investors by offering the possibility to hire purchase land, the possibility to reduce land costs relative to the number of employed people and the possibility to pay communal tax & contributions fees on an instalment basis for the first three years of operation.

Three business areas (Gornji Kneginec, Jalžabet and Lepoglava) have ICPR certificates. All these benefits can be confirmed by positive experiences of the entrepreneurs who are already doing business in those industrial zones, as well as provide motivation to each investor interested in investing in the Varaždin county. The Varaždin and Međimurje counties are the most prosperous counties in Croatia, and 75% of Croatian coating and shoe industry is still concentrated in these two areas.

The Varaždin county have 27 business zones ready for business, occupying 1083 ha. The following are the most important industrial, economy and business zones in the Varaždin county:

1. The Entrepreneurship zone Beretinec – 13.8 ha of land
2. The Entrepreneurship zone Breznički Hum – 49.65 ha of land
3. The Economy zone Cestica – 30.5 ha of land
4. The Entrepreneurship zone Kneginec – 168 ha of land
5. The Industrial zone Ivanec – 30 ha of land
6. The Entrepreneurship zone Jalžabet – 140 ha of land
7. The Entrepreneurship zone Lepoglava – 66.7 ha of land
8. The Entrepreneurship zone Ljubeščica – 19.3 ha of land
9. The Entrepreneurship zone Ludbreg – 82 ha of land
10. The Economy zone Donji Martijanec – 30 ha of land
11. The Business zone Novi Marof – 27.3 ha of land
12. The Entrepreneurship zone Sveti Ilija – 21.8 ha of land
13. The Entrepreneurship zone Trnovac Bartolovečki – 30.1 ha of land
14. The Economic zone Brezje – 157.6 ha of land
15. The Entrepreneurship zone Varaždinske Toplice – 82.5 ha of land

6.2.3. Road infrastructure

The geographic location of the Varaždin County makes it a part of the north-western connection of the Republic of Croatia with European transport systems. Its transport location is very favourable, at the intersection of European road and railway corridors, i.e. the transversal corridor connecting the

central Podunavlje region, surrounding the Danube River with the northern Adriatic Sea, and the longitudinal corridor connecting the eastern Alps with the Lower Podravina region, surrounding the Drava River.

Road infrastructure

Given the high population density and large number of settlements, as well as the great transport importance of this region, the transport system of the Varaždin County is well developed despite certain issues, such as obsolete and worn-out components of the transport infrastructure. Additionally, some parts of the county are characterized by poor traffic accessibility and connectivity of transport networks. This primarily refers to the west of the county which is inadequately connected with the A2 and A4 motorways.

The road network is well-branched. Of the entire length of local roads, only 48.67 km are macadam roads and there are no field roads in the county territory. The existing railway network is aged and the railway technology should be modernized since not a single kilometre is electrified, and electrification would increase speed and the number of passengers. Furthermore, all railways are single-track railways, which affects waiting time and consequently, costs.

Strategic Croatian road routes run through the Varaždin County: the European corridors E65 and E71 Hungary-Varaždin-Zagreb-Rijeka and the state corridors which are integral parts of the Podravska Road. Varaždin stands out as the transport hub at the intersection of all these routes, connecting the Central Danube region and the northern Adriatic with the eastern Alps and Lower Podravina region. The county's most important road routes developed on the connections between municipality centres and the county centre. Due to high population density and many settlements, the county's road network is well developed.

The road of the highest strategic importance is the 45 km A4 Zagreb-Goričan motorway. It is part of the ex-European transport Corridor Vb (TEN-T Mediterranean corridor) connecting Budapest, Zagreb and Rijeka. It is a motorway connecting the north and south of the county. There are five junctions, enabling the connections of settlements situated in the corridor 10-15 km from the motorway. To make the maximum use of the vertices or junctions, they should be situated 3-5 km from each other.

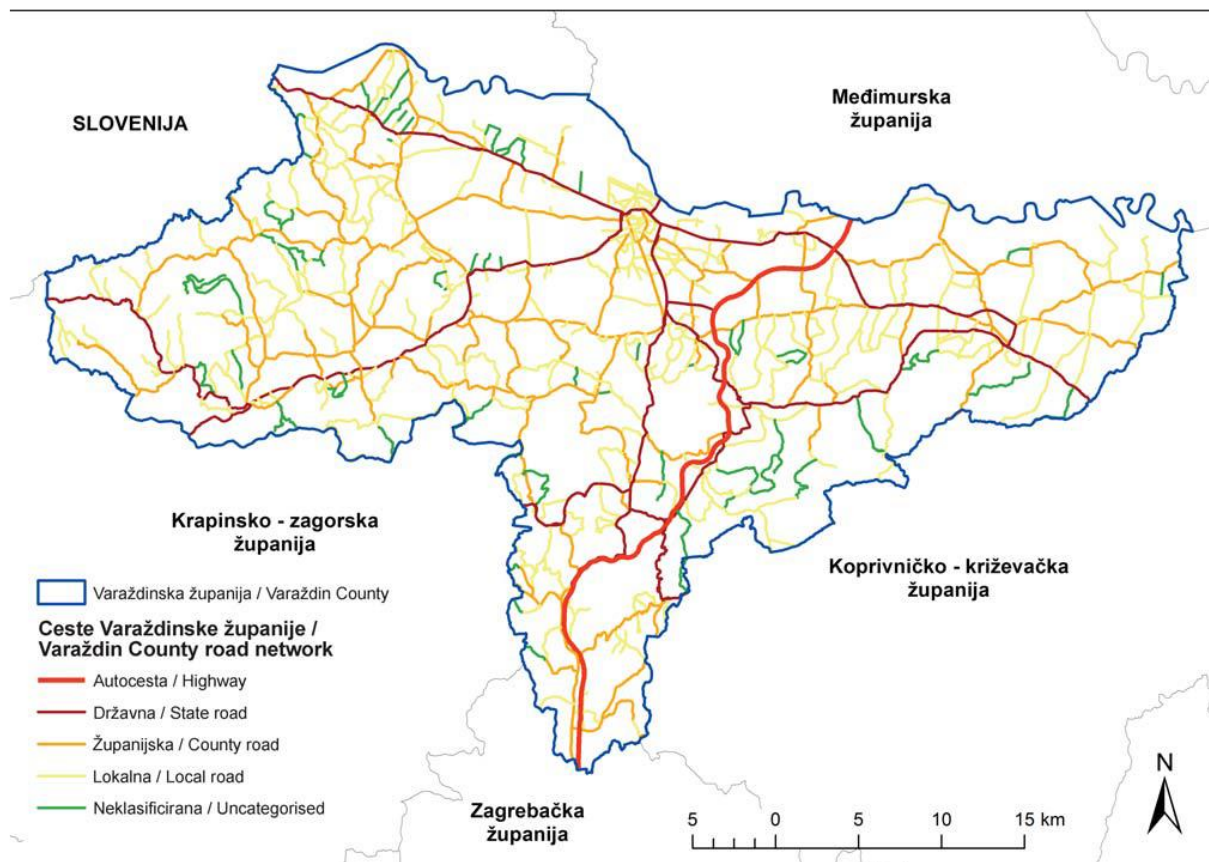


Figure 8 Varaždin County Road Network
Source: www.researchgate.net

In general, the county has good road infrastructure, especially county roads. The road network in the plain is more complete and in better condition than the roads running through the hilly countryside. An unsatisfactory situation is encountered in the border area, where there is not a single important road and some settlements can be accessed only via roads from Slovenia. Therefore, improving road infrastructure and its development and connectivity, especially near the border and in hilly areas, should be a priority at the county level.

6.2.4. Railway infrastructure

In total there are 91,751 km of railway lines, including class I railways (R202 Varaždin-Koprivnica and R201 Čakovec-Varaždin-Zaprešić-Zagreb) and class II railways (L201 Varaždin-Golubovec).

These railways run through the most densely populated area of Croatia and therefore passenger traffic is predominant. As the last railway was constructed 78 years ago, investments are needed to modernize the infrastructure. All railways are single-track and non-electrified. An additional problem is the speed limit which varies between 45 and 100 km/h.

The Varaždin-Golubovec railway is in the worst condition and speed limits decrease on a yearly basis, to only 20 or 30 km/h in some parts. On this 34.582 km long route there are eight lines daily, and the average speed is 38.86 km/h. There are 13 trains daily to Zaprešić (and further to Zagreb), and the average train speed on this 87.422 km long section is 40.47 km/h. As far as technical and

maintenance issues are concerned, the Varaždin-Koprivnica railway is in the best condition, with nine trains daily operating at an average speed of 62.48 km/h.

| Route | Length (km) | Average speed (km/h) | Number of lines per day |
|---------------------|-------------|----------------------|-------------------------|
| Varaždin-Zaprešić | 87.422 | 40.47 | 13 |
| Varaždin-Koprivnica | 44.98 | 62.48 | 9 |
| Varaždin-Golubovec | 34.582 | 38.86 | 8 |

Figure 9 Railways in the Varaždin County

Source: authors' own work

Although the development of the county railway network is better than the Croatian average (according to Engel's coefficient), its capacities and infrastructure are lagging behind, which results in loss of competitiveness. The Varaždin County railway network is not used enough for the transport of people and goods, the rolling stock of Croatian Railways is obsolete and poorly maintained, trains are slow and other infrastructure elements such as stations are in poor condition. The county centre Varaždin is the transport hub and the main railway junction. There are many buildings and facilities within the junction area. The railway line splits the city centre in two. The industrial tracks connect the major industrial areas in the city.

Conclusions

The Varaždin County has a developed transport system due to its favourable geographic location, even though this system is aged and requires modernisation. Road transport is the most important type of transport, but in order to improve the quality of the road network, new road lines (Zagorje express road) should be constructed and the state road network should be expanded and modernized (Podravina road). Additionally, further expansion of settlements along state and county roads should be avoided to prevent degrading them into lower categories. Railway transport has been lately gaining importance due to its lower costs. Railways and the accompanying railway infrastructure should therefore be modernized. Inland waterway transport is not important for the county, while there is room for air transport development.

6.2.5. Intermodal facilities

There are no intermodal facilities in the region.

6.2.6. Policy analysis

4.1.8. Entities responsible for rail freight transport and services in the region

HŽ Cargo and HŽ Putnički Prijevoz were up to 2013 the only rail carriers in the Croatian market. When the country entered the EU, the market was liberalised and new competitors appeared. Liberalisation was mostly apparent in freight transport, which could now be conducted by foreign carriers. Foreign companies had, indeed, been present on the market much earlier, via logistic companies. For example, Austrian State Railways (ÖBB) had been present on the freight market from 2010 through the company Express-Interfracht Croatia (today: Rail Cargo Logistics Croatia).

Most railway carriers have subsidiaries responsible for the organisation of carriage and logistic services. Logistic support for ÖBB is provided by the subsidiary Rail Cargo Group². PPD Transport, SŽ Tovarni Promet, and Train Hungary Magansvasut Ipari have been on the market since 2013.

Because of the complex process of accessing infrastructure, foreign rail carriers have not taken any great strides in taking shares of the Croatian market. In Croatia it is permitted to operate only vehicles licensed by the Agency for Safety of Railway Traffic (the same holds true for staff) and every company has to obtain a Safety Certification issued by the Agency. Thus SŽ Tovarni Promet acquired a safety decision for Croatian lines as late as May 2016. Even though, since 2015 the activity of foreign carriers has been gradually on the rise. Foreign carriers who do not have a company seat in the Republic of Croatia are not allowed to carry passengers, but only to use the infrastructure for the purpose of international passenger carriage. This limit will not last long and in the foreseeable future it is expected that the passenger transport market will be fully liberalised.

Analysis of the policy documents at the national and regional level

Development Strategy of the Varaždin County 2016-2020

Expressways should become one of the foundations of the county road network. According to the Regional Development Concept of the Varaždin County “the problem lies in the intensified transport of vehicles through residential areas, which is the reason why there are attempts to construct a new network of express roads outside of settlements and cities or bypasses, primarily to take over transit freight transport.”

The objectives of City of Varaždin’s transport system organization should be aligned with the planned development needs of the city as an organic system. Numerous roads in the territory are classified in accordance with their importance to the basic network of public roads of the Republic of Croatia, i.e. as state, county and local roads. The road transport system is currently almost fully focused on the north-south and east-west state roads. The most important road is the south-west bypass which delimits the western and southern parts of the city, while the street network does not meet current requirements, with an extreme traffic load on some routes during rush hours. The biggest traffic problem in the city territory is the D2 state road which runs through the central city area.

There are three railway lines in Varaždin, the most important connecting Varaždin with Čakovec and Zagreb. However, its role has been diminished due to its poor transport and technical characteristics.

The existing railways do not meet the requirements of modern transport systems and do not allow for the development of higher travel speeds or the transport of vehicles with a higher axle load. Good spatial distribution of railway facilities is a benefit since the existing railway routes are positioned radially regarding the centrally positioned Varaždin train terminal. That is why, the shortest and fastest traffic connections have been established within the greater city area and within the county and the country. One of the disadvantages is the low possibility of railway expansion due to the occasional passage through densely populated areas.

Recommendations

According to the Transport Development Strategy of the Republic of Croatia 2014–2030, regional transport in central Croatia is characterized by a radial transport structure, which is highly

concentrated in Zagreb. There is demand for transport services from small settlements to the capital, mainly for commuting or business purposes. As Zagreb is also the education centre, a high number of high school and university students commute to and from Zagreb daily. Therefore, one of the main objectives of transport development in Croatia is to develop an intermodal, sustainable, efficient and safe transport system and thus upgrade the economy and the overall development of the Republic of Croatia. This would ensure adequate resources to create social, economically and environmentally sustainable, efficient and high-quality infrastructure and services.

6.3.SWOT Analysis for Primorje-Gorski Kotar and Varaždin County (Croatia)

The table below presents a SWOT analysis for two regions in the territory of Croatia.

Table 14 SWOT analysis for two regions in the territory of Croatia

| Strengths | Weaknesses |
|---|--|
| <p>Economic development of these counties arising from various economic ventures</p> <p>Good road connections with major intermodal facilities</p> <p>The distances from the port in Rijeka to the ports in Central and Eastern Europe are shorter than from Koper or Trieste</p> <p>Geographical location</p> <p>Wide gravity area</p> <p>Well-developed highways and telecommunications</p> <p>Increasing number of business entities</p> | <p>Lack of new entrepreneurial projects in transport and sustainable planning</p> <p>Inappropriate logistics activities</p> <p>Excessive customs formalities</p> <p>Lack of railway and energy infrastructure</p> <p>Different types of bus voltage</p> <p>There are no clear criteria for intermodal development needs and plans</p> <p>Infrastructure projects are not prepared for EU funding</p> <p>The grounds in ports have different owners, which requires a lot of financial resources</p> <p>Croatian railways unfamiliar with new market conditions and competitors; bad reputation</p> <p>Overregulated business environment, weak local competition</p> <p>Underdeveloped ICT networks</p> <p>Insufficient investment in innovation and new products, technologies and industrial modernization</p> |
| Opportunities | Threats |
| <p>Changes in the political environment – constantly growing interest of foreign investors</p> | <p>Foreign partners do not have much confidence in investing in Croatia</p> |



| | |
|---|--|
| <p>to invest in Croatia</p> <p>Availability of funds from EU institutions (World Bank, EIB, EBRD) for joint programs and internal restructuring of intermodal infrastructure</p> <p>Development of the Rijeka port as a logistics centre for a wider hinterland</p> <p>Development of a foreign trade centre for Central European countries which do not have access to the sea</p> <p>Increasing the demand for transport by creating long-term partnerships</p> <p>Reconstruction of the railway infrastructure</p> <p>Better use of and increased investment in intermodal capacity and geographical benefits</p> <p>Development of clusters and industrial zones</p> <p>SME associations, cluster initiatives, infrastructure to support businesses</p> | <p>The Trieste-Koper connection is a strong competition for the port of Rijeka</p> <p>Lack of cooperation with Slovenia to extend the former Fifth Corridor from Trieste to Rijeka, i.e. to connect the Rijeka Traffic Route through Slovenia with the European Union</p> <p>Investment and market demand inconsistencies</p> <p>Lack of coordination and cooperation with service operators in the intermodal transport corridor</p> <p>Inadequate marketing mix</p> <p>No clear strategies or development plans</p> <p>Investment projects are not prepared and are not ready for EU funds</p> <p>Changeable external environment, tax sensitivity</p> |
|---|--|

Source: authors' own work

7. Komitat Vas and Zala (Hungary)

The specific development of Central European transition economies might have prevailed in their regional development, which can be seen mainly in regional industrial dynamics. In this regard, Lengyel and Leydesdorff (2010) showed that in Hungary, besides industrial dynamics, foreign-owned companies in high-tech and medium-tech industries have restructured regional economic systems. On the other hand, universities play a larger role in shaping the local organization of high-tech knowledge-intensive services (R&D and communication). The regional concentration of industries has also evolved accordingly. For example, north-western Hungary, where most of foreign companies are located, stands out as the leading area in automotive industry concentration (Grosz, 2006), while the ICT industry is spread over the entire country (Szanyi, 2008), although it is mostly concentrated in Budapest and its neighbouring regions (Lengyel, 2010). Szanyi and Lengyel (2010) conducted an empirical analysis of the determinants of cluster emergence and confirmed that, despite the industrial differences in regional dynamics, the change in geographic labour concentration negatively correlated with the initial degree of labour concentration in all the industries. This result suggests that the more the region was specialized in a certain industry, the more slowly the concentration occurred in terms of employment. The above arguments indicate that regional economic growth in Hungary in the transition period was closely associated with the spatial concentration of industry and market.

7.1. The analysis of the West-Transdanubian Region

West-Transdanubia (region's capital: Győr) is a developed and industrialized region at Hungary's western border. West-Transdanubia, which had a population of 983,251 inhabitants in 2017 (Eurostat, 2018) and comprises an area of 11,329 km², encompasses three counties: Győr-Sopron-Moson, Vas and Zala. The favourable geographical location (a border region with four neighbours: Austria, Slovenia, Croatia and Slovakia) and good accessibility by highways grants West-Transdanubia an advantageous competitive position. West-Transdanubia specialises in automotive and machinery industries and is characterized by larger than the national average amounts of foreign direct investment (FDI).

West-Transdanubia hosts 10% of the total population of Hungary. West-Transdanubia, like other Hungarian regions (except for Central Hungary), has experienced a decrease in population (2.1% since 2001). However, the population decline in West-Transdanubia is not as significant as in other regions. Its population is aging rapidly: the aging index increased from 100.2 to 137.3 between 2003 and 2017 (CSO, 2018).

The regional GDP in West-Transdanubia was €12.5bn in 2016, and the GDP per capita in PPS was 21,500 PPS per inhabitant in the same year (Eurostat, 2018). This meant an increase of over 20% since 2012 and can be considered relatively high in the national context (it is a region with the second highest GDP, although much below the performance of the region of Central Hungary). West-Transdanubia's GDP per capita in PPS constitutes 109.1% of the national average, and 73.6% of the EU-28 average, thus lagging behind many European regions.

The region experienced a rapid FDI-driven growth after the change of the regime. Currently the key driver of regional growth is the export-oriented production of foreign subsidiaries. The region's share

in total FDI stock has shown a slight increase since 2012 (over 15%) reaching 15.5% by 2016 (CSO, 2018), ranking second after Central Hungary with respect to FDI-attraction potential. FDI reinforced the region's specialization in manufacturing industries: machinery and equipment, automotive, and electronics. The key automotive investors include Audi, Luk Savaria, Opel Szentgotthárd, BPW Hungária, SMR Automotive Mirror Technology, Dana Hungary and Nemak Győr. Major actors representing the electronics industry are Delphi Hungary and Epcos. A major domestic innovative actor is Rába Automotive Holding Plc.

FDI led to an excessive concentration of these industries, which was hardly mitigated by interventions to mobilise the region's assets (thermal tourism, wood and furniture industries). Given the high concentration of automotive industry, the 2008-2010 crisis hit West Transdanubia particularly hard. The number of jobs decreased by nearly 7% between 2007 and 2010. Since then, growth has resumed and employment increased. West Transdanubia has the second-lowest unemployment rate in Hungary (following Central Transdanubia), amounting to 2.4% in 2017 (Eurostat, 2018). This is lower than the national average (4.2%) and much lower than the EU-28 average (7.6% in 2017; Eurostat, 2018). Apart from increasing labour demands, factors such as state intervention (e.g. public works schemes) or significant emigration to other countries also contributed to achieving low unemployment rates.

Currently, the main barrier for further FDI-driven growth is the shortage of skilled labour force. The rate of economically active population is among the highest in Hungary: 63.2% in 2017 (CSO, 2018), above the national average (61.8%). Tourism is one of the most important sectors within service industry. Income from hotel services ranks the region second in Hungary, following the Central Hungarian region. Its contribution to total industrial production is also relatively high. In 2017 it was 19.1%, second in the ranking following Central Transdanubia (20.2%) (CSO, 2018).

The map below shows the location of Zala and Vas Regions in the country.

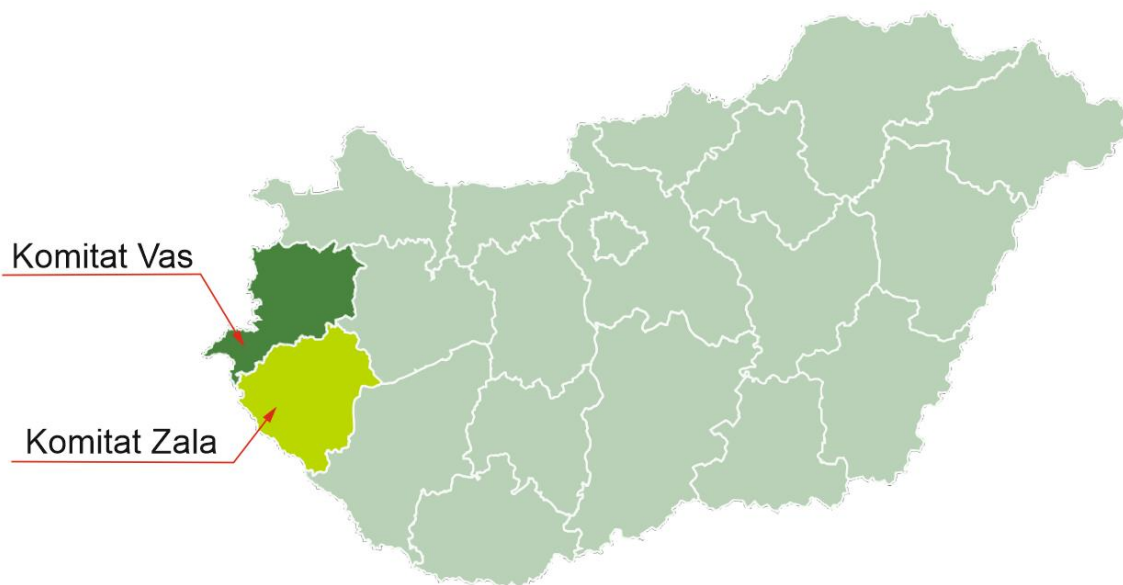


Figure 10 Location of the analysed areas in the country

Source: Authors' own work

R&D and innovation

Among the Hungarian convergence regions, West-Transdanubia features the most spectacular development in terms of innovation performance, albeit starting from a low level in the mid-2000s. West-Transdanubia used to rank last among Hungarian regions in terms of all major innovation indicators. Its poor innovation performance, especially in the light of a relatively good economic performance, used to be referred to as West-Transdanubia's innovation paradox: innovation performance was much inferior to what the region's relatively good economic performance would suggest. Both the number of research centres (188 in 2016) and researchers (full-time equivalent – FTE) – 1,707 in the same year – declined by more than 20% since 2013. Only 6.9% of the national research centres, and 4.0% of the FTE researchers are located in West-Transdanubia, since over half of these are concentrated in the Central Hungary region. The regional R&D expenditure has increased considerably (over 10% since 2010), amounting to €69.9m in 2015 (Eurostat, 2018), corresponding to 0.6% of the GDP. This is substantially below both the national average (1.4%) and the EU-28 average (2.0%). Of the total R&D investments in the region in 2015, 77.1% was provided by private companies, slightly above the national average (73.4%).

Most of the region's research centres are university-based. The key universities are: Széchenyi István University in Győr, University of West Hungary in Sopron and Mosonmagyaróvár, and the Pannon University in Keszthely. Industry-academia collaborations are concentrated at the Széchenyi University which has several (automotive industry related) knowledge centres, and at the University of West Hungary (wood- and eco-industry related centres). Except for some key multinational actors, companies in West-Transdanubia mostly innovate by adopting technologies developed elsewhere. While the patent applications filed to the European Patent Office (EPO) were far below the national average in 2012 (7.8 per million inhabitants, against the national average of 17.1 per million inhabitant; Eurostat, 2018), the number of employees in the high-tech sector has increased by over 20% since 2013, being at 18,100 employees in 2017 (Eurostat, 2018). In 2017, this represented 8.5% of the national employment in the sector (around 7% in 2013) and 3.8% of the total regional employment (3.5% in 2013), being above the EU-28 average which was 4.0% (Eurostat, 2018).

7.2. Transport infrastructure in the country

3 Core Network Corridors cross the territory of Hungary:

1. The Mediterranean Corridor that directly affects the regions analysed in this document - links the Iberian ports of Algeciras, Cartagena, Valencia, Tarragona and Barcelona through Southern France, with a link to Marseille, and Lyon to Northern Italy, Slovenia and a branch via Croatia to Hungary and the Ukrainian border. It covers rail and road, airports, ports, RRTs and, in Northern Italy, also the Po river inland waterway. The key projects are UIC standard gauge railway lines in Spain, the Lyon-Turin railway tunnel and the Karst crossing Trieste/Koper – Ljubljana.

Two others corridors run to the east of the analysed regions and also have an impact on development, these are:

2. The Orient/East-Med Corridor connects the German ports Bremen, Hamburg and Rostock via the Czech Republic and Slovakia, with a branch through Austria, further via Hungary to the Romanian port of Constanta, the Bulgarian port of Burgas, with a link to Turkey, to Greek ports Thessaloniki and Piraeus and a "Motorway of the Sea" link to Cyprus. It comprises rail, road, airports, ports, RRTs and the Elbe river inland waterway. The main bottleneck is the Timisoara-Sofia railway section.

3. The Rhine-Danube Corridor, which connects Strasbourg and Mannheim via two parallel axes in southern Germany, one along the Main and the Danube, the other one via Stuttgart and Munich, and with a branch to Prague and Zilina to the Slovak-Ukrainian border, through Austria, Slovakia and Hungary to the Romanian ports of Constanta and Galati. It covers rail, road, airports, ports, RRTs and the inland waterway system of the Main, the Main-Danube Canal, the entire Danube downstream of Kelheim and the Sava river. The key projects aim at removing the bottlenecks along the inland waterways and the railway sections Stuttgart-Ulm and München-Freilassing

Crossing corridors across the country creates new opportunities for the development of transport and indirectly affects the development of the analysed regions.

The layout of the Hungarian rail network is shown below.

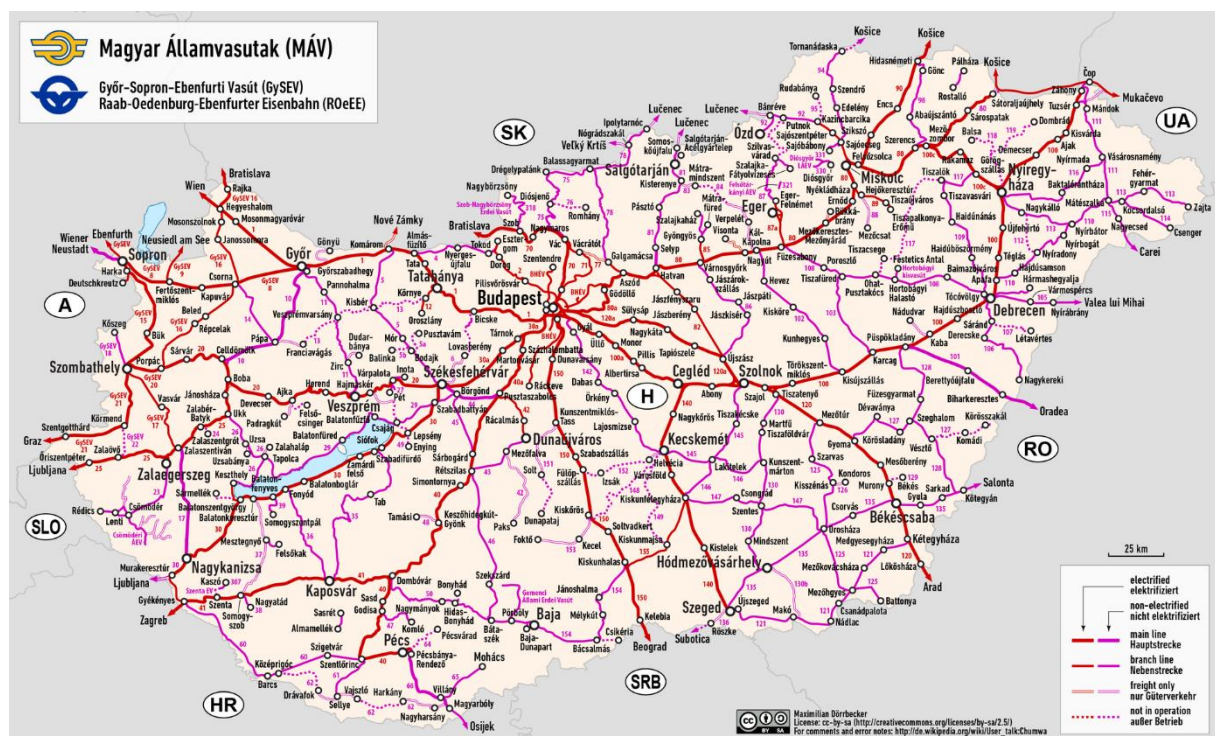


Figure 11 Layout of the rail network in Hungary

Source: carrier's website

The West-Transdanubia administrative county has great railway links to the rest of the Europe via rail freight corridors:

1. Mediterranean Rail Freight Corridor to western Europe
2. The Orient/East-Med Corridor to the North Sea
3. Amber Corridor to the Poland and Ukraine.

In 2017, 54 companies had a national railway license. The efficiency of rail freight transport in 2017, measured in tonnes, increased by 7.8% compared to the previous year. The average distance for freight transport by rail in 2017 was 212 km.

In terms of freight volume in Hungary, 72% of rail freight traffic is international. In rail transport, the main trading partners in 2017 were Austria, Slovakia, Italy, Germany, Romania, non-EU countries, Ukraine and Russia. The main destinations of rail transit are Romania, Germany, Slovakia, Slovenia and Austria.

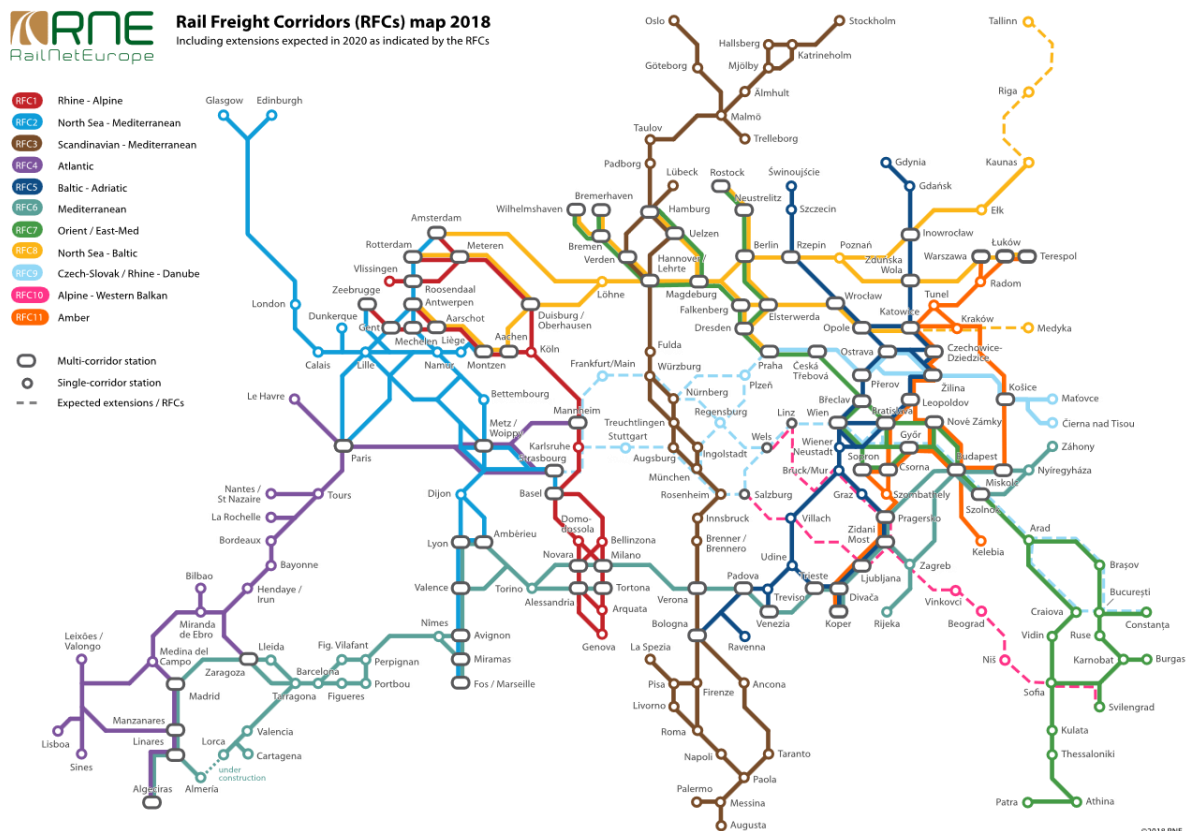


Figure 12 Rail freight corridors

Source: <http://rne.eu/rail-freight-corridors/rail-freight-corridors-general-information/>

7.3. Vas County territorial analysis

Vas is an administrative region of Hungary. It was also one of the counties of the former Kingdom of Hungary. The Vas County lies in western Hungary. It shares borders with Austria (Burgenland) and Slovenia (Mura Statistical Region) and the Hungarian counties Győr-Moson-Sopron, Veszprém and Zala. The capital of Vas county is Szombathely. Its area is 3,336 km². In 2015, it had a population of 253,997 and the population density was 76 inhabitants/km². The Vas County has 1 city county, 12 cities and 203 villages.

Szombathely is the 10th largest city in Hungary with a population of 78,407 and covers an area of 9.750 ha. It is the administrative centre of the Vas county, located near the border with Austria. Szombathely lies by the streams Perint and Gyöngyös, where the Alpokalja (Lower Alps) mountains meet the Little Hungarian Plain. Szombathely is the central capital city of the Vas County, which is part of the West Transdanubian Region, situated in the western part of Hungary, close to the Austrian border.

Its regional importance has been determined by several factors: the Mediterranean Corridor is situated ca. 100 kilometers away, linking Western Europe with the Balkans going through County Győr-Moson-Sopron (as well as the Rhine-Danube Corridor), and the extension of Mediterranean Corridor lies along the southern borders of the Zala County, which is also about 100 kilometres away from the city. Hence the development of the public road and railroad system in vertical directions is important for the city. The current national transport policy supports these connections, hence the development of motorway No. M86.

The closeness of the Austrian market is another determining factor; its evaluation, however, both regarding subjective and objective concerns is rather ambiguous. Burgenland, which offers significantly better salary opportunities, is a strong labour drain. However, the higher salaries of commuting employees are mostly spent in the Vas Region, which means that, along with shopping tourism coming from Austria, it also strengthens the economy and the role of Szombathely in the commercial and service sectors. Nonetheless, this has led to significant labour force shortage in the recent years mainly in the branches of catering, constructions and unskilled factory work.

7.3.1. Economy

Main economic activities in the city are commerce, automotive services, industry (multinational manufacturing companies in IT, electronics and automotive sectors are located here), with real estate sector, tourism, wood industry and food processing also having a significant share in employment and economic output. The city is located at the north-south roads and railway corridors connecting Central Europe and the Mediterranean area, and therefore logistic services linked to freight transport are a substantial part of the local economy.

Intermodal facilities

„SAVARIA LOGISTIC” intermodal logistic centre

The Savaria Logistic Intermodal Logistics Center was created in Szombathely in 2015 and began operating in 2016. It has a total area of 30,694m². The primary objective of the plan of the centre was to comply with the requirements of a modern intermodal centre.

The area borders with railway on the eastern side, and in the north, west and south side it is bordered by other properties. The property can be reached via a paved road in the east (railway crossing) and via a paved road on the west side. The goods arrive to the centre from the neighbouring countries and from local suppliers mainly by rail.

MÁV Kombiterminál Szombathely

The terminal has a total area of 24,240 m². Every day 4 trains deliver containers between terminals in Wels. Every second day one train goes to the Port of Rijeka and 3 trains per week from Romania

Biharkeresztes-Ferencváros-Hegyeshalom to Austria (Wels). Main operators on terminal are Hugarokombi and Ökombi.

7.4. Zala County territorial analysis

Zala is an administrative county in south-western Hungary. It is named after the Zala River. It shares borders with Croatia and Slovenia and the Hungarian counties Vas, Veszprém and Somogy. In 2015, it had a population of 277,290 and the population density was 73 inhabitants/km². The capital of the Zala County is Zalaegerszeg. Its area is 3,784 km² with population of 57,403 habitants. Lake Balaton lies partly in the county.

7.4.1. Economy

The GDP per capita of the county in the programme area is relatively low, amounting to ca. 54% of the EU average.

Industrial areas

Sopron container terminal

Sopron container terminal is an intermodal terminal located on the crossing of three rail freight corridors. Total terminal area is 30 ha, with container storage capacity of 1500 TEU. Warehouse capacity is 18,000 m². The terminal offers rail focused services with complex intermodal solutions, storage and customs.

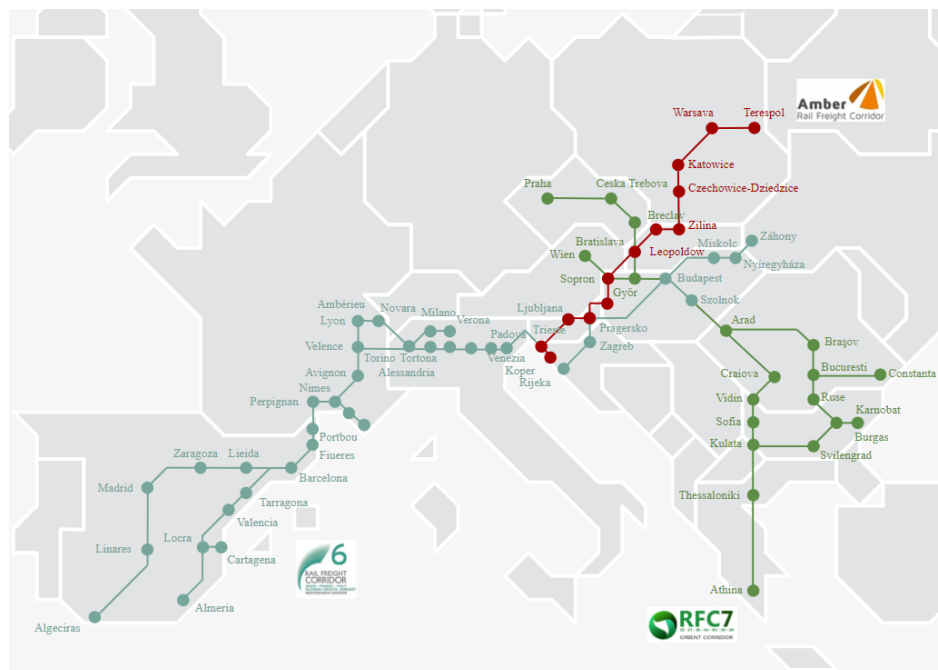


Figure 13 Railway connection of the Sopron container terminal

Zalaegerszeg Industrial Zone

Zalaegerszeg Industrial Zone is a 110 ha available industrial area. It consists of future Pannonia Logistics&Container Yard which is situated on the main corridor crossing Hungary from the north-east to the south-west. It is the closest Hungarian terminal to Trieste, Koper and further to Northern Italy. The Adriatic Sea handles ca. 69% of Hungarian sea container traffic. A direct connection to Trieste, Rijeka, Koper and further to Verona/Milano is planned, and also towards Vienna to connect with the North Sea and mainland Germany. The terminal may also be connected to the Budapest-Belgrade line, which will form an extension to the Greek ports of Piraeus and Thessaloniki. Moreover, it links to eastern Poland, where it will connect to the traditional route through Belarus and Russia. The terminal will include an intermodal yard with two 650-metre rail sidings, a container depot, truck parking, offices and warehouse areas.

Part of this industrial zone is an automotive test track – crucial in the development of autonomous cars. The Zalaegerszeg test track is unique since traditional test track features focusing on driving speed and driving stability have been implemented together with the R&D infrastructure elements connecting with future vehicles on multi-level system for validation. The testing ground provides not only dynamics tests for conventional vehicles, but it also allows validation tests for autonomous and electric vehicles.

In May 2016, the government of Hungary decided to create the vehicle test track in Zalaegerszeg, with the view to strengthen native automotive R&D capacities. In line with this, Automotive Proving Ground Ltd. was established as a company responsible for the management and implementation of the test track. Its task was to manage the creation of the proving ground, execute the investment, build the related automotive and engineering knowledge, establish competitive operation and create the customer network.

Inpark Zalaegerszeg is located next to the automotive test track. It is an intermodal logistics centre and a future container terminal, as well as the M76 expressway as a 2x2 lane “smart road”.

Inpark is located on a 62.1 ha yard offering 249,000 m² for development opportunity. The National Tobacco Distribution Company is already a customer of Inpark Zalaegerszeg.

7.5. National policy analysis

In 1993, Hungary adopted rail law, which is in line with the European Communities Directive of 1991.

Rail infrastructure in Hungary can be divided according to its ownership: lines owned by the state, lines owned by local governments, and a small number of lines owned privately. In Hungary, independent managers are subject to the same rules as the national MAV manager. Independent managers may also be carriers, but must comply with regulatory accounting principles – however, this only applies to entities which provide public services in accordance with national rail law.

The law also provides for other possible exclusions, e.g. certain networks do not have to be made available (therefore, entities managing qualified infrastructure are not required to publish the network rules).

7.6. Clusters



The history of clusters starts at the beginning of the early 2000s. Hungary was the first country in Central and Eastern Europe, where national government supported the development of corporate cooperation and clusters. The first cluster in Central and Eastern Europe was established probably in Hungary (in Dec 2000 – PANAC: Pannon Automotive Cluster) as a result of calls for proposals supporting the establishment and development of regional clusters starting in 2001. Top down approach was typical for clusters in those days.

Joining the EU in 2004 opened up new resources to support clusters and opportunities to spread the cluster phenomenon. The breakthrough was the 2007-13 programming period, in which clusters were supported along complex and long-term programmes.

The economic development and regional operational programmes in the 2007-13 programming period hugely supported the development of cluster organizations. The three-level cluster development policy supported:

- start-up cooperation, establishment of clusters;
- developing clusters (at least 1 year track record);
- accredited clusters;

The Regional Operational Programmes provided resources for the start-up and the development of clusters. The primary goal of the approved projects was to support the newly-formed and developing clusters (the ones which had been operating for at least 1 year).

The Economic Development Operational Programme provided grants for supporting accredited clusters using nationally uniform criteria. Calls targeted the support of joint R&I projects and investments of cluster members, project companies and consortia.

The three-level cluster development policy facilitated the continuous evolution of clusters and the end goal of this progress was to reach the “Accredited Cluster” label. The aim of the accreditation was to recognize the achievements of successfully operating clusters and to select and improve those clusters which met the following requirements:

- significant impact on employment
- outstanding depth of cooperation between members
- national or cross-border impact of cooperation among members
- international market entry potential
- significant innovation potential.

The Accredited Clusters, on the one hand, received an accreditation certificate, which provided the Accredited Cluster label for 2 years and on the other hand through the use of the label they were entitled to utilize certain advantages in the available calls for proposals (e.g. dedicated calls for proposals, higher grant intensity, advantage during the project selection process).

In 2013, 34 clusters had the Accredited Cluster label. Altogether they had 1261 members, including 1140 business organizations. The 34 clusters employed around 117,000 people and their aggregate income was over 9,500 billion HUF, a quarter of which came from export activities.

The 3-level cluster development model and the available calls for clusters and for their members led to an explosion of the number of Hungarian clusters in the 2007-13 period (Figure 13).



Figure 14 Hungarian clusters 2007-2013

The results and experience of the national cluster development policy was summarized in a study ordered by the Ministry for National Economy of Hungary in 2015. The purpose of the study was to determine the goals for the new 7-year period.

The main lesson of the study was that only a third of the 176 start-up and developing clusters could utilize the received grants successfully. The other clusters did not perform any real activity after the project implementation period. On the one hand, the abundance of cluster-related calls caused start-up and developing clusters to be established in the same industry almost next to each other geographically. On the other hand, cooperation among members did not have the right background.

In contrast, member companies of accredited clusters implemented a lot of successful projects making investments for economic development, particularly for R&I projects.

Taking into account this experience, the national cluster development policy has been changed significantly. Unlike previous practice, the cluster development policy is more focused in the 2014-20 programming period. The emphasis is placed on clusters with track record and on improvement of clusters which are able to develop, instead of numerous start-up cooperation programmes. Accordingly, the conditions for receiving the Accredited Cluster label have changed, so active cooperation among members, professional cluster management and international presence are more significant than before.

Beyond modifying the conditions for receiving the Accredited Cluster label, the aims of the national cluster development policy for 2020 were defined as follows:



1. Cluster concentration, internationally visible clusters

Concentration and growth of accredited clusters will result in the emergence of 10-15 top clusters within three years. Operational activities will be performed by a cluster management organization providing professional services (e.g. incubation, mentoring, supplier rating, etc.). Such a top cluster should concentrate the most relevant players in the industry and its related sectors and should have over 100 members (present average is about 40 members) and cover the entire spectrum of value chain.

2. Implementation of successful and market-oriented projects

Within three years, the concentrated cluster membership will present at least 3 successful, cooperative projects in each top cluster and the product coming out from such projects will be introduced to the market and/or sold. The projects will pay special attention to Industry 4.0 solutions.

3. Increasing international presence

Within three years, as a result of concentrated cluster membership each cluster will be involved in at least two international projects (e.g. Horizon2020, COSME, INTERREG EUROPE etc.).

4. Strengthening regional clusters

Besides the Accredited Clusters, successful regional clusters focusing on regional needs and local industry specialization will also play an important role. The purpose of supporting regional clusters is to help them in their further development and prepare them for international markets. The expected result is 15-20 clusters focusing on professional regional needs which will produce a new generation of Hungarian clusters.

In order to reach the above goals, the Ministry of National Economy introduced a new approach for supporting Hungarian cluster initiatives.

7.7.SWOT analysis for Vas and Zala Counties

Table 15 SWOT analysis for two counties in the territory of Hungary

| Strengths | Weaknesses |
|---|---|
| <p>Active environment for professional organization</p> <p>Intensive international processing, industrial and logistics services, ensuring the presence of transport</p> <p>Articulated transport for logistics development</p> <p>Advanced logistics infrastructure in the capital and in its vicinity</p> <p>Broadband (xDSL, CATV) coverage in Hungary has reached the average value of the EU</p> <p>Extensive system of international relations of national NGOs</p> <p>More attention was paid to the development of clusters</p> <p>Excellent transport and logistics system, especially when compared with Hungary's southern, eastern and northern neighbours</p> <p>Low labour costs</p> <p>Tax exemptions encourage investments related to eco-innovations</p> | <p>Education and training in logistics are not entirely in line with employers' expectations</p> <p>Hungarian private companies and training awareness remain at a low level</p> <p>The competitiveness of smaller domestic companies is constantly weakening in the increasingly complex logistics sector</p> <p>The quality of the current logistics tools system is uneven</p> <p>The IT background of SMEs supporting logistics activities (company management system, warehouse computing etc.) is much less developed than for large companies</p> <p>The transport and logistics regulations sector is struggling due to a lack of specialists</p> <p>Economic diplomacy is currently bipolar</p> <p>Lack of culture of cooperation with SMEs</p> <p>Despite the positive examples, the cooperation between networks and logistics partners is not widespread</p> <p>Low resource productivity</p> |
| Opportunities | Threats |
| <p>Sufficient use of resources from publicly funded forms of training</p> <p>Introducing regulations and incentives to intensify cooperation between educational establishments and companies</p> <p>Increasing amounts of foreign direct investment</p> <p>Development of logistic commitment and culture of national SMEs</p> | <p>Key logistic players are unable to clearly demonstrate the need for logistics development, and the expected results do not convince the government</p> <p>In some cases, state-supported infrastructure development will not be confirmed</p> <p>Most micro- and small enterprises use the Internet only for information (searching for information related to goods and services) and</p> |



| | |
|---|--|
| <p>The logistics sector can make greater use of secondary demand generated by agriculture and the processing industry</p> <p>Reducing taxes and administrative burdens for logistics service providers</p> <p>Budapest's centralized position in the logistics network should be reduced</p> <p>Intensive development in the field of urban logistics, green logistics and reverse logistics</p> <p>Greater use of nodal infrastructure potential</p> <p>Support for the development of broadband infrastructure in places where this investment would not be justified for purely business reasons</p> <p>More active participation in the work of international organizations</p> <p>More focused and efficient logistic activities of "country marketing"</p> <p>Developed network and increased cooperation can play a major role in stabilizing the market situation of domestic logistics players and in improving their competitiveness</p> <p>Low energy prices</p> | <p>for communication</p> <p>Disadvantages arising from the mismatch of horizontal approaches to sectoral approaches in the context of economic political aspirations</p> <p>National economic and sectoral strategies will not be completed in time</p> <p>Logistics for SMEs that currently do not carry out R&D activities also do not plan such activities in the future</p> <p>The domestic market is too small and underdeveloped to stimulate innovation and the emergence of new technologies, which requires enterprises to be "born on the global market"</p> <p>Legislation is not up to date, especially as regards the most modern industries</p> <p>Hungary – outside the capital – is a relatively small and slightly weak market, expansion options require immediate internationalization, especially in niche markets</p> |
|---|--|

Source: authors' own work

8. Stakeholders

The rail transport systems in the analysed areas depend on one another and form one, coherent entirety; therefore, one stakeholder analysis was carried out, common for all areas. The analysis took into account target groups of stakeholders and not specific entities because they can change at any time (e.g. new entities will be created). Only in the case of infrastructure owners and managers and rail carriers the largest entities in individual countries were listed, as well as the largest representatives of industries who have an interest in the development of rail freight.

Impact of stakeholders on the development of rail freight transport..

Table 16 Impact of stakeholders on the development of rail freight transport.

| | Interest (of stakeholders) | | |
|--|----------------------------|--|--|
| | | Low | High |
| Impact on the development of rail freight (Stakeholders) | Low | <ul style="list-style-type: none"> - Local entrepreneurs, - Inhabitants. | <ul style="list-style-type: none"> - Universities, - Institutes and other research units, - Clusters (listed above in the description of individual regions), - Chambers of commerce (listed above in the description of individual regions). |
| | High | <ul style="list-style-type: none"> - Large companies operating in a given area (mainly manufacturing companies whose products are exported to other countries), mostly automotive companies, e.g. Audi/VW, Mercedes, Fiat, Opel, Suzuki), electrotechnical and household appliances (e.g. Samsung, Electrolux, Bosch, LG, etc.) - Logistics operators (Schenker, Raben, Prologis, Kuehne + Nagel, etc.), - Potential new investors. | <ul style="list-style-type: none"> - Regional government units, - Local government units, - Infrastructure owners and managers (e.g. PKP PLK S.A., MÁV-Gépészet Zrt., HŽ Infrastruktura), - Railway carriers (e.g. PKP Cargo, DB Cargo Polska, Lokos Kolej, CTL Logistics, Rail Cargo Hungaria, GySEV Cargo, BHV, Train Hungary Hrvatska, HŽ Cargo, Rail \$ Sea d.o.o., PPD transport d.o.o.). |

Source: authors' own work



Table 17 Stakeholders and their role

| Stakeholder | Role | The importance of the project for the stakeholder | Contribution to the project | Benefits from the project | Threats from the project | Current level of support | Cooperation strategies |
|----------------------------------|---|--|-------------------------------------|---|--|--------------------------|---|
| Ministries | They prepare legal acts, plan key investments, draw up development strategies, and co-finance investments | The project is not important because the units operate according to developed long-term strategy plans | None | Potential partners will gain more awareness and may be more involved in other projects in the future. | None | None | None |
| Regional government units | They lobby managers and owners for new investments, co-finance investments | Very important for the stakeholder because thanks to such initiatives it can define further strategies | A large contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | No involvement of lower-level units, inadequate level of knowledge | High | They require constant monitoring and correction |
| Local government units | They lobby managers and owners for new investments | Very important for the stakeholder because thanks to such initiatives it can define further strategies | A large contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | Lack of proper staff and willingness to cooperate | Average | None |
| Infrastructure owners | They carry out investments and monitor them | Very important because by active participation in such initiatives they can affect | A large contribution to the project | Potential partners will gain more awareness and may be more | A different vision of development | Average | None |



| | | | | | | | |
|--|---|--|-------------------------------------|---|-----------------------------------|---------|------|
| | | the further development of the region | | involved in other projects in the future. | | | |
| Infrastructure managers | They carry out investments and monitor them | Very important because by active participation in such initiatives they can affect the further development of the region | A large contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | A different vision of development | Average | None |
| Railway carriers | They are lobbying for new investments | Very important because by active participation in such initiatives they can affect the further development of the region | A large contribution to the project | Greater transport opportunities | A different vision of development | Low | None |
| Large companies operating in a given area | They are lobbying for new investments | Very important because by active participation in such initiatives they can affect the further development of the region | Average contribution to the project | Greater transport opportunities | A different vision of development | Low | None |
| Potential new investors | They are lobbying for new investments | Very important because by active participation in such initiatives they can affect the further development of the region | None | Greater transport opportunities | A different vision of development | Low | None |



| | | | | | | | |
|--|--|--|-------------------------------------|---|--|---------|------|
| Universities | They support the development of plans, strategies, etc. They support the entire transport industry | Very important because by active participation in such initiatives they can affect the further development of the region | Average contribution to the project | The possibility of cooperation in the implementation of projects | Lack of properly developed cooperation | Average | None |
| Institutes and other research units | They support the development of plans, strategies, etc. They support the entire transport industry | Very important because by active participation in such initiatives they can affect the further development of the region | Average contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | Lack of properly developed cooperation | Average | None |
| Industry clusters | They support managing institutions and give opinions on projects | Very important because by active participation in such initiatives they can affect the further development of the region | Average contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | Lack of properly developed cooperation | Average | None |
| Chambers of Commerce | They support managing institutions and give opinions on projects | Very important because by active participation in such initiatives they can affect the further development of the region | Average contribution to the project | Potential partners will gain more awareness and may be more involved in other projects in the future. | Lack of properly developed cooperation | Average | None |
| Local | They are lobbying for | Very important because by | Little/ no contribution | Greater transport | Lack of properly | Average | None |



| entrepreneurs | new investments | active participation in such initiatives they can affect the further development of the region | on to the project | opportunities | developed cooperation | | |
|--------------------|--|--|-------------------|------------------------|--|------|------|
| Inhabitants | They consult prepared investments in terms of living comfort in a given area | Very important because by active participation in such initiatives they can affect the further development of the region | No contribution | Higher comfort of life | No information about the implemented project | None | None |

Source: authors' own work

9. Summary

For many years there has been a gradual decrease in the importance and share of rail in freight transport and an increase in road transport. Forwarders, senders and recipients choose road transport since in their opinion it is reasonably priced and convenient, and the deliveries can be made via the door-to-door system. The competitive advantage of road transport are undoubtedly the price, transport time and very high flexibility, i.e. adapting to the individual needs of the recipient.

Yet in international transport it is the railways that should play the main role on the longest sections of the routes and road transport should be performed only on the starting and finishing sections. This means that both modes of transport should cooperate rather than compete. That is why intermodal transport should be utilised more often, as its main role is to use different modes to transport a standard transport unit.

Taking into account the favourable geographical location of the regions analysed, economic conditions, current priorities in the EU transport policy and the dynamic growth of commercial exchange, constant cooperation between all regions included in the Central European Transport Corridor is necessary. Joint and coherent actions should take into account different modes of



transport and different areas of logistics. They should also indicate how to achieve an advantage, as well as guarantee the implementation of specific goals within a given period.

There are many similarities between the analysed regions. Each of them has recently put in a lot of effort into its economic and infrastructural development. There is a link between the development of transport and logistics infrastructure and the development of regions. Units of regional and local administration strive to make the best use of the location at the intersection of the most important transport corridors or their direct impact. They see this as a development potential. That is why we can see significant outlays for revitalization of existing infrastructure and creation of incentives for new investments.

But apart from similarities, barriers and restrictions are also noticeable. These usually are much more visible in the context of individual countries. Unfortunately, each of the regions in question has not yet achieved such a developed infrastructure as is the case in Western Europe. Years of neglect necessitate extensive time and effort in order to align the infrastructure with today's expectations. Despite numerous modernizations, railway routes are not as good as routes in Germany, Austria or France. Some regions still lack rail routes consisting of several parallel lines. Especially in Croatia, in the last dozen or so years the government has made efforts to make significant improvements in road transport, forgetting about rail transport. Therefore, there is a huge disproportion between modern highways and restrictions on axle loads on lines leading to seaports. When comparing the issues of progress in the liberalization of rail markets, here, too, one can notice a significant disproportion between individual countries: in 2018, 85 freight licenses were issued in Poland, over 50 in Hungary, while there were only a few in Croatia. The liberalization of the rail market is a great opportunity for the development of rail freight, as exemplified not only by the markets of Central Eastern Europe, but also the markets of Western Europe. This, however, must be followed by the efforts and endeavours of both central and regional authorities, which are manifested by even better access to data and analyses related to transport performance. As a consequence, this leads to easier assessment of market potential by investors interested in creating new or significantly improved services on subsequent markets.

The following table presents a comprehensive SWOT analysis for the regions in question.

Table 18 SWOT analysis - summary

| Strengths | Weaknesses |
|---|---|
| <p>Trained professional staff,</p> <p>Lower labour costs compared to Western Europe,</p> <p>Proximity to the largest European economies,</p> <p>Years of experience in successfully acquiring foreign investment,</p> <p>Good communication between regions,</p> <p>Access to two seas,</p> <p>A growing number of enterprises.</p> | <p>Low performance (due to the condition of infrastructure),</p> <p>Excessive customs formalities,</p> <p>Lack of properly developed railway and energy infrastructure,</p> <p>Different voltage in the railway network,</p> <p>Delays in implementing railway packages,</p> <p>Low reputation of rail carriers,</p> <p>Lack of relevant legal regulations.</p> |
| Opportunities | Threats |
| <p>Investments related to the improvement of transport infrastructure,</p> <p>Strengthening cooperation between regions,</p> <p>Strengthening works on new technologies accompanying the development of the transport and logistics sector,</p> <p>Creating conditions for the development of stable businesses and start-ups,</p> <p>More focused and efficient logistic activity of "country marketing",</p> <p>Better use of EU funds for the development of rail transport,</p> <p>Increased demand for traffic by creating long-term partnerships,</p> <p>A policy of sustainable development of transport branches,</p> <p>Development of intermodal transport.</p> | <p>Differing policies in the field of transport and logistics development,</p> <p>Lack of coherent actions aimed at improving the existing situation,</p> <p>Defects resulting from the mismatch of horizontal approaches to sectoral approaches in the context of economic political aspirations,</p> <p>Lack of up-to-date implementation as well as verification and updating of economic and sectoral strategies,</p> <p>The attitude of SMEs, which currently do not conduct R&D activities and also do not plan such activities in the future,</p> <p>The market of individual countries is too small and underdeveloped to stimulate innovation and the emergence of new technologies.</p> |

Source: authors' own work

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