



D.T1.4.1 WORK PAPER

Benchmarking study

10.2020

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1. Introduction and methodology

With this benchmarking study we try to focus on comparison between regions regarding the infrastructure and services in rail freight transport.

Based on a comparative benchmarking study each of regions will define (i) a priority list of actions (including cost estimations) to improve infrastructure & services for regional rail freight transport and (ii) potential policy measures that should be implemented to promote better framework conditions for the development of regional infrastructure & services. Activity T.1.4 will lead to the two outputs in all involved regions.

Results of the benchmarking studies will allow further regions to assess their status-quo against the REIF partner regions. The target groups addressed will actually mirror the partner structure of the REIF partnership.

This study identifies priority activities to improve rail infrastructure and rail freight services for the seven European regions studied. The comparative analysis compares the regions with each other according to their advantages and disadvantages and serves to determine the possibilities, ways and scope of improving the state of infrastructure and market services for more efficient implementation of freight transport.

Benchmarking analysis is a comparative analysis in general and comparison regarding infrastructure and services. In general for all regions and ports basic economic and transport situation is described. More in details for all investigated countries we focus on infrastructure and services and compare infrastructural technical features and characteristics of services affecting the transport market.

Market potential is the total demand for a product or service in a given business environment. Determining the main market potentials for regional rail freight transport and services is quite complex. The analysis shall help to find out the potential to shift goods transport from road to rail.

The analysis of the **rail network and services** on regional level serves as the basis for the analysis of the market potential because without existing railway lines and a certain level of network quality, freight transport on rail can hardly be implemented. This can be seen as the “ecosystem” of rail because the rail network and services are mutually related and dependent.

The analysis of the **logistic market** directly follows with both the former development of (rail) freight transport and trends of (rail) freight transport performance including the analysis of current transport flows.

The analysis of the **economic, political and technical market** conditions shall examine the framework conditions in these fields that can influence the market potential of rail freight transport.

The analysis of the **industrial structure and clusters** shall give an insight of potential goods and customers (respective loading units for the ports) for the transport of freight on railway. All freight and industries are analysed in general (including road suitable) in order to define what is high rail freight suitability and which of the goods and industries (respective loading units for the ports) are high rail freight suitable, inside all regions and loading units for ports.

2. Short presentation of regions or countries

This chapter presents all regions or countries included in this study with their location, size, population size and density. The Territorial Analysis is the first step to analyse the current state of rail freight transport (infrastructure and services) in all partner regions and ports and their hinterland or catchment area. A general description of every port and region gives an overview about main features and characteristics, including important facts and figures, like surface, population, population density etc., with graphical presentation in the map, to present the status quo in every region and port.

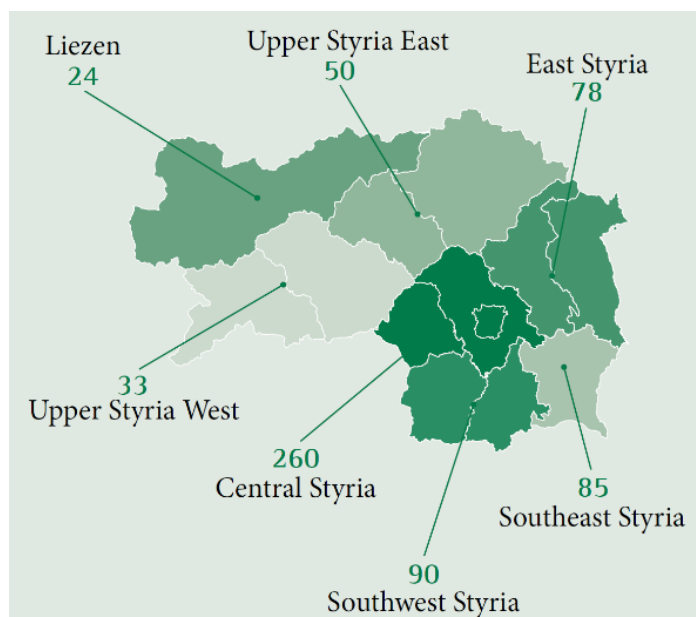
The analysis has a regional focus and different issues are highlighted. Aspect regarding rail freight transport is described in details for every region. In this regard each region or country is located within the TEN-T network.

2.1. Styria

Styria (German: Steiermark) is a state located in the southeast of Austria. Covering 16,401 km², Styria is the second largest of the nine component states of Austria with around 1,243,000 inhabitants (on a date 1.1.2019). The number of inhabitants is continuously growing since 2002.

Styria's neighbour to the South is Slovenia. The capital city is Graz, the second largest city in Austria with around 289,000 inhabitants at the beginning of 2019. The following figure shows various population density in Styria regions.

Figure 2-1: Population density of Styria (inhabitants per km²)



Source: Styria in numbers 2018

All main transport axes of the Styrian railway network are part of the Trans-European Transport Networks (TEN-T). The future southern railway corridor with Koralm railway and Semmering base tunnel as well as the railway line Graz – Spielfeld – Maribor are part of the Baltic-Adriatic Corridor and thus part of the TEN-T core network. The other main transport axes in the Styrian railway network are part of the TEN-T comprehensive network:

- TEN-T Baltic-Adriatic core network corridor: from Vienna via Semmering - Mürzzuschlag – Bruck/Mur – Graz – Koralmbahn – towards Klagenfurt and Graz - Spielfeld – towards Maribor (SI)
- TEN-T comprehensive network:
 - Pyhrn-Schober railway line: from Leoben via Selzthal – towards Linz
 - Ennstal railway line: from Selzthal via Liezen – Schladming towards Bischofshofen
 - Styrian East railway line: from Graz via Gleisdorf – Fehring towards Szentgotthard (HU)

2.2. Croatia

The Republic of Croatia is a South-East European country bordering with Slovenia to the north-west, Hungary to the north-east, Serbia, Bosnia and Herzegovina and Montenegro to the east, and sharing a maritime border with Italy. Croatia has a population of 4.28 million on an area of 56,594 square kilometres, which means the average density of the population is 75,8 people per square kilometre.

Figure 2-2: Map of Croatia with the four largest, most populated cities marked



Croatia is a part of the TEN-T core network, belonging to the Mediterranean corridor with its two main railway points being Rijeka and Zagreb. The TEN-T Mediterranean corridor combines components of all transport modes – road, rail and maritime modes (Through Rijeka), and connects them to major traffic hubs. Part of that network also belongs to the Mediterranean railway freight corridor 6 (RFC6) connecting Spain, France, Italy, Slovenia, Croatia and Hungary. RFC6 connects around 90 terminals and 9 sea ports across a line distance of over 7000 kilometres.

2.3. Trieste/Friuli Venezia Giulia

Friuli Venezia Giulia is an Italian autonomous region, governed by a special act, which lies in North-Eastern Italy. Trieste is its main city. With an area of 7,845 square kilometres and roughly 1,218,000 inhabitants, Friuli-Venezia Giulia borders with Austria to the north, with Slovenia to the east and with the Italian region Veneto to the west. Morphologically, the region may be divided into four natural areas: alpine, hilly, flat and coast.

Main ports and railroad terminals in Friuli-Venezia Giulia are located in the picture below.

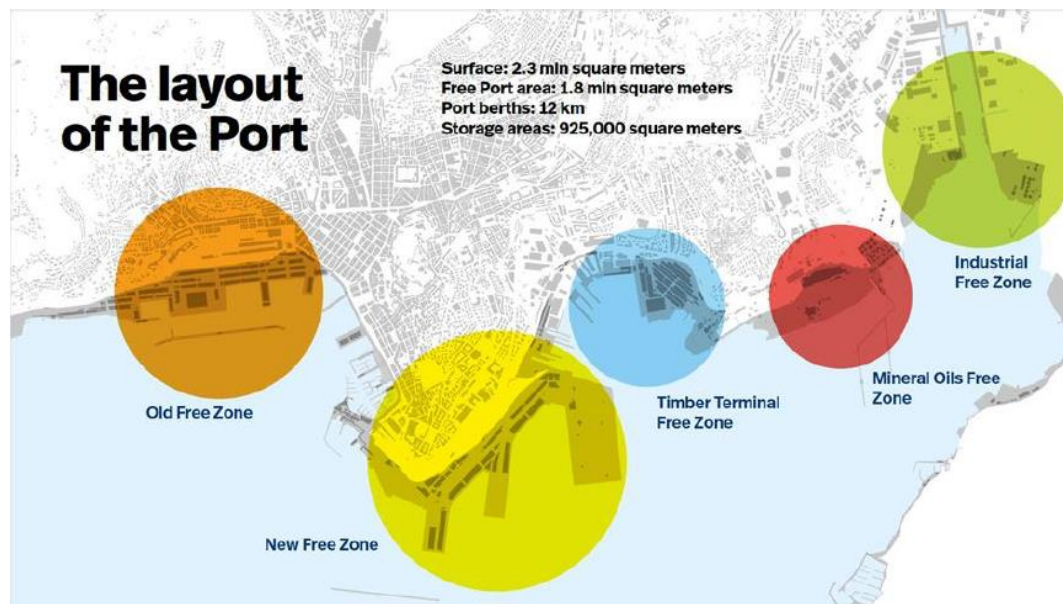
Figure 2-3: Ports and railroad terminals in Friuli-Venezia Giulia



Trieste is located at the intersection between shipping routes and the Baltic-Adriatic and Mediterranean TEN-T core network corridors. The Port of Trieste represents a core network node of the Mediterranean and Baltic-Adriatic Corridors

crossing the Region Friuli Venezia Giulia. It is a key node of the EU's TEN-T. Trieste plays a decisive role in two separate supply chains: long-distance intercontinental maritime transportation and short/medium-distance intra-Mediterranean trade. The TEN-T strategic axes of the “East Mediterranean Motorways of the Sea” converge with the “Baltic-Adriatic and Mediterranean Corridors”.

Figure 2-4: Layout of the Port of Trieste



2.4. Emilia-Romagna

Emilia-Romagna is an Italian region, located in north part of Italy on the surface of 22.452 square km, southern from regions Lombardy and Veneto. It has 4.471.485 inhabitants (counted on 1/1/2019). Population density was 199,11 inhabitants per square km (on date 1/1/2019).

Figure 2-5: Emilia-Romagna region in Italy (white)



Within the nine corridors making up the Trans-European Network – Transport (TEN-T), four of these cross Italy and three of these cross the Emilia Romagna territory. These are the Baltic Adriatic Corridor (BAC), the Scandinavian-Mediterranean (SCAN-MED) and the Mediterranean (MED).

Figure 2-6: Freight lines or freight corridors, with focus on Italy



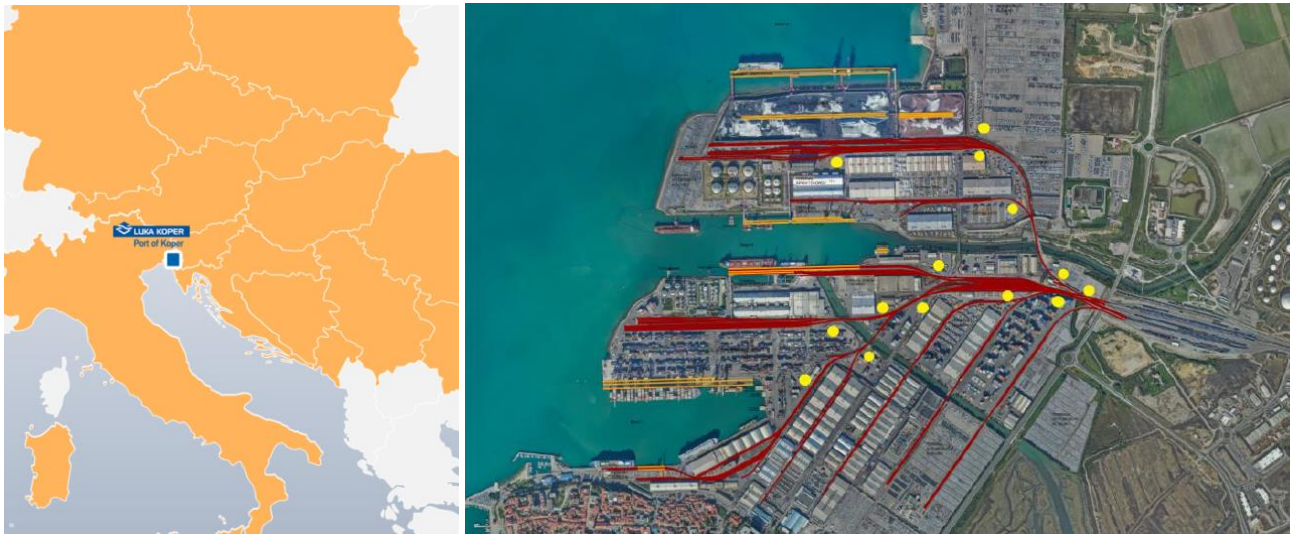
2.5. Slovenia

Slovenia is a Middle European country. It covers a small stretch of land south of the Eastern Alps, on an area of 20.273 km². In the west, Slovenia has a 50 km long share of the Adriatic Sea coast where also the most important Slovenian port, Port of Koper is situated. Northern part of Slovenia is characterised by the Alps, with the Julian Alps in the north-west as the highest mountain range in Slovenia also influencing Slovenian position within the European corridors. Capital city is Ljubljana. It has 2.081.000 inhabitants, population density is 103 inhabitants per square km.

Figure 2-7: Maps of Slovenia



Figure 2-8: Port of Koper with terminals

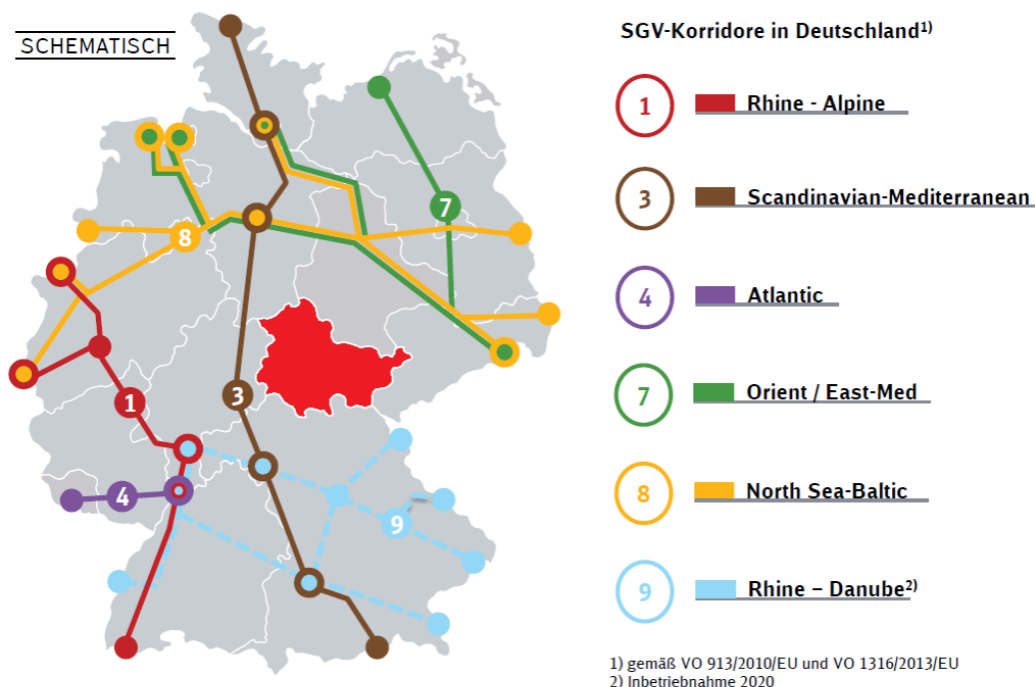


The Port of Koper, managed by Luka Koper d.d., is the only commercial cargo port of Slovenia and a core node in two EU TEN-T Corridors: Mediterranean and Baltic-Adriatic. 7 main railway lines belong to core TEN-T network, other 3 main railway lines belong to comprehensive TEN-T network.

2.6. Thuringia

Thuringia, officially the Free State of Thuringia, is one of the 16 federal states that constitute the Federal Republic of Germany. It is located in central Germany covering an area of about 16,000 square kilometres and has a population of about 2.15 million inhabitants (133 inhabitants per sq km), for that it is the sixth smallest German state by area and the fifth smallest by population. Erfurt is the capital and largest city.

Figure 2-9: Rail Freight Corridors (RFCs) in Germany and Thuringia



Source: adapted from DB Netz AG

The Free State of Thuringia is located close to the Scandinavian – Mediterranean TEN-T Corridor as well as to the Orient/East-Med Corridor and the North Sea-Baltic Corridor. As the railway network has good connections to Saxony and Saxony-Anhalt, there is an indirect, peripheric connection to those corridors.

2.7. West Pomerania, Lubusz, Lower Silesian

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.

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.

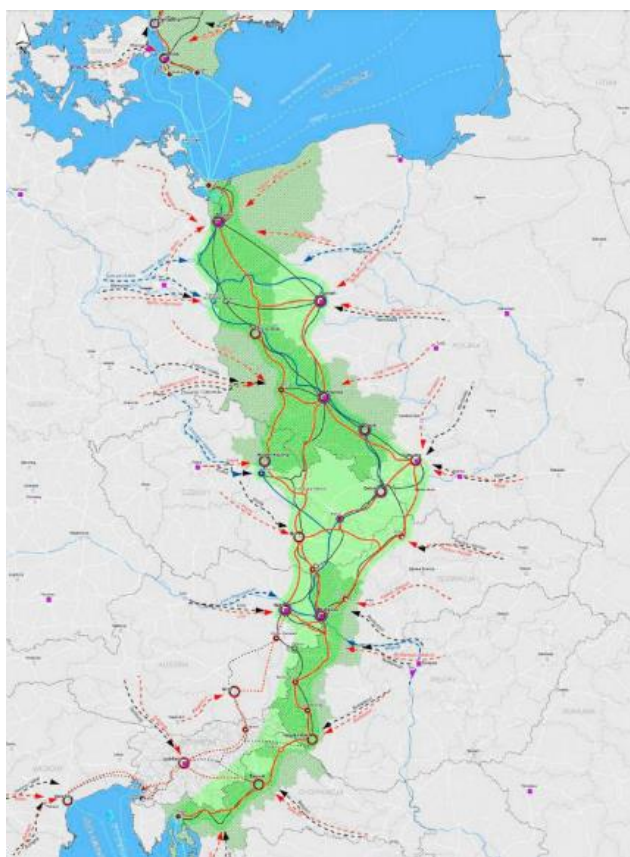
The Lubusz Region is located in the western part of Poland; it borders in the west with Germany, in the north with the West Pomeranian Region, in the east with the Greater Poland Region and in the south with the Lower Silesian Region. The region covers an area of 19,946.74 km², which according to 2018 data was inhabited by about 1 million people and the population density was 73 people/km².

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.

Figure 2-10: Map of Poland with West Pomeranian, Lubusz and Lower Silesian regions highlighted in colour



Figure 2-11: 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 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 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.

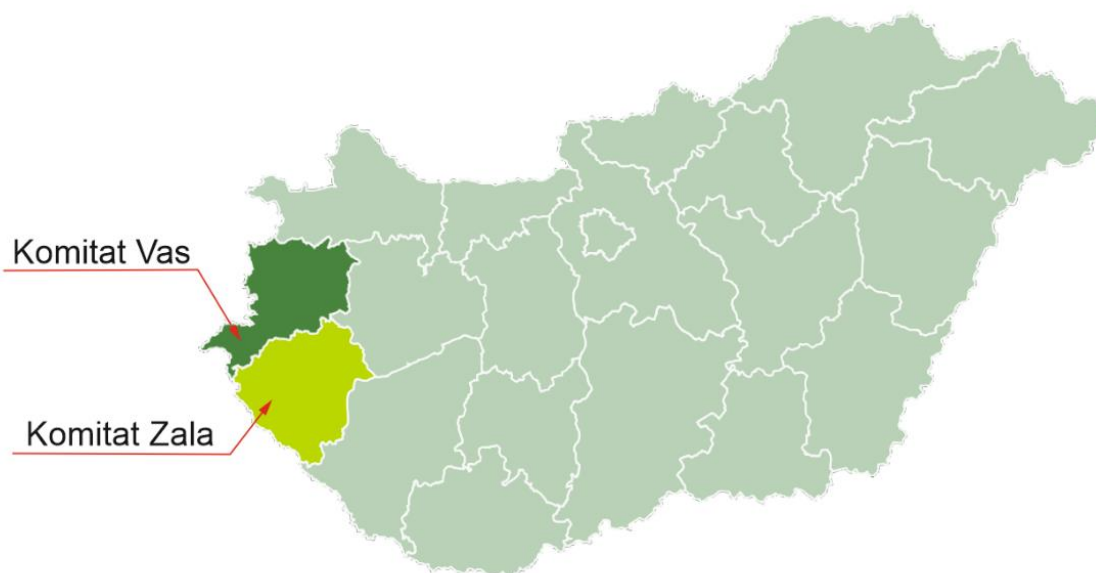
2.8. Komitat Vas and Zala, Hungary

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. 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).

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.

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.

Figure 2-12: Location of the analysed areas in the country



Source: Authors' own work

Three 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.
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.
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.

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

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

3. Benchmarking analysis of regions

3.1. Industry, economy and traffic modal split

In general the transport situation of regions and countries stems from the industrial and economic situation. Transport characteristics regarding use of road and rail transport are reflected in the modal split. General benchmarking analysis considers industry and economy with GDP and Modal Split figures.

3.1.1. Styria

Industry, economy

The economic areas in Styria are as follows:

- The Upper Styrian central region: from Judenburg to Mürzzuschlag
- The central area of Graz: from Leibnitz to Frohnleiten, including Voitsberg and Deutschlandsberg
- The economic area Weiz – Feldbach – Fürstenfeld
- The economic area Hartberg
- The Liezen economic area

The industrial clusters in Styria are:

- Automotive, rail
- Timber
- Mechatronics, electronics
- Materials and material technologies
- Health, life science, food

The following sectors were defined as guiding markets in the “Economic Strategy Styria 2025”:

- Mobility: automotive sector, rail systems, aerospace
- Green-Tech: green energy, green resources, green buildings, timber
- Health-Tech: health and food

Within the last decades, the rising share of intermodal transport units (containers) as well as the growing importance of hinterland-transport of ports increased the transport volumes by railway.

GDP per capita (PPS)¹: 35.400 EUR

Modal Split

Comparing the development from 1999 to 2018, the Modal Split regarding to road transport volumes (tons) at the Styrian border rose at all crossings, from +10% points at the Schoberpass to +5% points at Semmering.

The following table shows all Alpine crossings, their road transport share in years 1999, 2009, 2015, 2018 and the difference in the road share situation between 1999 and 2018.

¹ Eurostat News Release 38/2020, March 2020

Figure 3-1: Table of Modal Split development in years 1999, 2009, 2015 and 2018

	1999	2009	2015	2018	1999-2018
	Modal Split				
Alpine crossing	Share road	Share road	Share road	Share road	% points
Reschen	
Brenner	75%	67%	70%	73%	-2%
Tauern	59%	68%	54%	65%	+6%
Schoberpass	71%	77%	80%	81%	+10%
Semmering	30%	34%	32%	35%	+5%
Wechsel	99%	98%	98%	99%	0%
Schober, Semmering, Wechsel	63%	68%	70%	73%	+10%
Total	68%	68%	67%	72%	4%

Source: DG MOVE: Observation and analysis of transalpine freight traffic flows, key figures 2018

3.1.2. Croatia

Industry, Economy

Croatia's main industries include: tourism, shipbuilding, construction, petrochemicals, food processing and wood industry, and the following section will go through the state of each of those industries and the area in which they are represented.

Industrial sites for each branch:

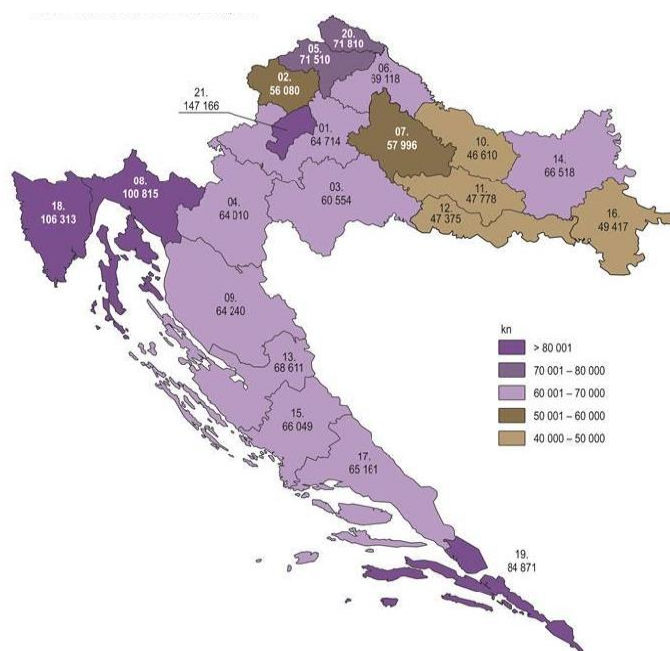
- Tourism: Croatia abounds in natural beauties, over 1000 islands, 8 national parks, 11 nature parks, UNESCO-protected monuments such as Diocletian's Palace in Split, the cities of Trogir and Dubrovnik, the Euphrasian Basilica in Poreč and St. Jacob's Cathedral in Šibenik.
- Shipbuilding: the large shipyards in Croatia are in Rijeka, Pula, Split and in Trogir; Croatia is the 9th largest shipbuilding country in the world, and 2nd largest in Europe.
- Construction: building of new buildings on land is largely represented in Croatia's cities with Zagreb in the lead; the cities that come closest regarding new completed dwellings per year from 2011 to 2018 are Split, Zadar, Osijek and Dubrovnik.
- Petrochemical industry: INA P.L.C. is the main representative in this field with two refineries in Rijeka and Sisak; INA also owns a stake in the Adriatic oil pipeline system JANAF P.L.C. and developed business cooperation with foreign companies in the fields of oil and gas exploration, joint ventures and exports and imports.
- Food processing industry: generates the highest total revenues and employs the most people; most developed in the city of Zagreb and Zagreb County, northwestern Croatia and Osijek-Baranja County.
- Wood industry: important for the Croatian economy because of its notable share in employment, rural development and export; export and import of wood products are mostly oriented toward Italy, Germany, Slovenia, Austria and other countries in the EU.

In some parts of Croatia, complete, where applicable, the development of the tourism sector as a major economic factor with adequate transport development, especially in favor of public transport and green mobility.

In the railway transport sector, it is extremely important to inform users about the movement of trains in order to enable adequate travel planning, i.e. planning the work of economic entities and thus increase the attractiveness of railway transport. For these reasons, it is extremely important to constantly adapt and update information technology and information channels in order to improve the entire sector."

GDP per capita (PPS)²: 19.100 EUR (2018)

Figure 3-2: Gross domestic product per capita in 2016 (in Croatian Kuna)



Source: dzs.hr

The previous map shows that the capital city of Zagreb and three counties have high gross domestic product (dark violet colour). The three mentioned counties are Istria, Dubrovačko-Neretvanska County and Primorje Gorski Kotar County. Primorje-Gorski Kotar has Rijeka, which is one of the most significant industrial cities in the whole of Croatia.

Modal Split

Croatia's freight transport relies mostly on Road transport with over 70% of all freight being transported by road since 2011, and has remained very similar percentage-wise since 2008. Railways are the second most used transport mode, averaging around 20% of all freight transport in Croatia since 2008. Inland waterways are the least represented mode of transport for transporting freight.

Figure 3-3: Table with Modal Split of freight transport in Croatia in years 2008-2017

Year	Roads	Railways	Inland waterways
2008	71,7	22,6	5,7
2009	71,8	22,1	6,1
2010	69	22,8	8,2
2011	71,2	22,4	6,4
2012	70,5	22,2	7,3
2013	72,9	19,8	7,3
2014	72,7	20,4	6,9
2015	72,9	19,4	7,8
2016	76,3 estimated	16,4 estimated	7,3 estimated
2017	73,6	20,1	6,3

Source: ec.europa.eu/Eurostat

3.1.3. Trieste/Friuli Venezia Giulia

Industry, Economy

The main industrial branches in Trieste area are the following:

- Logistics.
- Coffee.
- Ship engines.

Port of Trieste must be considered also the spatial structure of the port traffic in relation to the hinterland, for which the port represents the gateway. On one hand, the port benefits from the trade exchanges generated and attracted by the economic development of the territory and, on the other hand, it supports the socioeconomic growth by favoring the acquisition of raw materials and semi-finished products at low prices and offering the entrepreneurial system new opportunities, new marketplaces for local, regional and, more in general, territorial productions.

GDP per capita (PPS)³: 31.200 EUR (2018)

Modal Split

The modal share of freight transport is developed as follows:

- TEUs: road: 45%; rail: 55%.
- Semi-trailers: road: 77%; rail: 23%.

The above-mentioned data refer only to hinterland transport of 2018.

Figure 3-4: Table with modal share for unitized traffic in the Port of Trieste (containers + Ro-Ro) in 2018 and 2019

Item	2018			2019		
	Mln tons	% on total	% on land traffic	Mln tons	% on total	% on land traffic
Road	9,7	57,6%	67,9%	8,8	56,1%	66,1%
Rail	4,6	27,2%	32,1%	4,5	28,8%	33,9%
Total (without sea)	14,3	84,9%	100,0%	13,4	84,9%	100,0%
Sea	2,5	15,1%		2,4	15,1%	
Total (containers + Ro-Ro)	16,8	100,0%		15,7	100,0%	

Source: PNA of the Eastern Adriatic Sea (various years "Sinfomar statistics", 2020)

3.1.4. Emilia-Romagna

Industry, Economy

Emilia-Romagna has a highly specialized production system, consisting of 424 thousand companies, mainly SMEs, 50 thousand of which operate in the manufacturing macro-sector.

The region boasts some of the top Italian brands belonging to different sectors, and these are:

- Automotive (Ferrari, Lamborghini, Ducati and Maserati are some examples)
- Food (Barilla, Parmigiano Reggiano, Segafredo, prosciutto di Parma, etc.)
- Packaging (IMA, Marchesini Group, TetraPak)
- Fashion (Max Mara, Yoox, etc.)
- Tiles district (Florim, Marazzi, etc.)

- Wellbeing (Technogym)
- Health (Rizzoli Ortopedia, Cefla, etc.)

Regional specializations are detailed in the following list of products by sectors or brunches:

1. Agro-food: Meat and dairy products; Agricultural machinery; Bakery and farinaceous products
2. Housing & Construction: Ceramic products; Furniture and wooden products
3. Chemicals: Chemical, rubber and plastic products
4. Mechanical Engineering: Transport vehicles; Engines and hydraulic components; Agricultural machinery; Lifting and handling equipment; Boating; Packaging
5. Fashion: Footwear and leather goods; Textile and wearing apparel
6. Health Care: Biomedical; Pharmaceutical Products
7. Culture & Creativity: Creative, Arts and Entertainment Activities; Media and Cultural Industry

Top brands are spread all over the regional territory.

Transport systems are designed to meet the needs of the population and freight to reach opportunities distributed in space and time, and they generate direct and indirect effects on the distribution of economic activities in a given area. Accessibility is often measured by means of indicators, related not only to the performance of transport systems but also to the extent and quality of opportunities and services supplied in the nodes, strictly connected with individual factors and preferences.

The main regional logistic nodes with many operating companies are Piacenza, Parma, Dinazzano-Marzeglia-Rubiera, Bologna, Lugo and Villaselva. Companies derive products of the following main regional sectors of specialisation: Agrofood, Chemical and plastic products, Ceramics and tiles, Wood and furniture and Machines and mechanical products. Maximum number of all companies is in Dinazzano-Marzeglia-Rubiera and Bologna and within sectors of specialisation Machines and mechanical products. Dinazzano-Marzeglia-Rubiera logistic node has the most companies of sectors Machines and mechanical products, Agrofood and Ceramics and tiles. Bologna logistic node has the most companies of sectors Chemical and plastic products and Wood and furniture.

GDP per capita (PPS)⁴: 36.100 EUR (2018)

Modal Split

The freight rail modal share in Emilia-Romagna is equal to 11% (express as tons, 2016 data).

The rail/road modal split for regional freight transport is about 11%-89%, for domestic traffic, while for traffic originating in the region it is 14%-86%."

3.1.5. Slovenia

Industry, Economy

Among the most important industries in Slovenia there are the iron industry, automobile manufacturing and manufacturing of electrical devices. Slovenian industry is large share also based on wood and textiles, pharmaceuticals and chemicals, as well as engineering.

The industrial sector represents about one-third of the GDP (28,8 %) and employment (31,7%). Historically, the dominant industries in Slovenia have been the forestry, textile and metallurgical industries. Since the 1980s, the mechanical industries (automobile, tool machines) and high value-added industries (electronics, pharmaceuticals and chemicals) have developed significantly.

Slovenia's main export partners are Germany, Italy, Austria, Croatia and France, while the main exported product groups are road vehicles, medical and pharmaceutical products, electrical machinery and appliances, industrial machinery,

⁴ Eurostat News Release 38/2020, March 2020

metals, and iron and steel. The biggest share of imports are associated with road vehicles, followed by petroleum and petroleum products and electrical machinery, while the majority of products are imported from Germany, Italy and Austria.

The important industrial sites, which are bigger than 20 ha:

- Ljubljana and its area
- Maribor and its area
- Novo mesto and its area
- Velenje and its area
- Jesenice and its area

For the **port of Koper**, the cooling of the economy in 2019 was most felt in the automotive industry, the electronics industry and in the manufacture of iron products. Lower need for raw materials for these industries has meant lower demand for iron ore and coal, automotive components and lower shipment volumes of new cars, especially to Turkey. The year 2019 was also marked by a decline in the throughput of coal for energy purposes, mainly due to the decline in the competitiveness of energy from thermal power plants.

GDP per capita (PPS)⁵: 26.400 EUR (2018)

Modal Split

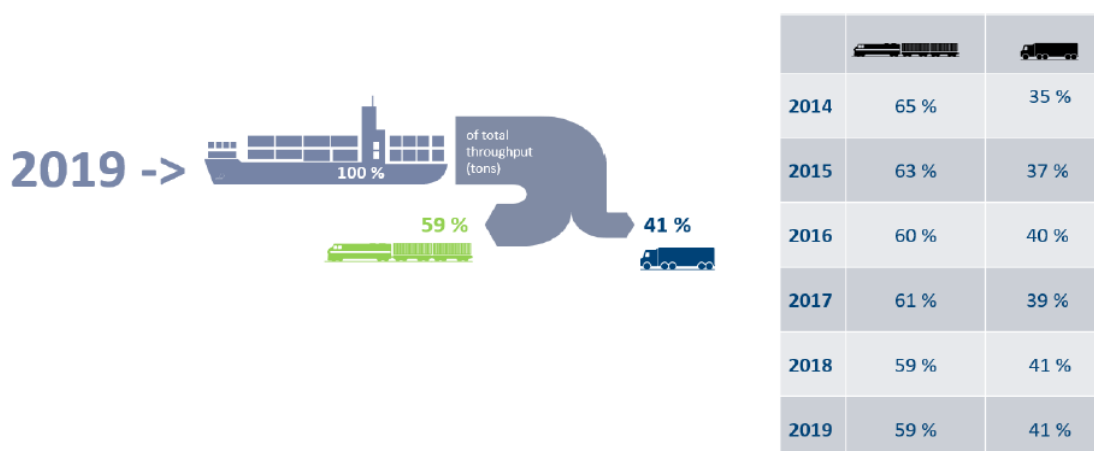
Modal split for freight transport in Slovenia (2018): 80% or. 85,4 mio tons on roads and 20 % or. 21,3 mio tons on rail. Modal share of rail transport has grown one third and modal share of road transport is two thirds, like visible for years 2005, 2010, 2015 and 2016 in a table below. Modal split in port of Koper is reversed, about 60:40% for rail transport.

Figure 3-5: Table with modal share development in Slovenia

Transport mode	2005	2010	2015	2016
Rail	30,8	31,8	35,0	33,3
Road	69,2	68,2	65,0	66,7
Waterways	N/A	N/A	N/A	N/A

Source: EUROSTAT

Figure 3-6: Modal split in port of Koper



3.1.6. Thuringia

Industry, Economy

The main industrial branches (volume of sales) in Thuringia are the following:

- Machinery and vehicle construction
- Metal production and processing
- Food
- Electrical engineering, precision engineering, optoelectronics, EDP
- Rubber and plastics
- Paper and printing industry
- Glass, ceramics, processing of stones and earths
- Chemical and pharmaceutical industry

Many large industrial areas (23 areas) in Thuringia with high structural and supraregional importance are bindingly defined in the Regional Development Program Thuringia. These industrial sites have at least a surface of 20 ha and an existing or a potential rail connection to railway freight transport. Largest industrial areas are the following: Altenburg/Windischleuba, Artern/Unstrut, Bad Langensalza, Eisenach-Kindel, Erfurter Kreuz, Grabfeld/Thüringer Tor, Hörsel (Waltershausen/Hörselgau), Industriegroßstandort Ostthüringen (Gera/Ronneburg), Nordhausen „Goldene Aue“, Ohrdruf/Gräfenhain, Sömmerda/Kölleda, Sonneberg/Rohrhof.

The countryside forms one of the backbones of the Thuringian economy. Its forestry and agriculture, its small manufacturing companies are one supporting pillar of Thuringia's job market. Larger industrial sites are usually close to the big cities like Erfurt, Jena and Eisenach.

The economy in Thuringia is characterised by small and medium-sized enterprises in the manufacturing sector and several large corporations. The concentration of manufacturing enterprises is quite different between the regions: The cities and their surroundings along the Thuringian string of cities are flourishing in means of industrial activities and source of zones. In addition, some regional centres in central and south-western Thuringia benefit of active industrial sites. Nearly all rural regions in the north and east of Thuringia suffer from a less-favoured economy situation with substantial unemployment.

The specialization field "Industrial Production and Systems" is a mainstay of the Thuringian economy. With growing markets and numerous activities in different industries, this field contributes to almost half of the turnover in the manufacturing industry in Thuringia.⁴

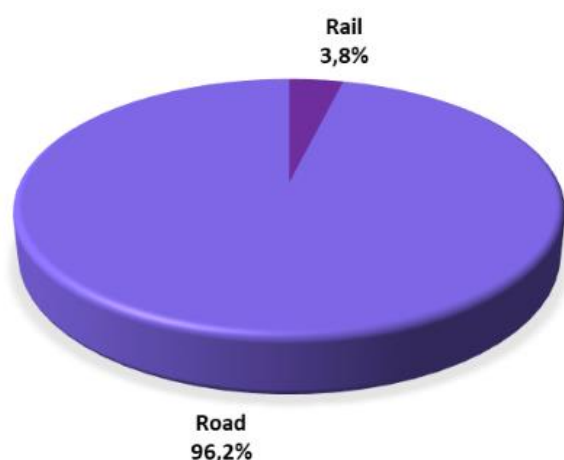
GDP per capita (PPS)⁶: 26.900 EUR (2018)

Modal Split

The modal share for freight transport in Thuringia stagnates in the last years or even decreases to the disadvantage of rail. Road transport is the strongest mode of transport in terms of tonnage transported with a share in modal split of 96.2 % in 2008 and 96.2 % in 2017. The share of rail freight transport in the total tonnage transported is very low and amounted 4.8 % in 2008 and 3.8 % in 2017.

The following chart shows the shares of road and rail transport in tons, in 2017.

Figure 3-7: Modal split in Thuringia 2017



3.1.7. West Pomerania, Lubusz, Lower Silesian

Industry, Economy

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."

There are two special economic zones in the Lubusz Region:

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

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.

The factors affecting the economy of the West Pomerania 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 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.

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.

The Lubusz 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.

Entrepreneurship is developing strongly in the urban centres; significant numbers of economic entities can be located especially in Zielona Góra and Gorzów Wielkopolski. In recent years, the role of industry in the Lubusz economy has clearly increased. 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 $\frac{3}{4}$ 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.

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.

GDP per capita (PPS)⁷ – West Pomerania: 17.700 EUR (2018)

GDP per capita (PPS)⁸ – Lubusz: 14.400 EUR (2018)

GDP per capita (PPS)⁹ – Lower Silesian: 23.400 EUR (2018)

Modal Split

Freight transport on the railways is growing at a slower rate to the total market, so the share of rail transport in total transport is decreasing. Share of rail transport in total transport in 2018 was 11,37%.

The development of freight transport, in particular intermodal transport, is also emphasised by the government's "Strategy for Responsible Development to 2020 (with an outlook to 2030)", which indicated that the increase in the share of road freight transport in recent years at the expense of all other modes of transport is worrying. The document also points out that "the growing role of road transport in the Polish transport system also results in increased pressure on public health, traffic safety and the environment".

3.1.8. Komitat Vas and Zala, Hungary

Within REIF project analyses we focus on two Hungarian smaller regions, Komitat Vas and Zala, but the available data refer mostly to the whole Hungary State.

Industry, Economy

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).

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 Eurostat News Release 38/2020, March 2020

⁸ Eurostat News Release 38/2020, March 2020

⁹ Eurostat News Release 38/2020, March 2020

Main economic activities in the city (Szombathely) 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 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 (157);
- developing clusters (at least 1 year track record) (19);
- accredited clusters (34).

GDP per capita (PPS)¹⁰ – Vas County: 28.667 EUR (2018)

GDP per capita (PPS) – Zala County: 23.940 EUR (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). 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 GDP per capita of the county (Zala) in the programme area is relatively low, amounting to cca. 54% of the EU average.

Modal Split

The share of rail freight (18.9% in 2017) is practically the same as at the time of accession of Hungary to the European Union in 2004, slightly above the EU average.

3.2. Transport Infrastructure

Freight transport takes place by rail or road network or by waterways. From remote locations, most cargo arrives at ports and continues on land. The volume and development of rail freight depends on the available infrastructure, which includes the existing rail network with the technical characteristics of the railway lines. It is transhipped at terminals on the way if necessary with the help of intermodal equipment. There are obstacles along the way on some places which cause delays. Places and situations where congestion in freight transport occurs are presented; we call them bottlenecks.

For each region the infrastructural features are presented and divided into three segments, railway lines, terminals and ports. The state of infrastructure is presented also with SWOT analysis and bottlenecks. The rail freight in the current operating environment in the domestic transport market is less competitive compared to road transport.

3.2.1. Styria

Railway lines

The Styrian rail network currently consists of around 1,000 kilometres of railway lines. The railway network for passenger and freight traffic comprises the network of the Austrian Federal Railways (ÖBB) with approx. 550 km on main lines and 140 km on secondary lines, the lines of the Styrian Provincial Railways (Steiermärkische Landesbahnen) with approx. 100 km and the lines of the Graz-Köflacher Railway (GKB) with approx. 90 km (see following map and annex).

The other lines are feeder lines with private freight traffic as well as lines that were closed down, but are still used for excursions, nostalgic trips, etc. by private associations.

The main railway lines in the Styrian railway network are:

¹⁰ Regional GDP per Capita, OECD. www.stats.oecd.org (accessed December 2020)

- Southern railway line: from Vienna via Semmering - Mürzzuschlag – Bruck/Mur – Leoben – Neumarkt – towards Klagenfurt and Bruck/Mur via Graz - Spielfeld – towards Maribor (SI)
- Pyhrn-Schober railway line: from Leoben via Selzthal – towards Linz
- Ennstal railway line: from Selzthal via Liezen – Schladming towards Bischofshofen
- Styrian East railway line: from Graz via Gleisdorf – Fehring – towards Szentgotthard (HU)"

The main Styrian rail network is of Class D4, i.e. with an axial load of 22.5 tons or 8.0 t/m. It is thus suitable for freight transports and in line with the requirements of the TEN-T.

Terminals and ports

There are three publicly accessible freight terminals in Styria (see map above and annex):

- the “Cargo Center Graz” terminal is located 15 km south of Graz
- the Montan Terminal Kapfenberg,
- and the Terminal St. Michael.

The Cargo Center Graz terminal, Styria’s most important freight terminal, is part of the TEN-T core network. The key figures of the terminal (2018):

- Direct connections with container trains: Koper-Graz, Neuss-Graz, Bremerhaven/Hamburg-Wien-Enns/Graz
- Single wagon traffic throughout Austria (daily)

The Terminal St. Michael is located at the intersection of the A9 Pyhrn motorway and the S36 Murtal expressway, as well as on the high-level rail network. The main destinations by rail are Austria, Germany and Italy, by road Austria and Germany.

The Montan Terminal Kapfenberg is connected to Austrian Southern Railway (Südbahn) and via the S6 Semmering expressway to the high-ranking road network.

Ports

There is no sea ports in Styria.

SWOT Analysis

Strengths

- All main transport axes are part of the TEN-T Networks (the southern railway corridor with Koralm railway and Semmering base tunnel as well as the railway line Graz – Spielfeld – Maribor).
- The main Styrian rail network is electrified, and double-tracked, suitable for freight transports and in line with the requirements of the TEN-T.
- The Styrian railway network serves as an important link between Austria and South Eastern Europe (the Pyhrn/Schober axis – in combination with the Tauern axis).
- Three publicly accessible freight terminals in Styria – all are suitable for bimodal rail-road transshipment (the Cargo Center Graz (CCG) terminal is the most important logistic node).

Weaknesses

- Missing a high capacity rail connection from the economic centres in central and the Northwest of Europe to Southeast Europe particularly to the Harbours of Koper and Rijeka as well as to the eastern Adriatic and Western Balkan region (the single-tracked bottleneck between Selzthal and Linz and further North as well as to the steep southern ramp to the Bosruck tunnel).
- The single track regional railway lines are not very suitable for economically successful freight transport.
- With the commissioning of the Koralm railway (2025) the section Bruck and der Mur – Graz will be at the limit of capacity, as several transport corridors pass along this track.
- Because of missing loading stations and companies’ feeder lines away from the terminals the accessibility for rail freight transport is very poor. Single wagonload transport is not supported by the railway undertakings.

Treaths

- Lack of money for investments in railway infrastructure, further closing of railway lines, private feeder lines or loading points.

Bottlenecks

- Missing Link - Bosruck Tunnel (high-level rail link);
- Missing Capacity - Railway Line Bruck/Mur-Graz-Spielfeld-Maribor (double-track railway line);
- Missing Capacity – Cargo Center Graz-Werndorf (CCG) Terminal (An expansion of the terminal is essential to increase the freight loading capacity for rail transport.);
- Missing Link - Railway Connection Koralmbahn to Steirische Ostbahn (A new railway line connecting the future Koralm Railway line and the Steirische Ostbahn).

3.2.2. Croatia

Railway lines

Croatian infrastructure manager HŽI controls 2,617 kilometres of railway network in length across the country (whole Croatia). There are 19 Border stations, 9 of which are with Slovenia (The Buzet station is exclusively used for passenger trains, Lupoglav is used for freight trains, and the rest are combined), 3 are with Hungary, 2 with Serbia, and 5 with Bosnia and Herzegovina. The railway infrastructure in Croatia is also connected with the railways in ports. Those include the ports of Bakar, Bibinje, Osijek Donji grad, Ploče, Rijeka, Rijeka Brajdica, Sisak, Slavonski Brod, Solin, Šibenik and Vukovar.

There are 19 Border stations, 9 of which are with Slovenia (The Buzet station is exclusively used for passenger trains, Lupoglav is used for freight trains, and the rest are combined), 3 are with Hungary, 2 with Serbia, and 5 with Bosnia and Herzegovina.

2363 kilometres of 2617 are single track railways, and 254 of double track railways. The first of the double track railways starts at the railway hub Zagreb, goes through Zaprešić, Savski Marof and Dobova into Slovenia towards Ljubljana. The second double track railway goes from Novska, through Nova Gradiška, Nova Kapela-Batrina, Slavonski Brod, Striz. Vrpolje, Vinkovci, Tovarnik and Šid into Serbia towards Belgrade. The third and final double track railway is the shortest one in Croatia, going from Spilit's suburbs towards Split. 980 kilometres of the 2,617 kilometres are electric rails.

Terminals and ports

Port of Rijeka is the biggest port in Croatia. The existing spatial-technical conception of the maritime and port system of Primorje-Gorski Kotar County is mainly concentrated around Rijeka, which is part of the urban whole of the city. The port of Rijeka is primarily a cargo port with 15 terminals.

There is 15 terminals in port of Rijeka:

- Zagreb terminal
- Bratislava terminal
- Prague terminal
- Visin's pier (Rijeka)
- Budimpešta terminal
- Orlando's pier (Rijeka)
- Vienna terminal
- De Francechi's pier (Rijeka)
- Senj terminal
- Sušak breakwater
- Delta south
- Delta north
- Brajdica North

- Bakar
- Škrlevo

The railway infrastructure in Croatia is also connected with the railways in **ports**. Those ports are: Bakar, Bibinje, Osijek Donji grad, Ploče, Rijeka, Rijeka Brajdica, Sisak, Slavonski Brod, Solin, Šibenik and Vukovar. The port of Rijeka is the largest port in Croatia, on the eastern Adriatic coast, and its impact is immediate on all traffic modalities.

Intermodal facilities which include rail are located in the three ports: Port of Rijeka, Port of Ploče and Port of Šibenik. Each of those ports connect the railway freight transport with maritime freight transport. Port of Rijeka, the largest Croatian port, is part of the Ten-T core network, and as such contains: 58 berth and two additional berths in the Liquid Cargo terminal, 150-hectare total port area and 335,000 m² of enclosed warehouses.

- The Port of Rijeka is comprised of several terminals: Bulk Cargo Terminal; Cereal Terminal; Container and Ro-Ro Terminal; General Cargo Terminal; Timber Terminal; Škrlevo Terminal; Frigo Terminal; Bršica Terminal; Passenger Terminal; Liquid Cargo Terminal.
- Port of Ploče is the second largest cargo seaport in Croatia, and contains the following terminals: General Cargo Terminal; Bulk Cargo Terminal; Liquid Cargo Terminal; Grain Cargo Terminal; Wood Terminal; Alumina and Petroleum Coke Terminal; Container Terminal; Bulk Cement Terminal; Slag Terminal; Passenger Terminal.
- Port of Šibenik is comprised of four main terminals: Passenger Terminal Vrulje – with 4 berths Terminal for transshipment of phosphates Dobrika – with 2 berths Terminal for bulk and general cargo Rogač – with 4 berths Wood Terminal – with 2 berths.

Another intermodal facility worth mentioning is the Spačva Ro-La terminal, located at Spačva's railway station, 20 km from the border with Serbia to the west (corridor X) and 22 km from the border with Bosnia and Herzegovina to the north (branch of corridor Vc).

SWOT Analysis

Strengths

- Three ports which connect the coast to the hinterland (Rijeka, Ploče, Šibenik).
- Croatian railway network serves as a link from Italy and Slovenia to Hungary and north-eastern European countries

Weaknesses

- Single track railway lines are less efficient in achieving a successful rail freight transport economy.
- Poor railway infrastructure.
- Level of interoperability on Croatian corridor railway network is low.
- Unsatisfactory maintenance level of infrastructure which causes limitations in operation.

Opportunities

- Increase the amount of electric rail in Croatia.
- Availability of funds for strengthening the railway infrastructure.

Threats

- Modern highway network in Croatia.
- Lack of compatibility between fleet and rail infrastructure.
- The drainage system along the corridor is insufficient and/or out of service.

Bottlenecks

- Old infrastructure

3.2.3. Trieste/Friuli Venezia Giulia

Railway lines

The regional railway network in Friuli-Venezia Giulia currently comprises 670 km of tracks, 480 km of which are electrified and 190 km are non-electrified, including also freight lines and sidings to ports and industrial areas. Port of Trieste has rail tracks with length of 70 km.

Data on infrastructure and intermodal services for RRTs Trieste, Cervignano, Gorizia, Pordenone (tracks, equipment) are listed:

- Trieste: 6 railway tracks, 450-meter long (North side) and 350-meter long (South side) respectively, divided into two operational beams; RoLa shuttle service connection w/ new port terminals.
- Cervignano: 8 railway tracks (six 750-meter long, two 450-meter long).
- Gorizia: connects with the Gorizia-Nova Gorizia international line that links Gorizia (I) railway station to Vrtojba (SI) railway station; 5 railway tracks whose length range between 340 and 500 m; Trains from and to Trieste need additional shunting and a change of locomotive upon arrival in Gorizia RRT.
- Pordenone: 7 railway tracks (4 for operations, length ranging from 560 to 830 m).

The regional railway network in Friuli-Venezia Giulia currently comprises 670 km of tracks, 480 km of which are electrified and 190 km are non-electrified, including also freight lines and sidings to ports and industrial areas.

Throughout the railway network, with the exception of the Udine - Cividale line, the company Rete Ferroviaria Italiana S.p.A. (i.e. Italian Railway Network) manages the infrastructure. Railways undertakings, in a system of free competition, operate the freight services.

The Port of Trieste represents a core network node of the Mediterranean and Baltic-Adriatic Corridors crossing the Region Friuli Venezia Giulia. It is linked to the national railway network, and therefore to the TEN-T network, through the nodes listed below:

1. Campo Marzio, serving Piers V, VI (RoRo) and VII (containers), where most of the traffic is currently concentrated.
2. Servola, serving the industrial port, i.e. a general cargo terminal and one of the most important steel production sites in North Italy.
3. Aquilinia, serving the Trieste industrial area.

The railway lines cross the whole region and are listed as follows:

Core double-track lines:

- (Mestre) – Latisana – Cervignano – Monfalcone – Trieste
- Monfalcone – Gorizia – Udine
- Aurisina – Villa Opicina
- Udine – Pordenone – Sacile – (Mestre)
- Udine – Tarvisio

Freight lines and sidings:

- Trieste Centrale – Trieste Campo Marzio
- Bivio Aurisina – Bivio Viadotto
- Trieste Campo Marzio – Villa Opicina
- Trieste Campo Marzio – Aquilinia
- Udine Parco – Bivio Vat
- Monfalcone – Porto Rosega
- San Giorgio di Nogaro – Porto Nogaro

As stated before, in Friuli Venezia Giulia Autonomous Region there are both double-track and single-track lines.

The regional railway network in Friuli Venezia Giulia Autonomous Region currently comprises 670 km of tracks, 480 km of which are electrified and 190 km are non-electrified, including also freight lines and sidings to ports and industrial areas.

As far as the railway accessibility from the Port of Trieste to the main connections towards current and potential Italian and foreign hinterland markets, it can be described as “highly qualified”. All tracks are characterized by the maximum possible loading gauge (“gabarit”) available for all types of intermodal transport, which is the “P/C 80” loading gauge.

Terminals and ports

The main terminals of the Port of Trieste in terms of multimodal connections, where the port is concentrating its investment priorities, are located in the New Free Zone are connected to the Campo Marzio railway station:

- Ro-Ro Terminal - Pier V, Samer Seaports & Terminals S.r.l.
- Ro-Ro Terminal, Pier VI, Europe Multipurpose Terminal (EMT)
- Container Terminal, Pier VII, Trieste Marine Terminal (TMT).

There are four railroad terminals (RRTs) in Friuli-Venezia Giulia, Trieste, Cervignano, Gorizia and Pordenone.

The facilities of the PORT OF TRIESTE are the following:

- Port areas: about 2.3 million sq. m of which about 1.8 million sq. m of free zones.
- Storage areas: about 925,000 sq. m of which about 500,000 sq. m under cover.
- Length of docks: 12 km
- Number of berths: 58 (for break bulks, conventional ships, multi-purpose vessels, container ships, Ro-Ro/ferries, oil tankers, chemical tankers, passenger ships etc.)
- Maximum depth: 18 m.
- Length of rail track: 70 km.

The RAIL ROAD TERMINAL (RRT) OF TRIESTE is located only 15 km from the Port of Trieste. Its main features are the following:

- Managed by Interporto di Trieste S.p.A., a public-owned company.
- Located in Fernetti – near the border with Slovenia.
- Total area: 232,000 m², out of which 35,000 m² are roofed warehouses; 80,000 m² parking area.

Development projects: 320,000 m² area (out of which, 70,000 m² storage) located in the industrial zone – 10 km from the Port area, directly linked to the road and railway network; it has free zone status."

Ports in Friuli-Venezia Giulia are Trieste, Monfalcone, Porto Nogaro.

SWOT Analysis

Strengths

- FVG Region boasts the presence of several multimodal logistics platforms (3 ports and 4 RRTs), a consistent infrastructural endowment for a region of only 1,2 people.
- Overall, the level of the infrastructure is good without criticalities in terms of operation and maintenance.

Opportunities

- Strong interest expressed major international investors interested in investing in the infrastructure of the Port of Trieste.
- Availability of European and national funds for the strengthening of port and inland port infrastructure.

Bottlenecks

- Lack of capacities port/terminals/railway lines (investments to increase railway capacity, which include technological improvements (ERTMS) and new infrastructures.
- Border barriers (interventions to reduce the impact of border controls are on-going).

3.2.4. Emilia-Romagna

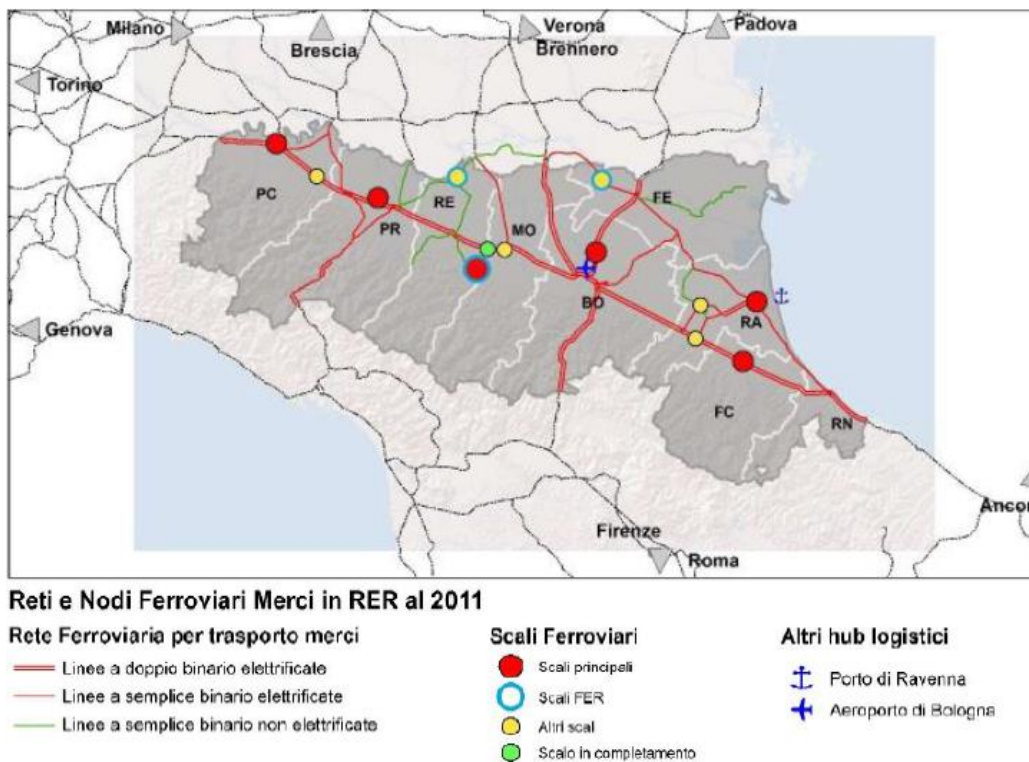
Railway lines

The national rail network infrastructure managed by the national operator (RFI) is 16,700 km long. In 2015, 45.52 million of trains*km ran on the national railway, 60% of which generated from the northern regions of Italy.

The portion of network managed by RFI is 1,315 km long while the part under the responsibility of FER is composed by 364 km of single-line tracks; FER operates under concession by the Region, in compliance with specific service and program contracts.

The overall length of regional tracks is 2,119 km, 1,609 km of which for the conventional lines, and 510 km for the high-speed lines (AV). All the lines managed by Emilia Romagna Railway (FER) have single tracks. Lines with double tracks are represented by a double red line in next figure.

Figure 3-8: Regional railway network



The operative RFI railway lines in Emilia Romagna are 1,315 km long. These can be classified as follows:

- Fundamental lines: 748 km
- Complementary lines: 397 km
- Node lines: 170 km

In addition to the lines managed by the national operator RFI, the regional lines managed by FER are listed below:

- Bologna – Portomaggiore
- Ferrara – Codigoro
- Ferrara – Suzzara
- Parma – Suzzara
- Modena – Sassuolo
- Casalecchio – Vignola
- Reggio Emilia – Guastalla
- Reggio Emilia – Sassuolo
- Reggio Emilia – Ciano d'Enza

Axial mass is of 22.5 tons (D4 classification).

The two main lines of the regional infrastructure managed by FER are currently the Reggio Emilia-Dinazzano and the Ferrara-Poggio Rusco-Suzzara, electrified until Poggio Rusco. More in general, only 138 km on a total of 364 of the FER lines are electrified.

Terminals and ports

Main regional intermodal nodes (terminals) are Villa Selva, Terminal Piacenza, Bologna freight village, Dinazzano Po, Rubiera, Lugo, Ravenna, Faenza.

There are many facilities in Emilia Romagna dedicated to intermodal and combined transport, with differentiated business models and offering differentiated multimodal services.

Following the agreement signed in 2009 between the national railway group (Gruppo FS) and the Emilia-Romagna Region, the Region identified the main regional intermodal nodes and these are:

1. Piacenza
2. Parma freight village CePIM
3. Marzaglia
4. Bologna freight village
5. Villa Selva
6. Ravenna
7. Bologna San Donato (Rail Freight Yard)
8. Faenza
9. Lugo

In addition to the above-mentioned intermodal nodes of the agreement, two more terminals of the Reggio Emilia area have been added because of their great relevance for the regional rail transport system: Rubiera and Dinazzano Po.

The main regional rail freight connections are Reggio Emilia-Dinazzano Po (6,300 trains) and the Port of Ravenna (5,800 trains). Very important origin and destination nodes are Piacenza, Parma, Rubiera and Bologna (14,300 trains totally).

The logistic nodes of Emilia Romagna are:

- Bologna Airport
- Port of Ravenna
- River port of Boretto
- Freight villages
- Main railway terminals
- Other railway terminals

Port Ravenna is the main port in Emilia-Romagna region.

SWOT Analysis

Strengths

- Quality and quantity of rail and inter-modal infrastructures.

Weaknesses

- Road accessibility to intermodal nodes.
- Competitiveness of rail/road intermodal transport strictly dependent on public incentives.

Threats

- Delays in infrastructure upgrading projects.

Bottlenecks

- Rail access to the Ravenna port rail terminals (lack of capacity and traction system).



- Low capacity of existing railway network direct to Ceramics and Tiles district (Emilia-Sassuolo: Missing links, Low capacity of existing railway lines, Speed restrictions, train length, missing links, lack of capacity, Bologna-Prato: Loading gauge).
- Lack of capacity on Parma-La Spezia railway line.

LINES

- The single-track Reggio Emilia-Sassuolo line is the only link to Dinazzano terminal; and it is crowded during daytime due to the coexistence of freight and passenger traffic
- A new North-South route is needed between Ferrara and Adriatic line, in order to reduce traffic on the Ravenna-Rimini line
- High saturation level of Bologna bivio S.Vitale-Castel Bolognese section
- Need for upgrade capacity improvement of Pontremolese railway line

NODES

- Ravenna port. Acceleration of manoeuvres between the railway station and the two links (Left/right) with the harbour. Use of Candiano freight yard.
- Ferrara station. A direct connection on the route Ravenna-Ferrara-Poggio Rusco is needed.
- Faenza station. A direct connection on the route Ferrara-Faenza-Rimini is needed.
- Fidenza station. A direct connection on the route Fornovo-Fidenza-Bologna is needed.
- Villa Selva terminal. Completion of works.
- Faenza freight yard. It is located into the urban area.

OTHER

- Dinazzano terminal. The performances of Reggio Emilia-Dinazzano railway line is low (it is not electrified and in the Scandiano station the train length allowed is not adequate)
- Dinazzano terminal. The terminal is reaching saturation
- Bologna freight village. Shortage of tracks dedicated to arrival/departure of trains
- Lotras (Villa Selva) terminal. Lack of electrification down to the operational tracks of the terminal
- 8. Sapir terminal. The branch with national rail network is not electrified.
- CEPIM. New tracks for locos and manoeuvres are needed.

3.2.5. Slovenia

Railway lines

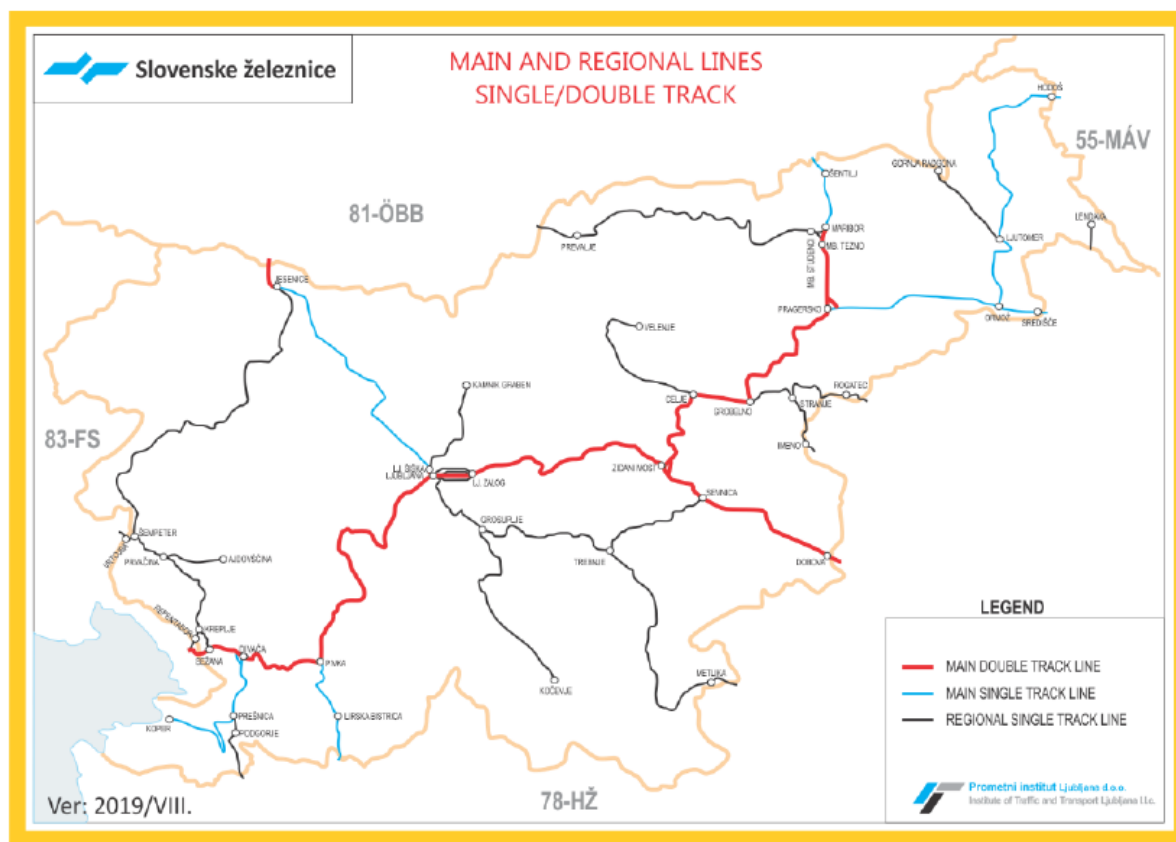
Public railway infrastructure in Slovenia contains 1,207.7 km of lines. Length of the main lines is 607.0 km (50%) and the regional lines 600.7 km (50%). Only the main railway lines are double tracked. Length of the double track lines is 333.6 km (28%), length of single track lines is 874.1 km (72%).

Only the main railway lines are double tracked. Length of the double track lines is 333.6 km (28%), length of single track lines is 874.1 km (72%).

Only the main railway lines are electrified. Length of the electrified lines is 605.5 km (50%), length of none-electrified lines is 602.3 km (50%)."

Maximal gradient on the railway lines is 27%. Axle load category 22,5 tons is presented at 46% of the railway network.

Figure 3-9: Main and regional Slovenian railway lines



Terminals and ports

The biggest freight terminals with most amount of loaded and unloaded freight from/to rail/road in Slovenia are Port of Koper, Sežana, Ljubljana, Celje, Maribor. In Koper there is a maritime transport as well.

Terminals in the Port of Koper: Container, Car and RO-RO, General Cargo, Reefer, Timber, Dry bulk, Silo, Alumina, Iron ore and Coal, Liquid cargoes, Livestock, Cruise.

There is a car logistic center in Grosuplje in Central Slovenia region, used by Autotransporti Kastelec which has a potential of industrial tracks. It is located by the secondary line no. 80 (state border-Metlika-Ljubljana) near Grosuplje station. It is a non-electrified single-track railway line.

Container terminals are in Port of Koper, Ljubljana, Celje and Maribor. Marshalling yard in Ljubljana Zalog.

Logistics services in Port Koper comprise:

- managing the port area,
- collection and distribution center services for all product groups,
- goods services (sorting, palletizing, sampling, security, labelling, weighing, cleaning, etc.) that goes hand in hand with the development of logistics services and upgrade customer demand,
- integrated logistics solutions.

Ports

In port of Koper there is 35 km of railway tracks, 6 railway groups, 8 terminals, speed 10 km/h, non electrified.

The Port of Koper, managed by Luka Koper d.d., is the only commercial cargo port of Slovenia and a core node in two EU TEN-T Corridors: Mediterranean and Baltic-Adriatic.

SWOT Analysis

Weaknesses

- Bottlenecks on the section Divača-Koper.
- Well-developed highway network in Slovenia.
- A lot of parts of railway network are old/still non-modernized.
- High occupancy of storage facilities and railway lines
- Relatively small port for global actors

Opportunities

- Construction of second railway line on the section Divača-Koper; second railway track Koper-Divača
- Modernization of railway lines in Slovenia: many infrastructure projects are in progress with an aim to upgrade the existing railway infrastructure."

Threats

- A lot of parallel railway freight routes (Italy, Austria, Croatia).

Bottlenecks

- Railway hub Ljubljana.
- Single railway track Koper-Divača.

3.2.6. Thuringia

Railway lines

The regional railway network in Thuringia has an overall length of lines of 1.521 km and almost 10,000 km of road network.

The most important axes for freight transport are:

East-West-Axes:

- Halle – Nordhausen – Kassel
- Leipzig/Halle – Großheringen – Erfurt – Bebra

North-South-Relation:

- Saalbahn
- Leipzig – Altenburg – Hof

New stretch of track (North-South-Main Line for fast railway freight transport):

- Leipzig/Halle – Erfurt – Nürnberg

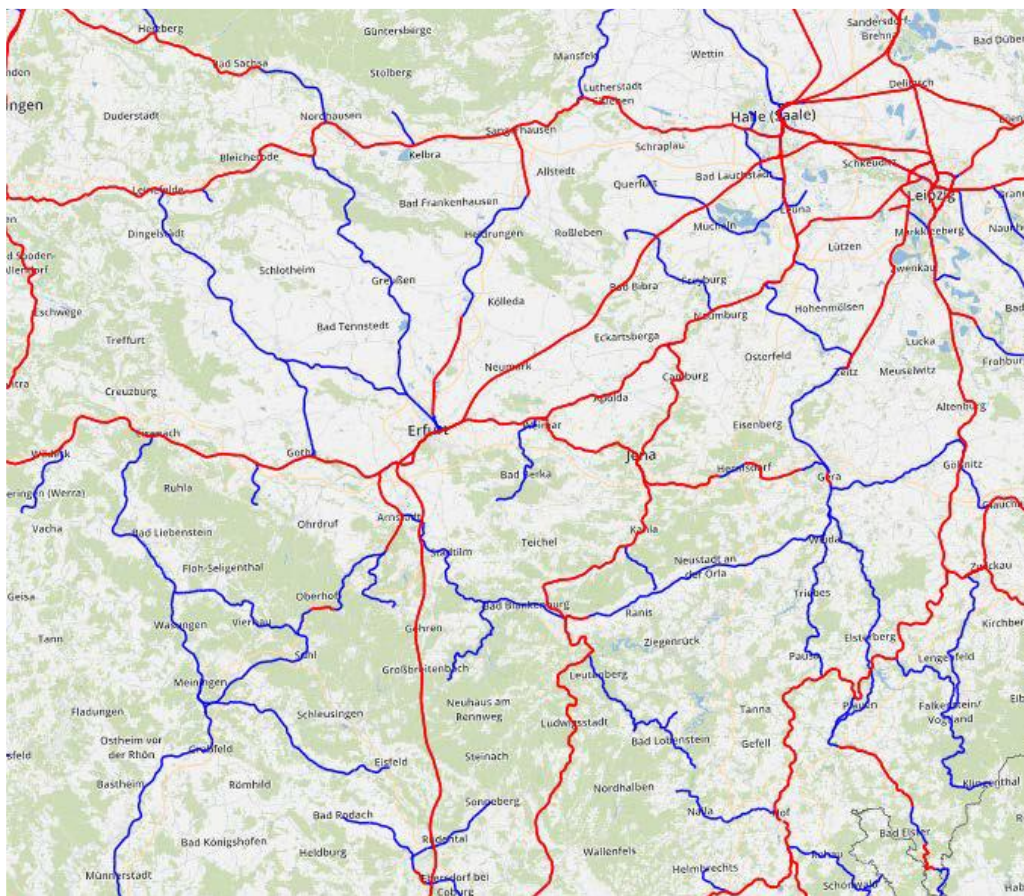
The regional railway network in Thuringia has an overall length of tracks of 2.352 km, of which 1.339 km are single tracks (including sidings; blue in the map) and 1.013 km are multi-tracks (red in the map).

The regional railway network of Thuringia currently comprises 1.521 km of lines, of which 452 km are electrified and 1.069 km are non-electrified. Hence, only 30 % of all tracks in Thuringia are electrified. In Germany the railway electrification system using alternating current (AC) at 15 kilovolts (kV) and 16.7 Hertz (Hz) is applied.

Thuringia predominantly has a clearance gauge of GA (for container transport) and DE3 (for German railway network and the network of neighbour countries). There is one line between Erfurt and Halle with a clearance gauge of GC. The clearance gauge G2 (Central Europe) can be found extensively in Thuringia.

Route classes for rail freight transport in Thuringia are mostly CE (national route class extension of C4: 20,0 t; 8,0 t/m), D4 (22,5 t; 8,0 t/m) and CM4 (national route class: 21,0 t; 8,0 t/m). Few tracks also have A (16,0 t; 5,0 t/m), B2 (18,0 t; 6,4 t/m) and C4 (20,0 t; 8,0 t/m)."

Figure 3-10: Regional railway network in Thuringia



Source: GeoViewer/Infrastrukturregister, DB Netze

Terminals and ports

CT-Terminals in Thuringia:

- DUSS Terminal Erfurt-Vieselbach (EV)
- Captrain-Terminal Eisenach

Loading points of DB Netz AG in Thuringia:

- Altenburg
- Arnstadt Hbf
- Bad Salzungen
- Ebersdorf-Friesau
- Eisenach
- Erfurt Gbf
- Gera Hbf
- Immelborn
- Kölleda
- Leinefelde
- Lobenstein
- Saalfeld/Saale
- Themar
- Walldorf (Werra)

Ports

In Thuringia there are no sea ports.

SWOT Analysis

Strengths

- Sufficient rail freight infrastructure.

Weaknesses

- The share of only 30 % of electrified railway tracks.
- Terminal is not electrified.

Opportunities

- Location in the “heart of Europe” in-between RFCs and TEN-T network.
- Maintenance and construction of track connections.
- Maintenance and reactivation of secondary lines.
- Implementation of a network of loading platforms designed for flexible use.

Threats

- Further closing or even dismantling of tracks should be prevented.
- New highways (Autobahn projects).

Bottlenecks

- Missing terminals for shipment.
- Infrastructural deficits
- Missing links in railway-network (a number of disused railway lines or sections)

3.2.7. West Pomerania, Lubusz, Lower Silesian

Railway lines

West Pomeranian Region

There are 1173 km of railway lines running through the area of the Zachodniopomorskie Voivodeship, with a railway network density of 5.1 km per 100 km².

The main railway lines in the region are:

- E-59 (AGC) line Świnoujście - Poznań with a branch to Szczecin Główny, which includes next lines:
 - No. 401: Świnoujście - Szczecin Dąbie: electrified, 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: two-track, electrified.
 - No. 857 which is 2.34 km long; allows direct trains from Poznań to Świnoujście to bypass the Szczecin Dąbie and Szczecin Główny stations.

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 next lines, with poor technical condition of the railway surface, level crossings and engineering structures:
 - No. 273 Szczecin Port Centralny SPB - Wrocław Muchobór: double track, electrified, national line;

- No. 428 Szczecin Zdroje- Szczecin Podjuchy, 2.998 km long: single track, electrified, not a national 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.
- No. 402 Koszalin – Goleniów – a railway line in the north-west of Poland connecting Koszalin with Goleniów through Kołobrzeg, Gryfice and Nowogard. Single-track line, electrified.
- No. 403 Piła Północ – Ulikowo - single track, non-electrified.
- No. 404 Szczecinek – Kołobrzeg – single track, electrified
- 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.
- No. 408 Szczecin Gumieńce – State Border/Grambow is a single-track, non-electrified line.

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.

All lines included in the European corridors are electrified and adapted to carry freight. The least adapted section is line no. 273, whose comprehensive modernisation would be planned only after 2023. Freight trains can be operated on the following lines: 202, 402, 403, 404, 408, 409, 855 | 857. In most cases these lines are single-track and electrified. In the voivodeship 141 sidings are adjacent to railway lines passing through the voivodeship.

Lubusz Region

A total of 912 km of tracks with a network density of 6.5 km per 100 km² runs through the Lubuskie Voivodeship.

Some lines passing through the region are of supra-regional or even international importance, being part of TEN-T corridors. Two of them are included in the TEN-T core network: E 20 (No. 3) and E 59 (No. 351, Poznań-Szczecin). The C-E 59 line (No. 273, the so-called "Nadodrzanica") is part of the comprehensive TEN-T network. Interconnections between the centres within the region are also provided by lines of lower categories, including numerous non-electrified single-track sections. The largest labour markets are connected with two-track non-electrified lines No. 203 and No. 14. There are 119 sidings adjacent to the lines passing through the area of the voivodeship.

Lower Silesian Region

A total of 1763 km of tracks run through the Dolnośląskie Voivodeship, not all lines are allowed for freight transport. The European Corridor E30 passes through the voivodeship, with lines no. 132, 275, 278 and 282. Within the voivodeship there are also lines included in the Baltic-Adriatic TEN-T core network corridor, which is included in lines no.: 143, 274 and 281. Apart from them, other key lines for freight transport run through the voivodeship: 137, 271, 273, 276, 289.

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. 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. The total length of electrified railway lines in the Lower Silesian Region is 1053 km, which constitutes almost 60% of all operating railway lines. The vast majority of freight railway lines are electrified, except for lines 137 and 282. There are 152 sidings adjacent to railway lines passing through the voivodeship.

Terminals and ports

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.

There are three intermodal terminals in the voivodeship Lower Silesian, only one intermodal terminal in the voivodeship Lubusz and two intermodal terminals in the voivodeship West Pomerania.

Intermodal terminals in the three regions:

- West Pomeranian: DB Port Szczecin Sp. z o.o.; OT Port Świnoujście
- Lubusz: Rail Terminal Rzepin
- Lower Silesian: Schavemaker Kąty Wrocławskie; PCC Intermodal – PCC Brzeg Dolny; Container Terminal Siechnice – Baltic Rail

The development of international intermodal connections (including Far East - Western Europe transport) 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 (in Lubusz region). 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 "Nadodrzanka", which also services intermodal trains.

In recent years, transhipments 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.

SWOT Analysis

Strengths

- 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

Weaknesses

- Poor condition of station infrastructure and railroad infrastructure on local lines.
- Poor technical condition of railway transport facilities
- Insufficient capacity of railway station nodes

Opportunities

- Electrification of railway lines and the inclusion of certain sections of the lines into the system of railway lines of national importance
- Increasing financial resources allocated for repairs/modernizations/construction of railway lines
- Reducing construction and modernization times of railway lines

Threats

- Deteriorating condition of linear infrastructure
- Insufficient funds allocated for the modernization of rail transport

Bottlenecks

- Cargo road/rail/sea/river terminals: Missing terminals (Taking into account the growth trend, assuming the growth rates and investments of railway carriers in intermodal platforms, the number of terminals and their total annual transshipment capacity will be insufficient.)

3.2.8. Komitat Vas and Zala, Hungary

Infrastructure data regarding the Vas and Zala Countries was not available or listed in the sources within REIF project, for this reason the presentation below mostly refers to the Hungarian state level.

Railway lines

The railway network consists of 7,893 km. About 7712 km of national railway network is operated by the Hungarian State Railways (MÁV) and the Hungarian-Austrian railway company (GYSEV), its technical construction and condition in most cases does not meet the needs of freight transport and is significantly lower than the EU15 (old member states) average. Hungary's transport network is centered in Budapest and has a radial layout. The domestic railway network in Hungary – with the axle load of 210 kN – is one of the weakest in Central Europe, compared to the neighbouring countries and Western Europe where the axle load of 225 kN is ensured on the main transport routes. The rail network lags far behind in terms of the length of double-track lines, since only 19% of the total line length is double-tracked compared to the EU average (more than 42%). In Hungary 39.9% (3,090 km) of the 7,712 km long railway network is electrified.

The following figure shows the Hungarian railway network with electrified and non-electrified lines; main and branch lines, for freight only lines not in operation. Main lines are the thickest.

Figure 3-11: The layout of the Hungarian rail network with electrified (red) and non-electrified, main and branch lines



Source: carrier's website

Terminals and ports

- „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.

- 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.

- 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.

- 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. Inpark Zalaegerszeg is located next to the automotive test track. It is an intermodal logistics centre and a future container terminal.

Ports

There is no sea ports in these regions. There are ports on Lake Balaton, connected with railway.

SWOT Analysis

Strengths

- Advanced logistics infrastructure in the capital and in its vicinity
- Broadband (xDSL, CATV) coverage in Hungary has reached the average value of the EU

Opportunities

- Greater use of nodal infrastructure potential
- Support for the development of broadband infrastructure in places where this investment would not be justified for purely business reasons

Threats

- In some cases, state-supported infrastructure development will not be confirmed

Bottlenecks

- Railway lines regarding technical parameters: Missing links (There is a 7 km long missing railway connection between Lendava (Slovenia) and Rédics (Hungary).)

3.3. Services

Services are key part of rail freight transport of goods. A significant roles in transport chain play operators and stakeholders. Within this chapter of services we focus on freight transport volume, flows and market characteristics. For the analysis also SWOT and bottlenecks findings are important.

3.3.1. Styria

Operators and Stakeholders

Local railway operator and freight transport carrier is company “Steiermarkbahn”.

Stakeholders with high importance or relevance for the project and rail freight transport in Styria are divided into five groups of stakeholders regarding their role: ÖBB-Infrastruktur AG; StLB, GKB; Railway undertakings RCA AG, LTE, StB; RRT CCG Terminal; Freight Forwarders.

Table 3-1: Stakeholders of high importance, their role, contribution, benefits and strategies

Stakeholder	Role	Contribution to the project	Benefits from the projects	Strategies to improve the support
ÖBB-Infrastruktur AG	builds and manages the main railway infrastructure	strategic goals and implementation of infrastructural works	Funds and coordination on regional level	Showing the added value of infrastructure investments
StLB, GKB	build and manage regional railway infrastructures	strategic goals and implementation of infrastructural works	Funds and coordination on regional level	Showing the added value of infrastructure investments
Railway undertakings RCA AG, LTE, StB	Operators	Data exchange of relevant freight flows	Additional potential for freight transport	Showing the added value of data exchange
RRT CCG Terminal	Terminal operator	strategic goals and implementation of infrastructural works	Funds and coordination on regional level, additional potential for freight transport	Showing the added value of infrastructure investments
Freight Forwarders	Operators	Data exchange of relevant freight flows	Better opportunities for freight transport	Showing the added value of data exchange

Goods

Most imports to Styria by rail come from:

- Slovenia (iron ore, coal, coke and containerised goods)
- Germany (wood, containerised goods and basic metals)
- Poland (coal, coke and containerised goods)
- Hungary (metal ores, basic metals, etc.) as well as
- Czech Republic (products of agriculture and forestry – mainly wood; coal and secondary raw material).

Freight transport demand

Significant export amounts from Styria are transported by rail to

- Germany (1,4 Mio. tons, thereof 740.000 tons of wood, 380.000 tons of basic metals and transport equipment (e.g. empty containers))
- Italy (317.000 tons, thereof mainly wood) and
- Slovenia (308.000 tons, thereof mainly wood).

The Cargo Center Graz terminal. The key figures of the terminal (2018):

- daily handling of around 10-12 trains and approx. 300 trucks, total volume more than 3,500 tons per day
- a total turnover of more than 200,000 containers per year

This terminal specializes in mining goods, including ores and alloys for the steel industry from China, South Africa and South America that are bundled in Kapfenberg and delivered directly to the processing industry in the region, such as Böhler-Edelstahl or voestalpine. The annual transport volume is approx. 25,000 TEU, corresponding to 300,000 tons."

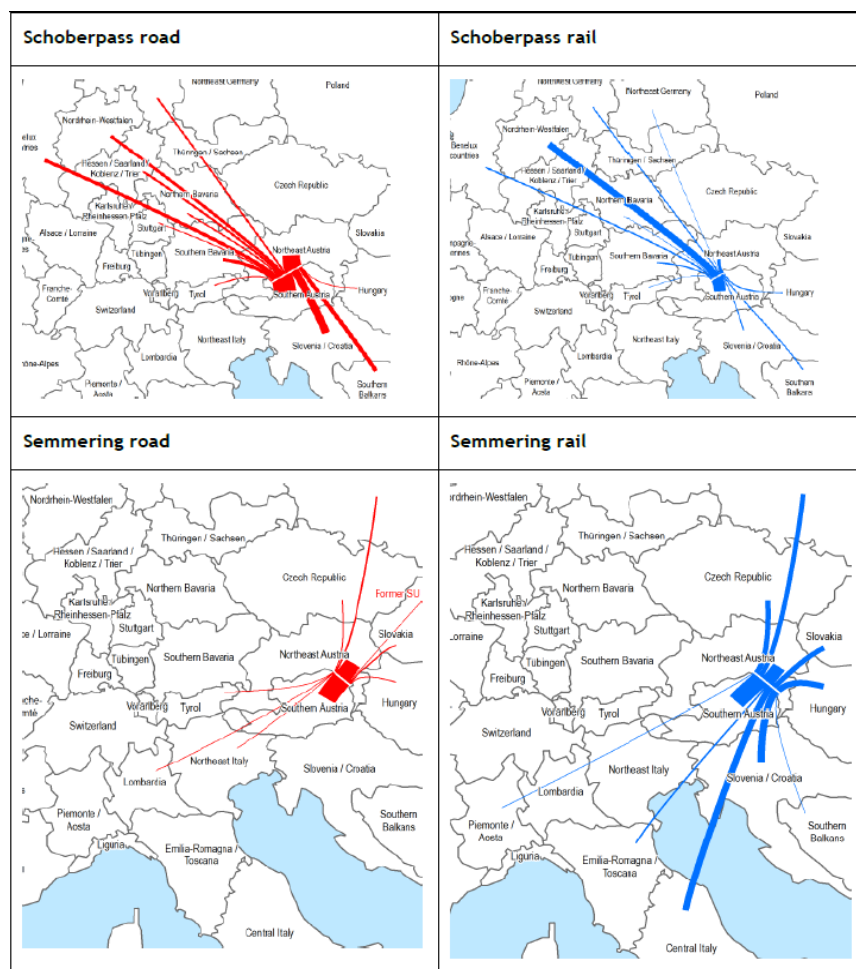
Styrian imports by rail accounted for 6,1 Mio. tonnes in the year 2018 whereas Styrian exports by rail accounted for 2,8 Mio. tonnes. The volumes of exports per rail account for only half of rail freight imports to Styria.

Within the last three years (2017-2019), the cross-border rail transport volumes of Styria decreased by 14% in imports and by 20% in exports. This is due to reduced imports of metal ores (-330.000 t) and containerised products (-530.000 t) as well as reduced export volumes of containerised products (-570.000 t) and basic metals (-110.000 t).

The alpine crossings – apart from Austrian domestic transport from and to Styria and Carinthia – are important transit routes between South or South-Eastern Europe and North or North-Eastern Europe. About 30% of the road freight transport volumes (Schober, Wechsel) and 20% of the rail freight volumes (Schober, Semmering) account for transit.

The particular transport flows are depicted. Germany is clearly the most important economic partner. Due to Styria's location in the Alps, import and export flows from Northern and North Eastern Europe pass the Alpine crossings Schober (Pyhrn-Schober axis), Semmering and Wechsel (Baltic-Adriatic Corridor).

Figure 3-12: Most important transport road and rail flows for Schoberpass and Semmering



SWOT Analysis

Opportunities

- Increase of the freight transport volumes in the next years.

Threats

- Strong competition from road transport.
- The development of the railway network cannot keep up with the development of freight transport.

Bottlenecks

There were no bottlenecks recorded regarding services in REIF analyses.

3.3.2. Croatia

Operators and Stakeholders

The single state operator of Croatian railways is HŽ Holding L.T.D., which is further divided into HŽ Passenger Transport L.T.D., HŽ Cargo L.T.D. and HŽ Infrastructure L.T.D.

Along with HŽ Cargo L.T.D. there are several other rail freight service providers operating in Croatian territory. Those include: Rail Cargo Carrier – Subsidiary Croatia; Rail&Sea L.T.D.; Transagent Rail L.T.D; ENNA PPD Trans; Train Hungary – Subsidiary Zagreb; Eurorail Logistics L.T.D."

Table 3-2: Regional stakeholders of medium/high importance, their role, contribution, benefits and strategies

Stakeholder	Role	Contribution to the project	Benefits from the projects	Strategies to improve the support
HŽ Cargo	Railway cargo transporter	Exchanges data on trains and relevant freight flows	Increased knowledge	Including stakeholder in workshop and sharing of information through publications
HŽ Infrastructure	Railway infrastructure manager	Exchange data on state of infrastructure	Increased knowledge	Including stakeholder in workshop and sharing of information through publications

Goods

Rail freight suitability for each group of goods present these products; goods, suitable for rail transport:

- Products of agriculture, hunting, and forestry; fish and other fishing products
- Coal and lignite; crude petroleum and natural gas
- Metal ores and other mining and quarrying products; peat; uranium and thorium
- Wood and products of wood and cork (except furniture); articles of straw and plaiting materials; pulp, paper and paper products; printed matter and recorded media
- Coke and refined petroleum products
- Chemicals, chemical products, and man-made fibres; rubber and plastic products; nuclear fuel
- Other non-metallic mineral products
- Basic metals; fabricated metal products, except machinery and equipment
- Transport equipment
- Secondary raw materials; municipal wastes and other wastes

Goods which are handled in three ports are:

- Port of Rijeka: coal, iron ore and bulk cargo, stores cereals and oilseeds, containers, general cargo, salt and cement, refrigerated and frozen foods, livestock, timber and general cargo, fuel and other liquid cargo.

- Port of Ploče: general cargo, coal, iron ore and bulk cargo, fuel and other liquid cargo, cereals and oilseeds, timber, alumina and petroleum coke, containers, cement, slag.
- Port of Šibenik: phosphates, bulk and general cargo, wood.

Freight transport demand

The port of Rijeka, as previously mentioned, is primarily a cargo port. It is the largest Croatian port, and in 2018, a total turnover of 13.4 million tonnes of cargo was achieved, and in the same period approximately 150,000 passengers were transported.

Railway freight corridors from the port of Rijeka to the markets with the greatest potential for the port (Hungary, BiH, Slovakia, Italy, southern Poland and Serbia).

SWOT Analysis

Strengths

- Market liberalisation.

Weaknesses

- Often train delays and inaccurate timetables.
- Insufficient train speed on some lines.
- Relatively old rolling stock in comparison to other EU countries.
- The old rolling stock is deteriorating the infrastructure and therefore the noise levels during operations are high.

Opportunities

- Increase of the amount of freight transport in the following years.
- Congestion of road network might be used as an opportunity for the usage of railways.
- Modernization of fleet."

Threats

- Dominant road transport competition.
- Punctual, fast and reliable road transport service.

Bottlenecks

- Old rolling stock

3.3.3. Trieste/Friuli Venezia Giulia

Operators and Stakeholders

The 3 principal European transport operators (Maersk, MSC and CMA CGM) manage the 46% of the capacity of global transfers.

The use of spaces and docks of the different terminals is given in concession by the Port Network Authority of the Eastern Adriatic Sea (PNAEAS) to various operators, who manage the movement of freights belonging to several handling categories.

On behalf of railway companies, shunting operations for arriving and departing freight trains in the Trieste Campo Marzio station are carried out by the company Adriafer S.r.l., constituted and owned by the PNAEAS, which has been represented the only operation manager for the Punto Franco Nuovo since 2016. Furthermore, Adriafer S.r.l. performs shunting operations at one of the terminals managing oil products and at the Interporto di Trieste, which is an inland terminal located in Ferneti and connected to the Villa Opicina station.

Table 3-3: Regional stakeholders of high importance, their role, contribution, benefits and strategies

Stakeholder	Role	Contribution to the project	Benefits from the projects	Strategies to improve the support
RFI S.p.A.	Company that manages the railway infrastructure	Implementation of the infrastructural works on RFI side	Adequate funds and coordination at local level	Continuous and regular meetings and feedback. Signature of specific MOUs
Railway Undertakings	Operators	Commitment to exchanging data on trains	Reciprocity in data exchange	Showing the added value of data exchange
RRTs	Operators	Commitment to exchanging data on trains	Reciprocity in data exchange	Showing the added value of data exchange
Terminal Operators	Operators	Commitment to exchanging data on trains.	Reliability and continuity of data exchange.	Showing the added value of data exchange.
Freight Forwarders	Operators	Commitment to exchanging data on trains.	Reliability and continuity of data exchange.	Showing the added value of data exchange.
Customs Agency		Commitment to exchanging data on trains.	Reliability and continuity of data exchange.	Showing the added value of data exchange.

Goods

More specifically, the following freight typologies are handled in the Port of Trieste: containerized freights, fruit and vegetable products, coffee, cereals, metal, engines, steel and chemical products, wood, solid and liquid bulk, crude oil and its derivative products.

The second most important sector in terms of handling category is the one encompassing transport equipment, machinery, manufactured objects and miscellaneous articles, which represents almost the 26% of total flows.

Freight transport demand

Having managed almost 62 million tons in 2019, the Port of Trieste has been representing for a few years the main Italian sea port for the total amount of handled freight (also thanks to its strategic role played in the liquid bulk sector), and in 15 years (since 2004 to 2019) it has more than doubled the managed volume of general cargo (from 8,3 to 16,9 million tons with an average annual rate of 4,5%). As it can be noticed in Figure 6, such result has been obtained by the relevant growth in container traffic that has increased almost five times in the considered time horizon (from 1,9 to 9,2 million tons).

Figure 3-13: Table of total throughput of freight transport in ports in Friuli-Venezia Giulia – 2018

PORT	TOTAL THROUGHPUT IN TONS (2018)	%
Trieste	62,676,502	91
Monfalcone	4,537,278	7
Porto Nogaro	1,343,600	2
TOTAL	68,557,380	100

Figure 3-13: Table of train movements from/to the Port of Trieste (number) – 2015-2019

	2015	2016	2017	2018	2019
Total train movements	5.980	7.631	8.682	9.733	9.771
of which for:					
- Liquid and solid bulk	n.a.	1.854	2.299	2.137	1.825
- Containers	n.a.	1.664	2.235	3.214	3.766
- Ro-Ro	n.a.	3.672	3.849	4.019	4.052

Source: PNA of the Eastern Adriatic Sea (various years "Sinfomar statistics", 2020)

The Port of Trieste is currently the first Italian port for volume of goods in transit and concentrates 97% of regional maritime traffic. In particular, the table below shows the statistics referred to the last ten years.

Statistics show a significant increase in the number of containers (expressed in TEU) both in global terms, with a double-digit growth within the four-year period, and in terms of full containers. In the four-year period 2015-2018 the number of full containers grew more than the general increase of the containerized traffic in the same period (+60.39% compared to +44.75%). A huge increase in intermodal traffic (+ 62.74 % over the last four years) has been recorded, confirming the Port of Trieste as the first Italian port in terms of number of trains.

Unlike other Italian ports, the Port of Trieste serves only in minimal part the regional and national territory focusing rather on markets in Central and Eastern Europe. The Port Network Authority of the Eastern Adriatic Sea and the terminal operators of the Port of Trieste have realized that the most suitable mean of transport to reach those markets is by train. Germany is the first country reached by rail freight flows. Only 28.5% of the trains are to/from Italy, while the remaining 71.5% are to/from foreign countries.

The proposed zoning model is articulated on two different levels, regarding traffic relationships and marketplaces.

The first one considers 14 aggregated “traffic zones”, with the aim of performing an initial skimming of the traffic relationships that could affect the development of the regional transport system:

- The Friuli Venezia Giulia region and other macro areas for the rest of Italy;
- Aggregation of 6 macro areas for the external European areas (north-west, north, northeast, east, south-east, and west);
- At continental level for Africa, North and South America, and Asia and Oceania.

The second and more detailed level considers 25 zones, with the goal of focusing on European marketplaces according to a national scale or on the basis of smaller aggregated sets of different countries:

- The Friuli Venezia Giulia region and other macro areas for the rest of Italy;
- At regional level for Austria, Slovenia and Croatia;
- At national level or small aggregated sets of contiguous countries for the rest of Europe;
- At continental level for Africa, North and South America, and Asia and Oceania.

The rail services performed by the principal economic entities in the Port of Trieste represent freight intermodal transport solutions destined mainly to Austria, Germany, Luxembourg, Hungary, Czech Republic and Slovakia; indeed, only a limited number of those services is directed towards Italy.

SWOT Analysis

Strengths

- The level of cooperation among institutional players and private operators is generally good with a constant exchange and sharing of opinions and experience.

Weaknesses

- The last mile connection (linking to the national railway network) must be strengthened due to the increasing volumes of traffic.
- High costs for last mile connections among nodes."

Opportunities

- Increase of the volumes in the next fifteen years.

Threats

- Strong competition at national and international level in the field of maritime and intermodal transport – e.g. RFC Alpine-Western Balkan.

- Weak awareness of the possibility of using intermodal transport units (ITU) and considering intermodality as a possible alternative, essential for modal shift.

Bottlenecks

Diesel traction, changes of locomotives (Investments to extend electrified tracks, IT improvements to increase efficiency of shunting).

3.3.4. Emilia-Romagna

Operators and Stakeholders

The regional rail infrastructure network of Emilia Romagna region is managed by two Infrastructure Operators (RFI – Rete Ferroviaria Italiana, national operator, and FER – Ferrovie Emilia-Romagna, regional operator).

Table 3-4: Regional stakeholders of high or medium/high importance, their role, contribution, benefits and strategies

Stakeholder	Role	Contribution to the project	Benefits from the projects	Strategies to improve the support
RFI	Railway infrastructure operator	implementation of infrastructure projects and upgrading of the railway network	improving coordination with local authorities	Continuous and regular meetings and feedback.
FER	Railway infrastructure operator	implementation of infrastructure projects and upgrading of the railway network	improving coordination with local authorities	Continuous and regular meetings and feedback.
Terminal operators	Operators	Data exchange; highlighting of critical points strengthening relations with other stakeholders; sharing good practices	Data exchange; highlighting of critical points strengthening relations with other stakeholders; sharing good practices	highlight the advantage of sharing information and the potential for strengthening relations with stakeholders
Railway Undertakings	Operators	Data exchange on trains; highlight helpful market strategies to attract traffic	Strengthen the relations with other stakeholders; share knowledge and data to improve the commercial offer	Highlight the opportunity to improve the market performance
Trade and Industry associations	Representative of industries	Contributing to the definition of market needs and requests of users of freight transport services	highlight the needs of industries and potential users of freight transport	Continuous and regular meetings and feedback.
MTO, Integrators, handling agents, shippers	Operators	Data exchange on freight traffic; highlight helpful market strategies to attract demand	Strengthen the relations with other stakeholders; share knowledge and data to improve the commercial offer	Continuous and regular meetings and feedback.

18 railway companies are running an average of 420 trains a day.

Goods

The tables in the following summarising figure shows the rail suitability of the main production chains and types of goods produced in the Emilia Romagna region are reported:

- ceramic products, tiles and clay raw materials,

- agricultural products and cereals,
- partly suitable: furniture, food industry products, Machinery, engines, automotive industry products, lifting equipment, boats, agricultural machines.

Freight transport demand

As can be seen, the regional nodes generate about 330 train pairs/week, which corresponds to about 34,000 trains/year expressed by the region (RFI data, 2015). The nodes that generate the greatest amount of traffic are Ravenna, Dinazzano, Bologna interporto, Parma and Piacenza, i.e. all the nodes connected to the lines with the highest capacity and with better performance in terms of infrastructure (gauge, weight and length module).

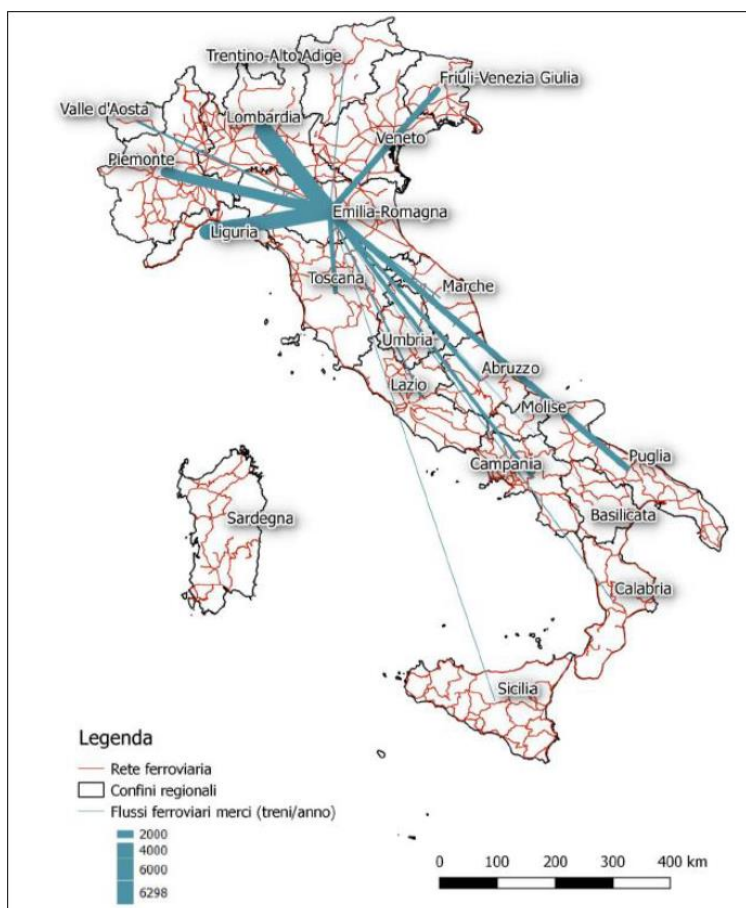
From a large part of the territory of Emilia-Romagna (excluding the provinces of Piacenza, Parma, Reggio Emilia and Modena) there is an average flow of about 240 heavy vehicles/day to the nodes of Milan, Melzo, Busto Arsizio, Mortara and Brescia. These are intermodal flows, directed to extra-regional platforms, which could potentially be oriented towards the nodes of the Emilia-Romagna region."

The total tons handled by the intermodal nodes system is equal to 18,171,147 tons.

An analysis of the quantities handled by the individual regional intermodal nodes shows the following:

- a strong relationship between the port of Ravenna and the Lombardia regional system;
- the significant function of the ports of Liguria in the export of the ceramics from the Reggio-Emilia Modena area;
- the connection role of the Bologna freight village both with the ports of Liguria and with the Lombardia Region;
- the node of Piacenza, in addition to its consolidated connections with the northern Italian regions, handles a significant amount of tons towards the south of the country, in particular towards Puglia and Campania.

Figure 3-14: Rail transport flow from Emilia Romagna to the other Italian regions (Source: ITL elaboration on RFI data)



The Emilia-Romagna region is located in a wide production area, which includes a significant part of northern Italy, in particular the regions of Lombardia, Piemonte and Veneto. In these regions there are - in addition to a number of industries and activities that generate high turnovers and massive traffic of freight - some intermodal nodes that, due to their geographical location and the quality and intensity of the services offered, are potentially attractive even beyond the borders of the regions in which they are located.

SWOT Analysis

Strengths

- Good level of cooperation among institutional players and private operators.
- Territory in which prestigious companies and brands are present, as well as a vast and productive agri-food sector, a potential basin of attraction/generation of large flows of goods.

Weaknesses

- Difficulties of integration between different modes of transport and different involved stakeholders.

Threats

- Difficulties in reducing the perceived and actual road/rail performance and cost gap.

Bottlenecks

NODES

- Ravenna port. Low capacity and high operation costs of the railway links between station and harbours. High terminal times and conflicts with heavy road traffic.
- Piacenza terminal. Increase of rail traffic capacity.
- Ferrara station. The passenger station intercept freight traffic.

OTHER

- Lotras (Villa Selva) terminal. Allowed train length along the line leading to the terminal shorter than that allowed in the terminal (575 m vs 645 m).
- Rubiera terminal. Loading gauge along the Bologna-Firenze-Spezia not allowing for high cube containers. Along the same route there is limitations on weight and length of trains (No possibility to operate train with a length of 500 m and a weight of 1.600 t.).
- Sapir terminal. Freight traffic must cross Ravenna passenger station.

3.3.5. Slovenia

Operators and Stakeholders

Regional stakeholders are presented in the table below. The highest ranked is the Ministry of Infrastructure who is in charge of national legislation and rules, national transport policy and owner of national rail infrastructure. SŽ – Infrastruktura, d.o.o. is rail infrastructure manager who is contracted by the ministry as authorized infrastructure manager. There are several rail transport operators of which the most important are Slovenian Railways with biggest market share in freight transport (more than 80 %).

Three major rail operators provide rail services in/to the port of Koper: Slovenian Railways (Slovenske železnice - SŽ), Rail Cargo Carrier (RCC) and Adria Transport (ADT). For the year 2018, 80% of rail services were provided by Slovenian Railways - Cargo, 12% by Rail Cargo Carrier and 7% by Adria Transport.

Table 3-5: Regional stakeholders of high importance, their role, contribution and benefits strategies

Stakeholder	Role and contribution	Benefits from the projects
Ministry of Infrastructure	National legislation, covering fields of rail, road, air and maritime transport, navigation and the field of transport infrastructure, transport policies;	Better modal split, lower external costs and environmental impacts
Rail infrastructure manager (SŽ – Infrastruktura, d.o.o.)	Railway infrastructure manager – provides access to rail infrastructure, railway maintenance, provides requirements and needs	More traffic on public rail infrastructure, better quality of service (more income from rail user charges)
Rail transport operators (Slovenian Railways,...)	Services in rail freight transport	Increased transport volume, more incomes, better quality of service
Forwarding agents (47 members of the Slovenian association of port logistics providers)	Organization of shipment in the logistics chain, ordering of services to the port	New business, better quality of service

Potential users of rail freight transport are companies who produce or harvest a lot of heavy natural goods or make a lot of heavy products. These goods for rail transport are: cars, wood, petroleum products, chemicals, building material, insulation material, joinery etc.

Goods

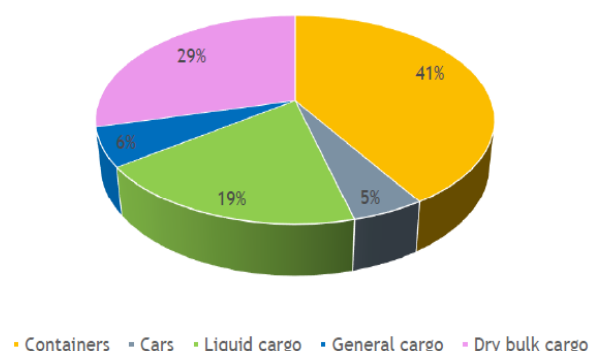
Main goods on rail in 2018 were: coal, gas, oil and derivatives (19,1%), ore (17,1%), metal and metal products (8,6%), manufacturing products (5,7%) etc. (Source: SURS).

The following cargo groups have been identified in Port of Koper for further growth and possibility to transport it on the rail:

- Containers as strategic cargo group in the port of Koper, including the process of containerization (where intermodal freight transport is using intermodal containers which begin to replace older forms of transportation).
- General cargoes, as steel coils (for automotive industry), timber, fast-moving consumer goods, raw materials for pharmaceutical industry.

Timber and general cargoes are traditionally present at the port of Koper, where approximately 100 product groups are handled, but mostly: coffee, sugar, rice, paper, pulp, magnesite, aluminium, profiles, steel plates & coils, pipes, rails, household appliances, project cargo, etc.

Figure 3-15: Structure of cargo groups in the Port of Koper in 2019

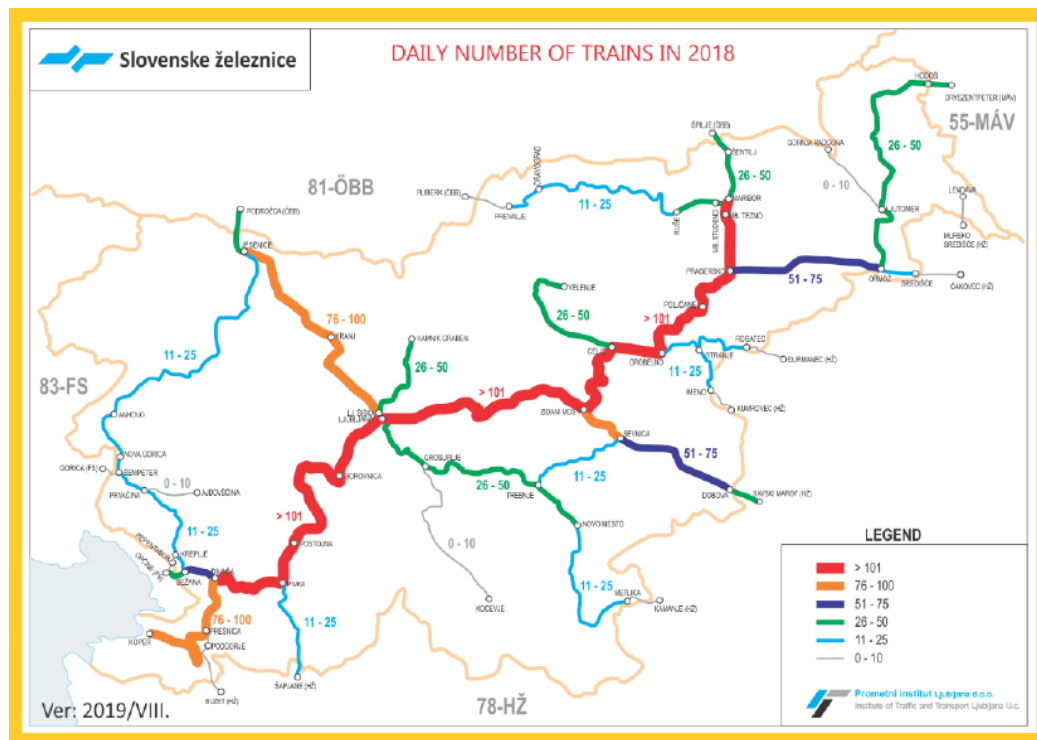


Freight transport demand

The strongest transport flows are between Port of Koper via Ljubljana, Jesenice and Maribor to Austria and Hungary.

Most important hinterland markets are markets of Austria, Hungary, Slovakia, the Czech Republic, Italy, as well as Croatia, Serbia and Romania, Germany and Poland.

Figure 3-16: Rail transport flows in Slovenia, daily number of transport in 2018



In Port of Koper 59% of the goods are transported on wagons, loaded on wagons or unloaded from them.

The road transport is more flexible than the rail transport and the increase of the volumes of cargo in last years has brought the railway in Slovenia to its natural limits, pushing for an increase of road transport to satisfy the market's demand.

Figure 3-17: Transport modes – loaded and unloaded wagons and trucks from/to Port of Koper in the period 2011-2019

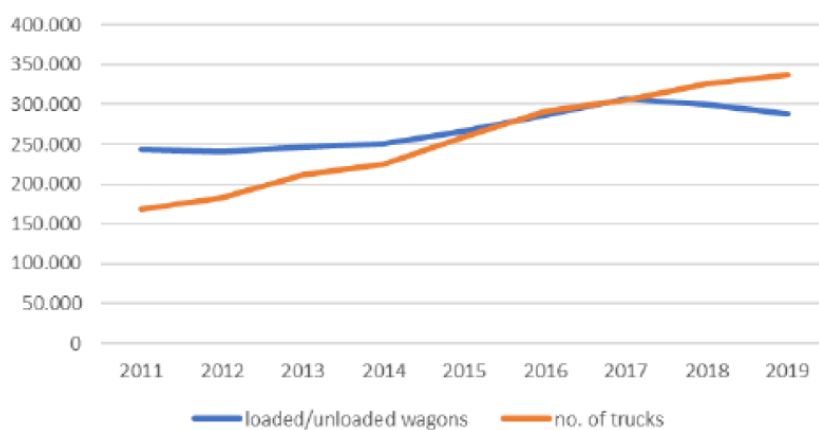
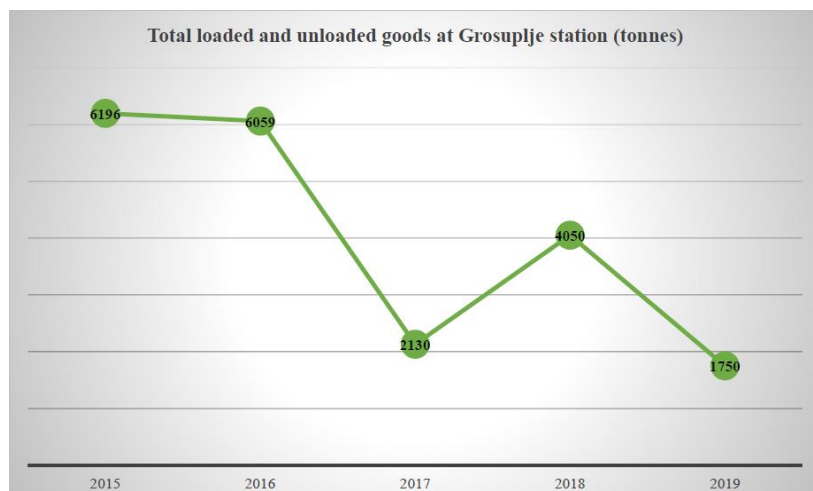


Figure 3-18: Total loaded and unloaded goods at Grosuplje station



Further, an important advantage in terms of rail transport potential is ongoing modernization of railway sector (new lines, modernization of stations, new trains,...), e.g. second track Divača-Koper (concerning Pilot in Koper) and reconstruction of regional railway line Greosuplje-Kočevje.

SWOT Analysis

Strengths

- High railway modal share
- Multipurpose port (for all kinds of goods)

Opportunities

- Potential of strengthening of Adriatic route (diversion of goods from northern ports)

Bottlenecks

- Rolling stock of the national rail carrier in Slovenia
- Stopping (dwell) times at border crossings
- Process of delivering & dispatching the wagons between Koper train freight station “Koper tovorna” and the Port of Koper
- Reading/registering the numbers on wagons going to Iron ore and coal terminal

3.3.6. Thuringia

Operators and Stakeholders

Besides the state-owned railway traffic and railway infrastructure undertakings (all part of the DB consortium) there is a significant group of small, local and regional undertakings. They serve as infrastructure operators, railway traffic operators or provide other services, e. g. rental of rolling stock and staff services.



Table 3-6: Relevant stakeholders in Thuringia, their role, contribution, benefits and strategies

Stakeholder	Role	Importance/ Relevance (High/medium/low)	Contribution to the project	Benefits from the project	Conflicts (Potential, existing, former)	Current level of support	Strategies to improve the support
Public Railway Undertakings	Type						
DB Cargo AG (Regional Sales East)	Operator	High	Knowledge, experience	further cooperation		High	
Erfurter Bahn GmbH (EIB)	Operator	Low	Knowledge, experience			Low	
Thüringer Eisenbahn GmbH	Operator	Medium	Knowledge, experience	Further cooperation		Medium	
Railway Infrastructure Company							
DB Netze AG		High	Knowledge, experience	Further cooperation		High	
Rennsteigbahn GmbH & Co. KG		Medium	Knowledge, experience			Low	
Thüringer Eisenbahn GmbH		Medium	Knowledge, experience			Medium	
ZossenRail Betriebsgesellschaft mbH		High	Knowledge, experience	Further cooperation within pilot action		High	
Erfurter Bahn GmbH (EIB)		Low	Knowledge, experience			Low	
Logistic company							
TFG Transfracht GmbH		High	Knowledge, experience	Further cooperation		High	
Kühne & Nagel KG		Medium	Knowledge, experience			Low	
DUSS (Deutsche Umschlaggesellschaft Schiene-Straße mbH) DB Netze		High	Knowledge, experience	Further cooperation		High	
Customers							
Zellstoff- und Papierfabrik Rosenthal GmbH	Operator	High	Knowledge, experience				
Pollmeier Massivholz GmbH		Medium	Knowledge, experience			Low	
Thüringen Forst		High	Knowledge, experience	Further cooperation		High	
Granitwerk Fischer GmbH & Co KG		Low	Knowledge, experience			Low	



Stahlwerk Thüringen GmbH		Low	Knowledge, experience			Low	
Others							
Chamber of Commerce		Medium				Low	Workshops, Advisory Board Meetings
Regional Development Agency		Medium		Project Results		Low	Workshops
Regional Planning, regional public authorities		Medium		Knowledge, project results		Medium	
DBV-Förderverein der Max-& Moritz-Bahn e.g.V.	Interest group	Low	Knowledge, experience			Low	
VDV Sachsen/Thüringen	Interest group	Medium	Knowledge, experience			Medium	

Goods

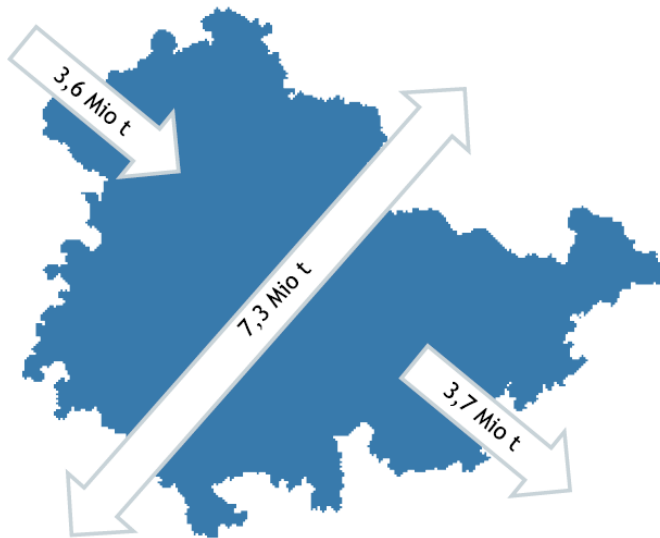
The companies are spread nearly all over the federal state. The following table shows the most important industries and companies with high rail freight suitability in Thuringia:

- Products of agriculture, forestry; fish and fishing products
- Coal and lignite; crude petroleum and natural gas
- Metal ores and other mining quarrying products; mining products
- Products of wood; paper and paper products; printed matter
- Coke and refined petroleum products
- Chemical products etc.
- Other non-metallic mineral products (glass, cement, plaster etc.)
- Basic metals; fabricated metal products
- Transport equipment
- Furniture; other manufactured goods etc.
- Secondary raw material

Freight transport demand

Shipping and receiving within the region increased from 317,000 tons in 2001 to more than 428,000 tons in 2017. The inland transport nationwide increased in shipping (1.6 Mio tons to 2.8 Mio tons), but decreased in receiving (3.6 Mio tons to 2.9 Mio tons). The transnational transported goods from Thuringia decreased from 948,000 tons to 865,000 tons in the same period while goods from abroad to Thuringia increased a little bit (620,000 tons to 652,000 tons).

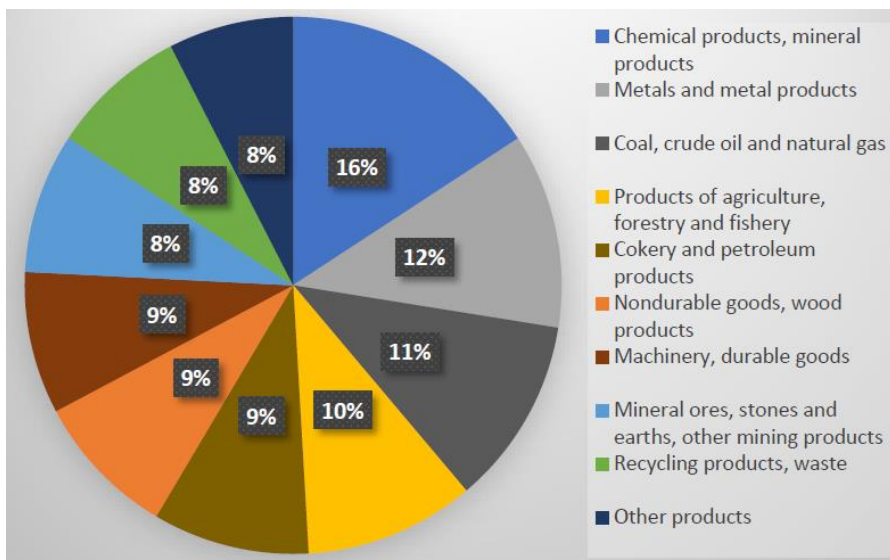
Figure 3-19: Shipping, receiving and transshipment in Thuringia.



Source: Own representation, based on destatis

The maximum mass of the transported cargo regarding shipping is in the group of goods “Chemical products, mineral products” (28%), in Rail freight transport in Thuringia in 2017. The maximum mass of the transported cargo regarding receiving is in the group of goods “Cokery and petroleum products” (19%), in Rail freight transport in Thuringia in 2017. The maximum mass of the transported cargo regarding transshipment is in the group of goods “Chemical products, mineral products” (16%), in Rail freight transport in Thuringia in 2017.

Figure 3-20: Rail freight transport (transshipment) in Thuringia 2017



SWOT Analysis

Strengths

- Location of Thuringian Industries concerning markets.
- Low utilization rates of many lines.
- Wide range of goods.

Weaknesses

- Amount of closed railway lines.

- 2 combined terminals:
 - One is specialized for car-transport (Opel production site).
 - The biggest one at Erfurt freight village works at capacity limit.
- Low freight volume.
- 50% transit traffic on lines.

Opportunities

- Facilitate, support and promote the establishment of additional offers for rail transportation.
- Establish a central institution which pools the potentially suitable volumes for rail traffic at an administrative level (practical example TCU).
- Research cluster.

Threats

- Skilled staff missing.

Bottlenecks

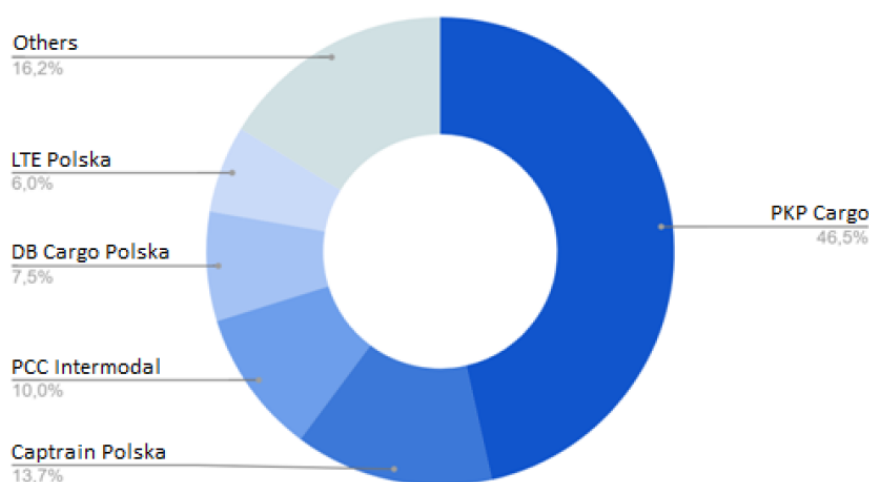
- Rail freight transport is only profitable on routes with rail passenger transport.

3.3.7. West Pomerania, Lubusz, Lower Silesian

Operators and Stakeholders

In Poland, 104 railway carriers currently have a licence for freight carriers issued by the Office of Rail Transport (UTK). 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.

Figure 3-21: Market share of intermodal carriers by weight in 2018



There is nearly 100 potential enterprises using rail transport. In West Pomerania over 35 companies are recorded, in Lubusz about 20 companies are recorded, in Lower Silesian about 45 companies are recorded, from all different sectors potential for rail transport.

Many regional stakeholders cooperate in freight transport in Poland. Many of them (13) are of high importance.

Table 3-7: Regional stakeholders of high importance, their role, contribution, benefits and strategies

Stakeholder	Role	Contribution to the project	Benefits from the projects	Strategies to improve the support
Regional government units	They lobby managers and owners for new investments,	A large contribution to the project	Potential partners will gain more awareness and may be	They require constant monitoring



	co-finance investments		more involved in other projects in the future.	and correction
Local government units	They lobby managers and owners for new investments	A large contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Infrastructure owners	They carry out investments and monitor them	A large contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Infrastructure managers	They carry out investments and monitor them	A large contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Railway carriers	They are lobbying for new investments	A large contribution to the project	Greater transport opportunities	None
Large companies operating in a given area	They are lobbying for new investments	Average contribution to the project	Greater transport opportunities	None
Potential new investors	They are lobbying for new investments	None	Greater transport opportunities	None
Universities	They support the development of plans, strategies, etc. They support the entire transport industry	Average contribution to the project	The possibility of cooperation in the implementation of projects	None
Institutes and other research units	They support the development of plans, strategies, etc. They support the entire transport industry	Average contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Industry clusters	They support managing institutions and give opinions on projects	Average contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Chambers of Commerce	They support managing institutions and give opinions on projects	Average contribution to the project	Potential partners will gain more awareness and may be more involved in other projects in the future.	None
Local entrepreneurs	They are lobbying for new investments	Little/ no contribution to the project	Greater transport opportunities	None
Inhabitants	They consult prepared investments in terms of living comfort in a given area	No contribution	Higher comfort of life	None

Goods

Many different goods can be transported in the region or have high suitability for rail freight transport. The main transported goods are wood products, agricultural products, steel products, coal and mining aggregates. Due to the fact that companies from the Automotive sector are mainly present in the Lubuskie region, the development of intermodal transport in this sector should be expected as well. Over 70 different products (goods) can be transported in the region and are listed as high rail freight suitable.

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).

Freight transport demand

Regional clusters of companies are potential customers for rail freight transport. Data about cluster are available for the West Pomeranian Region, Lubusz Region and Lower Silesian Region. The clusters operate in various industries, some of them are not directly related to rail freight transport or transport at all. With freight transport demand are related the following clusters in the three regions.

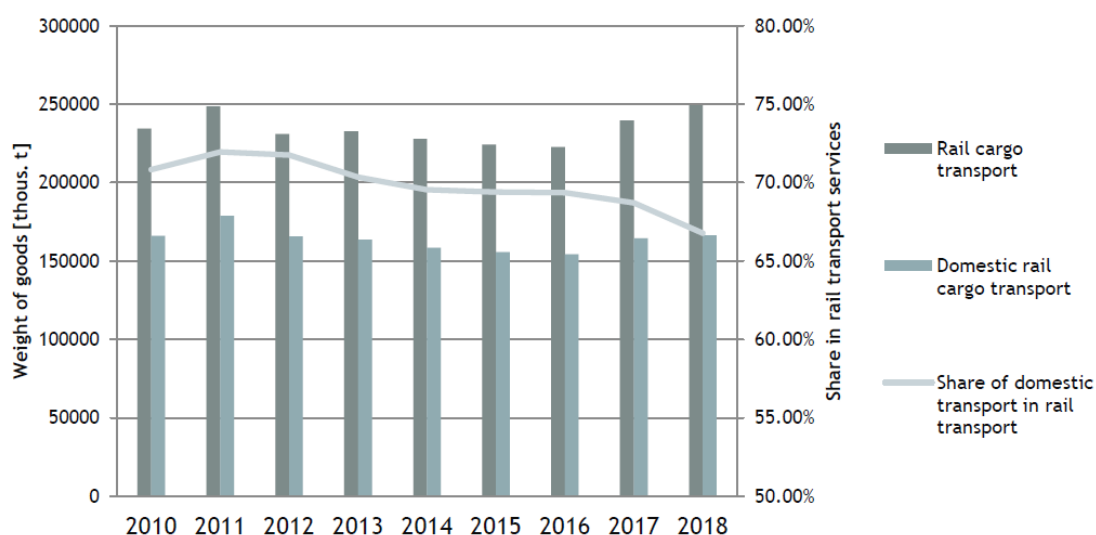
Main industry clusters operating in the West Pomeranian Region, interesting for rail freight transport are: Maritime economy, logistics; Maritime economy, in particular offshore industry and marine construction; Metal, machine and automotive industry, metalworking; Wood and furniture industry; Construction; Chemical industry, material engineering, fertilizers, packaging, energy efficiency, recovery of raw materials. Main industry clusters operating in the Lubusz Region, related to rail freight transport are: Metalworking, metal products; Transport, Forwarding and Logistics; Agricultural and food processing plants. Main rail freight related industry clusters, operating in the Lower Silesian Region are: Management of raw materials; Metal industry; Wood management, promoting wood as a building material and reducing energy consumption.

Potential capacity share of freight volume transhipped in intermodal transport units for 6 ports is approximately 60,5%, potential capacity share for 25 domestic terminals is 7,5% and potential capacity share for 6 border terminals is approximately 32,5%.

The total weight of cargo in 2018 was 2.192 million tonnes. Containers with a total cargo weight of 67.26 million tons were transhipped at intermodal terminals, which represents 3.06% of the total cargo weight. The total annual transshipment capacity of intermodal transport terminals in Poland amounted to 9.1 million TEU, including sea terminals - 6.3 million TEU and land terminals - 2.8 million TEU. Meanwhile, the transshipment of containers in intermodal terminals amounted to 7.3 million TEU, which means that 80% of the transshipment capacity of the intermodal terminals was used.

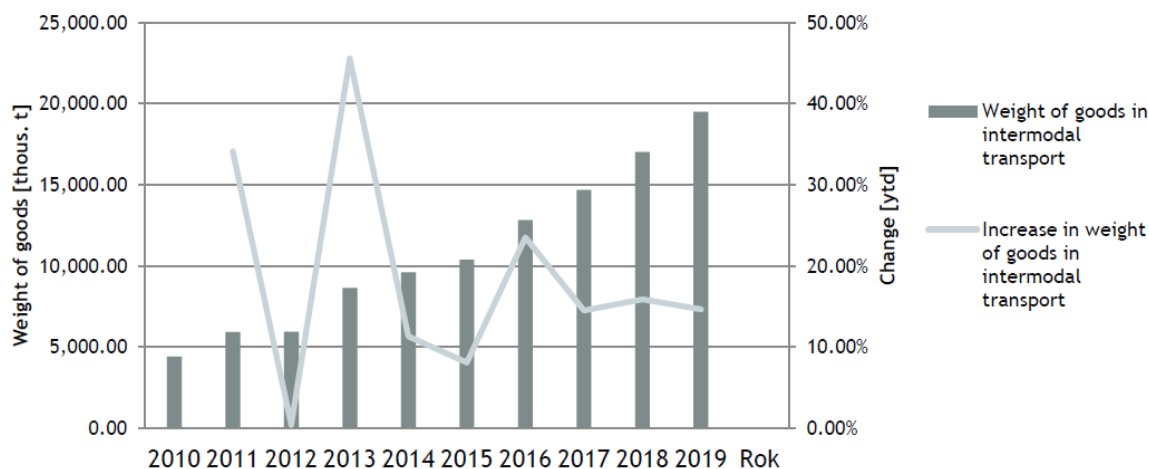
In May 2020, PKP CARGO Connect, a company belonging to the PKP CARGO Group, launched regular operator trains, providing services several times a week, with fixed hours on three routes: Gdańsk – Warszawa Praga, Gdańsk – Poznań Franowo i Gdańsk – Gliwice B Kontenerowa. Containers will be transported on the platforms from and to the port of Gdańsk, which is the largest container transshipment terminal in the Baltic Sea.

Figures 3-22: Rail cargo transport in Poland – 2010-2018



Source: Own study based on Statistics Poland (GUS) data

Figure 3-23: Intermodal rail ransport in Poland – weight of goods



Source: Own study based on The Office of Rail Transport (UTK) data

SWOT Analysis

Strengths

- Increased safety of rail traffic as compared to other means of transport
- Large diversity of rail transport
- Attractive location – on the state border
- West Pomeranian Region – the access to the Baltic Sea – ports

Weaknesses

- Obsolete and worn out rolling stock
- Low standard and relatively low speed of trains
- Insufficient transport offer and frequency of trains

Opportunities

- 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 of transport systems
- Introducing modern technologies based on the use of the latest solutions in the field of telecommunications and IT

Threats

- A drop in demand for rail freight transport to and from ports
- Liberalization and displacement of carriers from the railway market
- Experienced staff leaving railway transport and the insufficient training system for new staff
- Increase in operating expenses and rising electricity costs
- Much faster development of the road network than the railway network

Bottlenecks

Lack of the labour force; lack of knowledge (difficulties in attracting qualified staff for these professions are expected in the coming years; main reason is that only few schools teach these professions; this situation is caused by the restructuring of the railway sector in Poland at the beginning of the century).

3.3.8. Komitat Vas and Zala, Hungary

Operators and Stakeholders

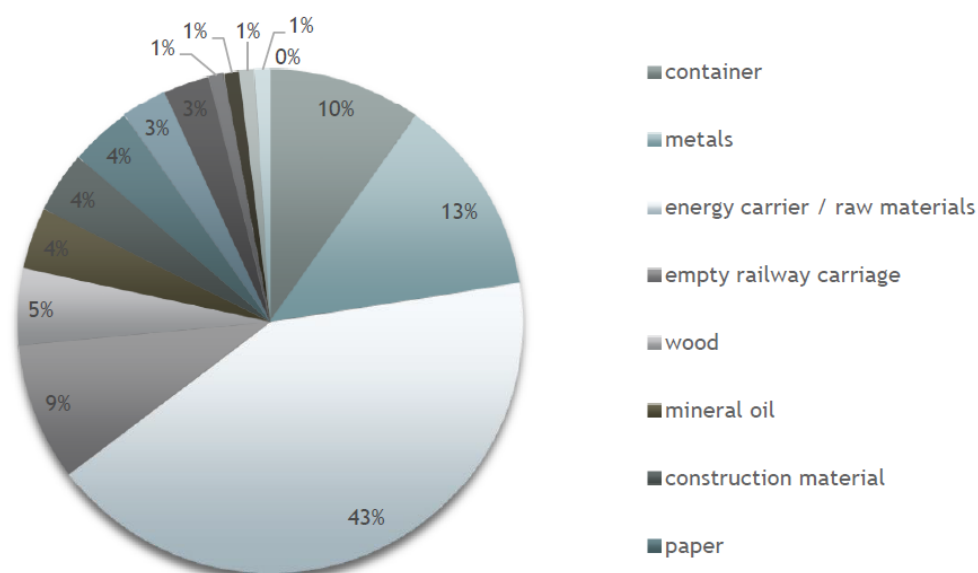
In 2017, 54 companies had a national railway license.

Many regional stakeholders cooperate in freight transport in Hungary. Many of them are of high importance. Analysis of stakeholders is similar as in Poland and list of stakeholders is like in the Table „Regional stakeholders of high importance, their role, contribution, benefits and strategies“. (One stakeholder analysis was carried out, common for all areas: West Pomeranian, Lubusz and Lower Silesian Regions in Poland, Komitat Vas and Zala, representing West Transdanubian Region in Hungary, Primorje-Gorski Kotar and Varazdin County in Croatia.)

Goods

Foreign direct investments reinforced the region's specialization in manufacturing industries: machinery and equipment, automotive, and electronics. More than 40% of the domestic rail freight turnover is exposed by energy and raw materials, while the share of other groups of goods (excluding 13% of metals) does not exceed 10%.

Figure 3-24: Distribution of goods transported by rail



Freight transport demand

In terms of freight volume in Hungary, 72% of rail freight traffic is international.

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 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.

In rail freight, the average freight volume was 50-53 million tonnes per year, while the annual freight capacity was between 9-10.5 billion freight ton km (2006-2016). In 2017, an outstanding transmission capacity of 11.4 billion freight ton km was realized on the domestic railway network. Overall, the volume of tonne-kilometres grew much faster than the mass of goods transported (measured in tonnes). This means that the volume of goods transported increased only to a relatively small extent, but these goods were transported over greater distances. The distribution of domestic rail freight in domestic and international traffic is 30-70%.

In 2017, 52.8 million tons of goods were transported on the domestic railway network, 11.4 billion freight ton km, 19.3 million train km, 24.5 billion gross ton-kilometres was realized, about 170 thousand freight trains were transported.

SWOT Analysis

Strengths

- Intensive international processing, industrial and logistics services, ensuring the presence of transport
- Articulated transport for logistics development
- Excellent transport and logistics system, especially when compared with Hungary's southern, eastern and northern neighbours

Weaknesses

- The competitiveness of smaller domestic companies is constantly weakening in the increasingly complex logistics sector
- The quality of the current logistics tools system is uneven
- The IT background of SMEs supporting logistics activities (company management system, warehouse computing etc.) is much less developed than for large companies
- The transport and logistics regulations sector is struggling due to a lack of specialists
- Despite the positive examples, the cooperation between networks and logistics partners is not widespread

Opportunities

- The logistics sector can make greater use of secondary demand generated by agriculture and the processing industry
- Intensive development in the field of urban logistics, green logistics and reverse logistics
- More focused and efficient logistic activities of "country marketing"

Threats

- Most micro- and small enterprises use the Internet only for information (searching for information related to goods and services) and for communication
- Logistics for SMEs that currently do not carry out R&D activities also do not plan such activities in the future
- 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"

Bottlenecks

There were no bottlenecks recorded regarding services in REIF analyses.

3.4. Other characteristics

Beside the infrastructure and services which directly influence the quality of rail freight transport, also legislation indicate performance and development of transport flows. Here as well SWOT characteristics and bottlenecks appear from legislation and policy point of view.

3.4.1. Styria

Policy and legislation

Steirisches Gesamtverkehrskonzept 2008 (StGVK): The strategic document on the development of mobility in Styria is already 12 years old, but is still up to date with regard to the goals in freight transport and international connections. The aim is to increase the share of rail transport in supra-regional and international freight traffic by upgrading the Styrian rail infrastructure to international standards and to reduce transport costs by rail.

ÖBB Target Network 2025+ (2011): Target Network 2025+ is an expansion strategy for developing the rail infrastructure and is part of the "Overall Transport Scheme" for Austria. It contains investment in expansion and modernisation beyond the year 2025.

SWOT Analysis

The SWOT analysis serves to identify key factors in the regional rail freight transport. These factors give an overview or a summary of the status quo of rail freight transport in the Styria region.

Opportunities

- In the course of the next TEN-T revision in 2023, the federal states of Styria, Carinthia, Upper Austria and Salzburg are aiming to include the Pyhrn-Schober axis and the Tauern axis into the TEN-T core network.
- According to the Austrian government's programme 2020 – 2024 and the Styrian government's programme (2019) freight transport is to be carried out in an energy-efficient, environmentally and climate-friendly manner. This should increase the competitive opportunities for rail transport in the future.
- Availability of European, national and regional funds for the strengthening of railway infrastructure.

Threats

- The political will for true cost and restrictions in road transport to reach equal conditions in the freight transport market is undermined by the lorry lobby.

Bottlenecks

There were no bottlenecks recorded regarding legislation and policy in REIF analyses.

3.4.2. Croatia

Policy and legislation

Transport Development Strategy of the Republic of Croatia 2017 – 2030, developed by the Croatian Ministry of Sea, Transport and Infrastructure, is considered the starting point in the process of planning the transport development in Croatia. This strategy evaluates and defines future infrastructural, operational and organizational measures in the transport sector related to national and international transport in all transport sectors regardless of their source of funding. The transport Development Strategy provides a framework for the development of interventions and defines interactions with other strategies and assessments, taking into account European strategies and requirements such as TEN-T, ERTMS, TSI etc.

National Railway Infrastructure Program 2016-2020 is the base document setting out development priorities, construction, modernization, renovation and maintenance of the functionality of the railway infrastructure system.

SWOT Analysis

The SWOT analysis serves to identify key internal (Strengths and Weaknesses) and external (Opportunities and Threats) factors in the regional rail freight transport.

Strengths

- Sustainable and environmentally friendly mode of transport.

Opportunities

- Policy on combined transport encourages modal shift and wider use of railways.
- Raised awareness about the necessity of the usage of more environmentally friendly modes of transport.

Threats

- Current operations of all three major companies in Croatian railway system are not sustainable without government support.

Bottlenecks

- Change of locomotives in the border area

3.4.3. Trieste/Friuli Venezia Giulia

Policy and legislation

“Connettere l’Italia” (i.e. Connecting Italy) is a document adopted in 2016 by the Italian Ministry of Transport defining goals, strategies and guidelines for a structural reform of the transport sector. Overall, its main strategic goals are the following: accessibility to territories, Europe and Mediterranean Sea; competitiveness and quality of life in urban areas; support to the industrial policies related to the supply chain; sustainable and safe mobility. Within this framework, the modal shift from road to rail is highly promoted through ad hoc measures that aim at increasing the offer and the quality of the services.

At regional level, the “Piano regionale delle infrastrutture di trasporto, della mobilità delle merci e della logistica” (i.e. Regional Strategy for transport infrastructure, mobility of goods and logistics), adopted in 2011, defines the transport policy of Friuli Venezia Giulia Autonomous Region according to the goals and strategies set by the EU White Paper on transport.

SWOT Analysis

This section will report the strategic evaluations about the Port of Trieste and Friuli-Venezia Giulia Autonomous Region using this analysis instrument. The conclusions based on this baseline study and the role of the above-mentioned stakeholders are summarised in the following chart:

Weakness

- The governance of the regional logistics infrastructure is still fragmented.

Bottlenecks

Border crossing procedures: Long stopping times - Police and customs procedures - EU member state – EU non-member state: Trieste is a Free Port in EU, therefore specific controls are required while entering/exiting from/to landside. Some controls and actions are needed on railway on border crossing in case of international services.

3.4.4. Emilia-Romagna

Policy and legislation

Freight transportation is essential for safeguarding the competitiveness of industrial and regional services, especially in an economy that is integrated in internationalized and strongly export-oriented supply chains. The regional intermodal system has a great potential and the public as well as private investments confirm this thesis.

The Regional Integrated Transport Plan (PRIT2025) aims at rebalancing towards new forms of collective and non-motorized mobility both in urban and extra-urban areas for increasing the accessibility of the territory. More efficient systems of modal integration and co-modality for passengers and for goods will be promoted, innovating and empowering the local public transport and acting on the rules of the system governance.

The Region approved a new law (Regional Law 30/2019) on incentives for regional rail transport.

SWOT Analysis

SWOT analysis of Emilia-Romagna has no special policy and legislation related characteristics.

Bottlenecks

There were no bottlenecks recorded regarding legislation and policy in REIF analyses.

3.4.5. Slovenia

Policy and legislation

The Ministry of Infrastructure is responsible for transport in the Republic of Slovenia, in the field of rail, air, road transport and maritime transport. The most important national document regarding transport is “Resolution on the National Programme for the Development of Transport of the Republic of Slovenia until 2030”. Furthermore, Railway Transport Act regulates railway transport.

Port of Koper

Decree on National spatial plan for comprehensive spatial arrangement of the international port in Koper (Official Gazette of the Republic of Slovenia, no. 48/11).

In 2011 The Government of the Republic of Slovenia endorsed the National Spatial Plan (NSP) for a comprehensive spatial arrangement of the Port of Koper. The NSP is the principal document that will facilitate the port's development as well as enhance its competitive edge.

SWOT Analysis

Strengths

- EU and national policy which promote railway freight transport.
- Railway transport is an important factor in sustainable development.
- Rail freight transport is considered to be the most environmentally friendly mode of transport of goods.
- Geographical position

Opportunities

- A lot of EU projects in terms of railway interoperability among EU countries (ETCS,...).

Threats

- New environmental, safety and institutional requirements
- Non-supporting municipalities Delays in infrastructure investments

Bottlenecks

There were no bottlenecks recorded regarding legislation and policy in REIF analyses.

3.4.6. Thuringia

Policy and legislation

On **national** level The Master Plan Rail Freight Transport is the central strategic paper for the future of rail freight transport in Germany. It was introduced in 2017 with the aim to strengthen rail freight transport permanently and make it economically more attractive in comparison to other modes of transport.

The Action Plan Freight Transport and Logistics pursues the strengthening of the logistics location of Germany, the preservation and modernisation of an efficient transport infrastructure, improved cross-linking of all modes of transport as well as the promotion of environmentally friendly and energy-efficient freight transport.

Regional level

The Regional Development Program Thuringia 2025 is an informal document and instrument with goals and guidelines to develop the regional and spatial potentials of Thuringia. It was declared as obligatory by the federal state government in 2014, based on the Thüringer Landesplanungsgesetz ThürLPIG (State Planning Act Thuringia) from 2012.

SWOT Analysis

Strengths

European, national and regional (funding) programs and initiatives to promote rail freight transport and private sidings

Weaknesses

Slow processes (e.g. for funding strategies)

Most papers are not bindingly defined

Bottlenecks

- Rail freight transport is only profitable on routes with rail passenger transport.

3.4.7. West Pomerania, Lubusz, Lower Silesian

Policy and legislation

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).

In addition to the Act on rail transport, the national legal acts regulating the issue of transport of goods by rail include five acts: on public collective transport; on the transport of dangerous goods; on the Railway Fund; on financing of land transport infrastructure; on the commercialization, restructuring and privatization of a state-owned enterprise „Polskie Koleje Państwowe”.

SWOT Analysis

SWOT analysis for all three regions in the territory of Poland is presented.

Strengths

- Low external costs and low environmental impact
- Integrating the development of rail transport into the Regional Operational Program

Weaknesses

- Limited level of financing of rail transport from the state budget

Opportunities

- 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
- Effective use of EU funds

Threats

- Incorrect course of the state transport policy in relation to railways.

Bottlenecks

- Legislation for labour force: Labour certifications (the complex process of training and certification)

3.4.8. Komitat Vas and Zala, Hungary

The data regarding the Vas and Zala Countries was not available or listed in the sources within REIF project, for this reason the presentation below mostly refers to the Hungarian state level.

Policy and legislation

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).

SWOT Analysis

Strengths

- Active environment for professional organization
- Extensive system of international relations of national NGOs
- More attention was paid to the development of clusters
- Low labour costs
- Tax exemptions encourage investments related to eco-innovations

Weaknesses

- Education and training in logistics are not entirely in line with employers' expectations
- Hungarian private companies and training awareness remain at a low level
- Economic diplomacy is currently bipolar
- Lack of culture of cooperation with SMEs
- Low resource productivity

Opportunities

- Sufficient use of resources from publicly funded forms of training
- Introducing regulations and incentives to intensify cooperation between educational establishments and companies
- Increasing amounts of foreign direct investment
- Development of logistic commitment and culture of national SMEs
- Reducing taxes and administrative burdens for logistics service providers
- Budapest's centralized position in the logistics network should be reduced
- More active participation in the work of international organizations
- Developed network and increased cooperation can play a major role in stabilizing the market situation of domestic logistics players and in improving their competitiveness
- Low energy prices

Threats

- Key logistic players are unable to clearly demonstrate the need for logistics development, and the expected results do not convince the government
- Disadvantages arising from the mismatch of horizontal approaches to sectoral approaches in the context of economic political aspirations
- National economic and sectoral strategies will not be completed in time
- Legislation is not up to date, especially as regards the most modern industries



- Hungary – outside the capital – is a relatively small and slightly weak market, expansion options require immediate internationalization, especially in niche markets

Bottlenecks

- Lack of Information communication technologies in transport: Information flows (The public transport services are not harmonized in the Hungarian-Croatian-Slovenian cross-border region.)

3.5. Benchmarking/comparison summary table

Benchmarking table summarizes conclusions from previous chapters and gives outcomes as comparison of regions regarding key indicators of infrastructure and service potential.

In general, accessibility is assessed as a combination of time and opportunities offered at nodes (capacity, volumes, connections, etc.). Accessibility is therefore a key concept, also in the activities of this project, as it represents a fundamental element to promote intermodal transport and to highlight possible limits and barriers to its development.

Benchmarking at the end compares regions with each other according to key indicators in order to summarize the state of infrastructure and service. Here some predictions, expectations, plans and potentials are highlighted.



Table 3-8: Benchmarking summary table

Region/ country name	Location (type)	General (Industry sectors)	General (Modal Split)	Infrastructure			Services			Other	
				Length; Main lines; Category, Electrification	Terminals, Ports	SWOT-S (strengths), SWOT-W (weaknesses), Bottlenecks (B)	Operators, Goods	Freight transport demand (volume, markets)	SWOT-S (strengths), SWOT-W (weaknesses), Bottlenecks (B)	Legislation, Policy and Strategy	SWOT-S, SWOT-W, Bottleneck
Styria	region	Mobility: automotive sector, rail systems, aerospace Green-Tech: green energy, green resources, green buildings, timber Health-Tech: health and food	Share road in 2018: 72% Share rail in 2018: 28%	Around 1000 km of railway lines, 4 main railway lines Class D4, with an axial load of 22.5 tons or 8.0 t/m; 15 kV	Three publicly accessible freight terminals: the “Cargo Center Graz” terminal, the Montan Terminal Kapfenberg and the Terminal St. Michael. P: NO sea ports	SWOT-S: All main transport axes part of the TEN-T Networks; main network electrified, double-tracked, suitable for freight transports; important link between Austria and SE Europe; three publicly accessible freight terminals for bimodal rail-road transshipment SWOT-W: Missing a high capacity rail connection from the economic centres in central and the NW of Europe to SE Europe (Harbours of Koper and Rijeka) as well as to the eastern Adriatic and Western Balkan region; due to the single-tracked bottleneck between Selzthal and Linz and further North as well as to the steep southern ramp to the Bosruck tunnel; along the Pyhrn-Schober-Corridor is the mainly single track section between Werndorf and Spielfeld. The single track regional railway lines are not very suitable for economically successful freight transport. B: Missing links and capacities	Local railway operator “Steiermarkbahn” Most imports by rail come from - Slovenia (iron ore, coal, coke and containerised goods) - Germany (wood, containerised goods and basic metals) - Poland (coal, coke and containerised goods) - Hungary (metal ores, basic metals, etc.) - Czech Republic (products of agriculture and forestry – mainly wood; coal and secondary raw material).	Imports by rail accounted for 6,1 mio tonnes in the year 2018 whereas Styrian exports by rail accounted for 2,8 mio tonnes. The alpine crossings – are important transit routes between South or South-Eastern Europe and North or North-Eastern Europe.	SWOT-S: n/a SWOT-W: n/a B: n/a	Steirisches Gesamtverkehrskonzept 2008 (StGVK): increase the share of rail transport in supra-regional and international freight traffic by upgrading the Styrian rail infrastructure to international standards and to reduce transport costs by rail ÖBB Target Network 2025+ (2011): investment in expansion and modernisation beyond the year 2025	SWOT-S: n/a SWOT-W: n/a B: n/a
Croatia (+Varaždin, Primorje-Gorski Kotar)	country, 2 regions	Tourism, shipbuilding, construction, petrochemicals, food processing and wood industry The development of the tourism sector as a major economic factor with adequate transport development, especially in favor of public transport and green mobility.	Share road in 2017: 73,6% Share rail in 2017: 20,1% Share of waterway in 2017: 6,3%	2.617 km of railway lines, 31 lines of international significance, 980 km electrified, 25 kV mainly (3 kV near Slovenia), 254 km double track railway lines	Intermodal facilities which include rail are located in the three ports: Port of Rijeka (biggest port), Port of Ploče and Port of Šibenik. P: Bakar, Bibinje, Osijek Donji grad, Ploče, Rijeka, Rijeka Brajdica, Sisak, Slavonski Brod, Solin, Šibenik and Vukovar	SWOT-S: three ports connect the coast to the hinterland; SWOT-W: Single track railway lines are less efficient in achieving a successful rail freight transport economy; Poor railway infrastructure. Level of interoperability on Croatian corridor railway network is low. Unsatisfactory maintenance level of infrastructure which causes limitations in operation. Railway network serves as a link from Italy and Slovenia to Hungary and north-eastern European countries B: old infrastructure	State operator of Croatian railways is HŽ Holding L.T.D. Type of goods: bulk cargo, cereals and oilseeds, containers, general cargo	Croatia’s railway transport of goods (by type of goods and type of transport) in 2018 was 13.444 thousands of tonnes. Rijeka is primarily a cargo port, transit port for countries of Central and Central-Eastern Europe. Railway freight corridors from the port of Rijeka to the markets with the greatest potential for the port (Hungary, BiH, Slovakia, Italy, southern Poland and Serbia).	SWOT-S: Market liberalisation. SWOT-W: Often train delays and inaccurate timetables. Insufficient train speed on some lines. Relatively old rolling stock in comparison to other EU countries. The old rolling stock is deteriorating the infrastructure and therefore the noise levels during operations are high. B: Old rolling stock	Transport Development Strategy of the Republic of Croatia 2017 – 2030, defines future infrastructural, operational and organizational measures in the transport sector related to national and international transport in all transport sectors regardless of their source of funding. National Railway Infrastructure Program 2016-2020, setting out development priorities, construction, modernization, renovation and maintenance of the railway infrastructure system.	SWOT-S: Sustainable and environmentally friendly mode of transport. SWOT-W: n/a B: Change of locomotives in the border area
Trieste/Friuli Venezia-Giulia	port, region	Logistics, Coffee, Ship engines. The port benefits from the trade exchanges, it supports the socioeconomic growth by favoring the acquisition of raw materials and semi-finished products.	Share road in 2019: 56,1% Share rail in 2019: 28,8% Share of sea in 2019: 15,1%	670km, 70 km (Port of Trieste), 5 Core double-track lines, 7 freight lines and sidings, 480 km electrified; “P/C 80” loading gauge; 3 kV (25 kV on new high-speed)	Four railroad terminals (RRTs): Trieste, Cervignano, Gorizia, Pordenone P: Trieste, Monfalcone, Porto Nogaro	SWOT-S: FVG Region boasts the presence of several multimodal logistics platforms (3 ports and 4 RRTs), a consistent infrastructural endowment; the level of the infrastructure is good without criticalities in terms of operation and maintenance. SWOT-W: / B: lack of capacities port/terminals/railway lines, which include technological improvements (ERTMS) and new infrastructures	3 principal European transport operators (Maersk, MSC and CMA CGM) Freight typologies handled in the Port of Trieste: containerized freights, fruit and vegetable products, coffee, cereals, metal, engines, steel and chemical products, wood, solid and liquid bulk, crude oil and its derivative products.	Managed almost 62 million tons in 2019, the Port of Trieste has been representing for a few years the main Italian sea port for the total amount of handled freight. Germany is the first country reached by rail freight flows. Only 28.5% of the trains are to/from Italy, while the remaining 71.5% are to/from foreign countries. (year 2018) Freight intermodal transport mainly to Austria, Germany, Luxembourg, Hungary, Czech Republic and Slovakia.	SWOT-S: The level of cooperation among institutional players and private operators is generally good with a constant exchange and sharing of opinions and experience. SWOT-W: The last mile connection (linking to the national railway network) must be strengthened due to the increasing volumes of traffic. High costs for last mile connections among nodes. B: Diesel traction, changes of locomotives (Investments to extend electrified tracks, IT improvements to increase efficiency of shunting)	“Connettere l’Italia”; sustainable and safe mobility. Within this framework, the modal shift from road to rail is highly promoted through ad hoc measures that aim at increasing the offer and the quality of the services. At regional level, the “Piano regionale delle infrastrutture di trasporto, della mobilità delle merci e della logistica”, defines the transport policy of Friuli Venezia Giulia Autonomous Region.	SWOT-S: n/a SWOT-W: The governance of the regional logistics infrastructure is still fragmented. B: Border crossing procedures: Long stopping times - Police and customs procedures: Trieste is a Free Port in EU, specific controls while entering/exiting from/to landside; in case of international services.
Emilia-Romagna	region	Automotive, Food, Packaging, Fashion, Tiles district, Wellbeing, Health	Share road in 2016: 66,7% Share rail in 2016: 33,3%	2.119 km, 9 regional lines managed by FER, 138 km on a total of 364 of the FER lines are electrified; D4; 3 kV (25 kV on new high-speed)	9 main regional intermodal nodes: 1. Piacenza, 2. Parma freight village CePIM, 3. Marzaglia, 4. Bologna transport strictly dependent on public incentives. B: lack of access to Ravenna port terminals, low capacity of railway lines	SWOT-S: Quality and quantity of rail and inter-modal infrastructures. SWOT-W: Road accessibility to intermodal nodes. Competitiveness of rail/road intermodal transport strictly dependent on public incentives. B: lack of access to Ravenna port terminals, low capacity of railway lines	Two Infrastructure operators (RFI – national operator, FER – regional operator) High rail freight suitability: ceramic products, tiles and clay raw materials, agricultural products and cereals.	The regional nodes generate about 330 train pairs/week, which corresponds to about 34.000 trains/year expressed by the region (RFI data, 2015). The total tons handled by the intermodal nodes system is equal to 18.171.147 tons (2018 data); strong relationship between the port of Ravenna and the Lombardia regional system. Significant part of northern Italy, in particular the regions of Lombardia, Piemonte and Veneto, where there are massive traffic of freight.	SWOT-S: Good level of cooperation among institutional players and private operators. Territory in which prestigious companies and brands are present, as well as a vast and productive agri-food sector, a potential basin of attraction/generation of large flows of goods. SWOT-W: Difficulties of integration between different modes of transport and different involved stakeholders. B: Ravenna port. Low capacity and high operation costs of the railway links between station and harbours; Increase of rail traffic capacity (Piacenza); traffic must cross passenger station (Ferrara, Ravenna); limitations on weight and length of trains	Freight transportation is essential for safeguarding the competitiveness of industrial and regional services, especially in an economy that is integrated in internationalized and strongly export-oriented supply chains. The Regional Integrated Transport Plan (PRIT2025); new forms of collective and non-motorized mobility both in urban and extra-urban areas for increasing the accessibility of the territory; co-modality for passengers and for goods will be promoted.	SWOT-S: n/a SWOT-W: n/a B: n/a
Slovenia (+Port of Koper, Osrednje-slovenska reg.)	country, 2 regions	Iron industry, automobile manufacturing and manufacturing of electrical devices. Slovenian industry is large share also based on wood and textiles, pharmaceuticals and chemicals, as	Share road in 2018: 66,7% Share rail in 2018: 33,3% In Port of Koper (2019): road 41%	1.208 km of railway lines (607 km main railway lines and 601 km regional railway lines), 10+3 mail railway lines (3 main arcs), 605,5 km (50%) electrified 3	Container terminals in Port of Koper, Ljubljana, Celje and Maribor, Marshalling yard in Ljubljana Zalog. P: Port of Koper	SWOT-S: n/a SWOT-W: Bottlenecks on the section Divača-Koper. Well-developed highway network in Slovenia. A lot of parts of railway network are old/still non-modernized.	Three major operators (rail services in port of Koper): Slovenske železnice - SŽ, RCC and ADT. These goods for rail transport are: cars, wood, petroleum products,	Increase of the volumes of cargo in last years. Number of trains per day (in 2018) is more than 101 on the route Divača-Ljubljana-Maribor (the highest daily number).	SWOT-S: High railway modal share Multipurpose port (for all kinds of goods) SWOT-W: n/a B: Rolling stock of the national rail carrier in Slovenia Stopping (dwell) times at border crossings	“Resolution on the National Programme for the Development of Transport of the Republic of Slovenia until 2030”, in the field of rail, air, road transport and maritime transport.	SWOT-S: EU and national policy promote railway freight transport. Railway transport is an important factor in sustainable development. Rail freight transport is considered to be the most environmentally friendly



Region/ country name	Location (type)	General (Industry sectors)	General (Modal Split)	Infrastructure			Services			Other	
				Length; Main lines; Category, Electrification	Terminals, Ports	SWOT-S (strengths), SWOT-W (weaknesses), Bottlenecks (B)	Operators, Goods	Freight transport demand (volume, markets)	SWOT-S (strengths), SWOT-W (weaknesses), Bottlenecks (B)	Legislation, Policy and Strategy	SWOT-S, SWOT-W, Bottleneck
		well as engineering. The industrial sector represents about one-third of the GDP (28,8 %) and employment (31,7%).	/ rail 59%	kV; category 22,5 tons is presented at 46% of the railway network		High occupancy of storage facilities and railway lines Relatively small port for global actors B: railway hub Ljubljana, railwaj connection Koper-Divača	chemicals, building material, insulation material, joinery	The strongest transport flows are between Port of Koper via Ljubljana, Jesenice and Maribor to Austria and Hungary. Hinterland markets beside Austria and Hungary are Slovakia, the Czech Republic, Italy, as well as Croatia, Serbia and Romania, Germany and Poland.	Process of delivering & dispatching the wagons between Koper train freight station and the Port of Koper Reading/registering the numbers on wagons going to Iron ore and coal terminal	Decree on National spatial plan for comprehensive spatial arrangement of the international port in Koper, for a comprehensive spatial arrangement of the Port of Koper.	mode of transport of goods. Geographical position SWOT-W: n/a B: n/a
Thuringia	region	Machinery and vehicle construction; Metal production and processing; Food; Electrical engineering, precision engineering, optoelectronics, EDP; Rubber and plastics; Paper and printing industry; Glass, ceramics, processing of stones and earths; Chemical and pharmaceutical industry	Share road in 2013 96,2% Share rail in 2017: 3,8%	1.521 km, 3 most important axes for freight trans. with 5 lines, 452 km are electrified; 15 kV	Two CT-Terminals: Erfurt-Vieselbach (EV), Eisenach. Loading points of DB Netz AG: Altenburg, Arnstadt Hbf, Bad Salzungen, Ebersdorf, Friesau, Eisenach, Erfurt Gbf, Gera Hbf, Immelborn, Köllda, Leinefelde, Lobenstein, Saalfeld/Saale, Themar, Walldorf (Werra) P: NO sea ports	SWOT-S: Sufficient rail freight infrastructure. SWOT-W: The share of only 30 % of electrified railway tracks. Terminal is not electrified. B: missing terminals, links, infrastructural deficits	31 public and non-public, regional and national rail freight undertakings, 7 public railway infrastructure companies Goods: Chemical products, mineral products; Metals and metal products; Coal, crude oil and natural gas; Products of agriculture, forestry and fishery; Cokery and petroleum products; Nondurable goods, wood products; Machinery, durable goods; Mineral ores, stones and earths, other mining products; Recycling products, waste; Other products	Shipping and receiving within the region increased to more than 428,000 tons in 2017. The transnational transported goods from Thuringia decreased from 948,000 tons to 865,000 tons. Shipping, receiving and transshipment in Thuringia: 3,6 Mio t Shipping; 3,7 Mio t Receiving; 7,3 Mio t Transshipment.	SWOT-S: Location of Industries concerning markets. Low utilization rates of many lines. Wide range of goods. SWOT-W: Amount of closed railway lines. 2 combined terminals: - One is specialized for car-transport (Opel production site). - The biggest one at Erfurt freight village works at capacity limit. Low freight volume. 50% transit traffic on lines. B: Rail freight transport is only profitable on routes with rail passenger transport.	The Master Plan Rail Freight Transport; to strengthen rail freight transport permanently and make it economically more attractive in comparison to other modes of transport. The Action Plan Freight Transport and Logistics pursues the strengthening of the logistics location of Germany, the preservation and modernisation of an efficient transport infrastructure, improved cross-linking of all modes of transport. The Regional Development Program Thuringia 2025, to develop the regional and spatial potentials	SWOT-S: European, national and regional (funding) programs and initiatives to promote rail freight transport and private sidings SWOT-W: Slow processes (e.g. for funding strategies); most papers are not bindingly defined B: Rail freight transport is only profitable on routes with rail passenger transport.
West Pomerania (WP), Lubusz (L), Lower Silesian (LS)	3 regions	WP: blue, maritime, green economy; tourism, agriculture and forestry, producing energy from renewable sources. (The development of the region's economy depends to a large extent on properly functioning transport, especially on the transport crossing land-sea borders.) L: 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 LS: trade, repair of motor vehicles, construction, as well as professional, scientific and technical activities	Share of road in 2018: 88,63% Share rail in 2018: 11,37% Share of rail is decreasing.	WP: 1173 km 8 main railway lines (E-59, 4 lines, CE-59 2 lines) All lines in the EU corridors electrified; 22.5 tons/axle (E-59); 3 kV (25 kV on new high-speed); L: 912 km in the TEN-T core network: E 20 (No. 3) and E 59 (No. 351), C-E 59 line (No. 273); two-track non-electrified lines No. 203 and No. 14 LS: 1763 km; the most important lines constituting the transport backbone of the region are: E30, 274, 137, 289 and 276; line No. 274 load 221 kN/axle; 60% lines electrified	In 2018 37 terminals transhipped intermodal transport units: 6 ports (Gdynia, Gdańsk, Szczecin, Świnoujście, itd.); 25 domestic terminals (1 in Silesia); 6 border terminals (5 on border with Belarus and 1 with Russia). 6 intermodal terminals in 3 regions. P: Szczecin-Świnoujście port complex	SWOT-S: well-developed rail network, good national and international connections; good rail connections with major cities; lines E 59 and CE 59 - their modernization is a priority of the state's transport policy; inclusion of lines E 59 and CE 59 SWOT-W: Poor condition of station infrastructure and railroad infrastructure on local lines; Poor technical condition of railway transport facilities; Insufficient capacity of railway station nodes B: Cargo road/rail/sea/river terminals: missing terminals (Taking into account the growth trend, assuming the growth rates and investments of railway carriers in intermodal platforms, the number of terminals and their total annual transshipment capacity will be insufficient.)	104 railway carriers with licence for freight carriers; PKP Cargo is the leader of the Polish freight market. More than 70 highly suitable goods can be transported in the region. The main transported goods: wood products, agricultural products, steel products, coal and mining aggregates. In 2018, the largest share in rail transport in Poland: black coal, lignite, oil and natural gas; metal ores and other mining products; coke, briquettes, refined petroleum products, gases produced by industrial methods.	The total weight of cargo in 2018 was 2.192 million tonnes. Containers with a total cargo weight of 67.26 million tons were transhipped at intermodal terminals. The total annual transshipment capacity of intermodal transport terminals in Poland amounted to 9.1 million TEU. The transshipment of containers in intermodal terminals amounted to 7.3 million TEU. Regular operator trains, providing services several times a week, with fixed hours on three routes (Gdańsk – Warszawa Praga, Gdańsk – Poznań Franowo i Gdańsk – Gliwice B Kontenerowa). Port of Gdańsk is the largest container transshipment terminal in the Baltic Sea.	SWOT-S: Increased safety of rail traffic as compared to other means of transport; Large diversity of rail transport; Attractive location – on the state border; West Pomeranian Region – the access to the Baltic Sea – ports SWOT-W: Obsolete and worn out rolling stock; Low standard and relatively low speed of trains; Insufficient transport offer and frequency of trains, B: Lack of the labour force: Lack of knowledge (difficulties in attracting qualified staff; only few schools teach these professions; caused by the restructuring of the railway sector in Poland at the beginning of the century)	All documents regulating the area of rail transport may be divided into national and international legal provisions. The supreme national law, strictly applicable to rail transport, is the Act of 23 March 2003 on rail transport. In addition to the Act on rail transport, the national legal acts regulating the issue of transport of goods by rail include five acts: public collective transport; the transport of dangerous goods; the Railway Fund; financing of land transport infrastructure; the commercialization, restructuring and privatization of a state-owned enterprise.	SWOT-S: • Low external costs and low environmental impact; • Integrating the development of rail transport in the Regional Operational Program SWOT-W: • Limited level of financing of rail transport from the state budget B: Legislation for labour force: Labour certifications (the complex process of training and certification)
Vas and Zala Counties	2 regions (counties)	Main economic activities in the city (Szombathely) 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).	Share road in 2017: 81,1% Share rail in 2017: 18,9%	7,893 km Hungary's transport network is centered in Budapest and has a radial layout. 3,090 km electrified; axle load of 210 kN; 25 kV	„SAVARIA LOGISTIC” intermodal logistic centre; MÁV Kombiterminál Szombathely; Sopron container terminal; Zalaegerszeg Industrial Zone P: No sea ports	SWOT-S: • Advanced logistics infrastructure in the capital and in its vicinity; • Broadband (xDSL, CATV) coverage in Hungary has reached the average of EU SWOT-W: / B: Railway lines regarding technical parameters: missing links (There is a 7 km long missing railway connection between Lendava (Slovenia) and Rédics (Hungary).)	54 companies with national railway license in 2017 Region's specialization in manufacturing industries: machinery and equipment, automotive, and electronics. More than 40% of the domestic rail freight turnover is exposed by energy and raw materials, while the share of other groups of goods (excluding 13% of metals) does not exceed 10%. Goods transported by rail: container, metals, energy carrier/raw materials, wood, mineral oil, construction material, paper.	In terms of freight volume in Hungary, 72% of rail freight traffic is international. The efficiency of rail freight transport in 2017, measured in tonnes, increased by 7.8% compared to the previous year. In rail freight, the average freight volume was 50-53 million tonnes per year, while the annual freight capacity was between 9-10.5 billion freight ton km (2006-2016). In 2017, an outstanding transmission capacity of 11.4 billion freight ton km was realized on the domestic railway network. In 2017, 52.8 million tons of goods were transported on the domestic railway network, 11.4 billion freight ton km, 19.3 million train km.	SWOT-S: • Intensive international processing, industrial and logistics services, ensuring the presence of transport • Articulated transport for logistics development • Excellent transport and logistics system, when compared with Hungary's S, E, N neighbours SWOT-W: • The competitiveness of smaller domestic companies is constantly weakening in the increasingly complex logistics sector • The quality of the current logistics tools system is uneven • The IT background of SMEs supporting logistics activities (company management system, warehouse computing etc.) is much less developed than for large companies • The transport and logistics regulations sector is struggling due to a lack of specialists • Despite the positive examples, the cooperation between networks and logistics partners is not widespread B: n/a	In 1993, Hungary adopted rail law, which is in line with the European Communities Directive of 1991. Rail infrastructure in Hungary divided according to its ownership: lines owned by the state, 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 must comply with regulatory accounting principles. Provide public services in accordance with national rail law.	SWOT-S: • Active environment for professional organization • Extensive system of international relations of national NGOs • More attention was to the development of clusters • Low labour costs • Tax exemptions encourage investments related to eco-innovations SWOT-W: • Education and training in logistics are not entirely in line with employers' expectations • Hungarian private companies and training awareness remain at a low level • Economic diplomacy is currently bipolar • Lack of culture of cooperation with SMEs • Low resource productivity B: Lack of Information communication technologies in transport: Information flows (The public transport services are not harmonized in the Hungarian-Croatian-Slovenian cross-border region.)

4. Key findings and conclusion

Key findings include some conclusions and recommendations for further improvement of railway infrastructure and services.

Based on benchmarking analysis in the table below there are identified deficiencies on advantages of regions and on the other hand advantages that represents opportunities for other regions. The deficiencies (weaknesses) suggests also what should be improved in future.

Main weaknesses are lack and low quality of infrastructure (mainly railway infrastructure), missing connections and delayed border procedure which are often as a result of different power supply in countries/regions. Also, old rolling stock is identified as a deficiency in some regions.

On the other hand advantages are mainly good developed economy and market in many regions. Some regions have also good developed or satisfied infrastructure (Trieste / Friuli Venezia-Giulia, Emilia-Romagna and Thuringia). Business cluster development was identified as a good practice in Italian regions and in Vas and Zala Counties.

Table: General advantages (strengths) and deficiencies (weaknesses) of all regions

Region	Deficiencies	Advantages
Styria	Missing connections between areas, Missing capacities of terminals, rail lines	Developed economy, industry, Good condition, capacity of infrastructure and services, 3 terminals, favourable strategy, plans, allocated funds
Croatia	Old, less efficient infrastructure (single-track lines), Poor maintenance, poorer level of interoperability, Less favourable services (replacement of locomotives at the border), old vehicles	Lively market, wide range of production, 3 major freight, logistics ports connected to the hinterland, favourable strategic plans
Trieste / Friuli Venezia-Giulia	Poor "last mile" connections, diesel traction, locomotive replacement, delayed border procedures	Developed trade, Cargo port of Trieste, Good rail line infrastructure, Developed logistics centres, Good cooperation, favourable policy, strategies, Extensive transport
Emilia-Romagna	Poorer access to intermodal hubs, poorer accessibility of the port of Ravenna, Limited line capacity, High costs, dependence on subsidies	Developed trade, economy, Extensive transport (export), Good infrastructure, Developed many intermodal hubs, connections, Good cooperation, Favourable transport policy
Slovenia	Poor condition of infrastructure and vehicles, Bottlenecks on the lines, Divača-Koper connection, Delayed services, Long-term border procedures	Port of Koper with a high share of railway transport, Freight terminals, Favourable transport policy
Thuringia	Insufficient electrification of lines and terminals, Missing (closed) lines, connections, Missing terminals, Unprofitable freight traffic	Developed economy, market, many (but mostly unused) loading points, Satisfactory infrastructure, Diversity of cargo types, Good strategies, plans, logistics policy, Many operators
West Pomerania, Lubusz, Lower Silesian	Poor technical condition of lines, vehicles, stations, Poor regional connections, Missing terminals, Insufficient workforce, knowledge, Limited funding, Slow development of transport	Well-developed railway network, good railway connections, Ports by the Baltic Sea, Individual legal acts
Vas and Zala Counties	Lack of connection, Bad technical rail line characteristics, Uncompetitiveness of small businesses, Poor IT support, Lack of education, knowledge, communication technologies, cooperation	Business cluster development, Diversified railway network, Developed logistics, Intensive international services

Below there are summarised outcomes and proposals by countries/regions, to improve transport situation.

Styria

The current situation of regional freight transport in Styria forms the basis for suggestions for improvement. Styria's economy concentrates within the central region of Graz and the industrial region in Upper Styria. It is mainly export oriented. The three terminals form the access points to the national railway network and to the international corridors and markets. The main railway lines and international corridor lines are very well suitable for high-quality freight transport but not yet developed for the general increasing freight transport. The weakness in rail freight transport lies apart the central region and industrial region in Upper Styria. Missing loading stations and companies' feeder lines as well as missing of support for single wagonload transport by the railway undertakings push freight transport on the road.

The political programmes at national and regional level promise that rail freight transport will become even more important in the future. In order to achieve the goals, the expansion plans for the national and regional rail network must be made even more ambitious and implemented in right time:

- The rail-road terminal CCG as main logistic node has to be expanded.
- The Styrian railway network has to be developed in order to increase capacity and attractive rail paths for freight trains.
- Apart from the central region and industrial region in Upper Styria regional logistic nodes have to be developed with access to regional railway lines to concentrate regional freight transport.

With focus on regional rail transport, the market potential of the rail section Gleisdorf – Weiz among the industry locations, railway freight transports have to take action in three main fields in order to be more competitive to road transports:

- further development of multi-modal services with customer focus, with easily accessible booking and monitoring platforms for existing customers as well as new clients without railway sidings.
- further development of an efficient and interoperable infrastructure network across Europe, including the respective legal framework (technical standards, European Train Control System ETCS etc.) Rail freight transports need a fixed share of capacities as compared to passenger transport, especially for driving in and through agglomerations with frequent passenger services.
- the provision of a level playing field, namely the allocation of external costs to road transport (accident costs, climate costs, road maintenance costs, etc.). This is uttermost important, as businesses base their transport mode decision strongly on the amount of transport costs.

Croatia

Comparing to most of other REIF regions Croatian railway infrastructure is poor with low level of interoperability on Croatian corridor. Unsatisfactory maintenance level of infrastructure which causes limitations in operation. Single track railway lines are less efficient in achieving a successful rail freight transport economy.

The priority should be improvement of railway infrastructure. It is necessary to thoroughly revitalize the entire system in order to preserve the functionality and safety of traffic with taking into consideration the financial sustainability as well as user needs, as arising from Directive 2008/57 / EC on the interoperability of the rail system within the Community, considering EU Directives and Regulations, and laws and regulations. The investments in rail transport (both infrastructure and fleet) will make using rail freight options more attractive, increasing its share in the modal split.

In terms of railway service it is necessary to modernize the rolling stock in order to increase competitiveness of rail passenger and freight transport in relation to other modes of transport. The first step would be the implementation of a comprehensive analysis of the existing organizational and operational structure and the structure of maintenance of railway transport in relation to existing and future transport requirements, and then the development of an operational plan and maintenance plan. Once the actual needs have been identified, further studies should define the specific technical requirements of the rolling stock.

The Port of Rijeka Authority is implementing a number of capital projects, including infrastructure projects for the construction and upgrade of the railway infrastructure in the port. This will improve the connectivity of the port and the hinterland, and speed up the transport on the Rijeka transport route.

The main administrative bottleneck in railway transportation is the change of locomotives in the border area, especially at the border with Bosnia and Herzegovina, but at the other borders too. This can be solved also with rail feet (rolling stock) modernization.

Trieste/Friulia Venezia

The following conclusions should be taken into consideration:

- Intermodality plays an important role in the medium and long-term development strategies carried out by the Port Network Authority of the Eastern Adriatic Sea and the private terminal operators of the Port of Trieste. Moreover, it is essential for implementing the catchment area of the Port of Trieste in order to reach the Central and Eastern European markets.
- Infrastructural bottlenecks hindering intermodality related, in particular, to the shunting yard of Campo Marzio in the Port of Trieste have to be eliminated.
- Administrative bottlenecks have to be removed as well by developing innovative ICT tools and solutions whose aim is to optimize the use of the existing infrastructure.
- In order to optimize the use of the existing infrastructure, it is advisable to invest in new technologies.
- The subsidy regime for intermodal transport should be extended even to the short distances, in order to allow a better connection between regional logistics nodes and, overall, support the modal shift.

Emilia-Romagna

The Emilia-Romagna region has an important and extensive railway network and several intermodal nodes, widespread throughout the territory. However, there are a lot of possibilities and needs to improve and upgrade current infrastructure and services, such as:

- Upgrade of Reggio Emilia-Sassuolo railway line
- Construction of the new freight railway line between Dinazzano and Marzaglia freight station
- Regional law on incentive for regional rail transport
- Upgrade of the shunting tracks of Ravenna Port
- Doubling of railway line between Parma and Vicofertile stations and upgrading of Parma station

In order to make rail freight transport attractive to a larger market catchment area, it is necessary to reduce the dependence of attractiveness on the incentive system and make the system more competitive by acting on the accessibility of intermodal nodes and on costs reduction.

Slovenia

In general, Slovenian railway infrastructure is not in a good condition due to low investments in last decades. The main bottleneck represents a single track railway line Koper-Divača, connecting also hinterland with the biggest and the only Slovenian port – The Port of Koper.

The second track construction is planned in next years (preparatory works are already in progress) and it is aimed to eliminate traffic congestion on the core Trans-European Transport Network (TEN-T) corridors in Slovenia – Baltic-Adriatic and the Mediterranean. The track will allow a capacity of 231 trains per day (today less than 100) or 43.4 million net tonnes of cargo per year (including the new and the existing track).

Rail industrial sidings are another opportunity to increase the volume of freight on the railways, and reduce road congestion. New reconstructed and modernized railway connection Ljubljana-Kočevje represent the main potential for increased rail transport. Mainly where industrial area located near railway line without direct connection, such as car logistics centre in Grosuplje (the documentation and design for constructing a siding is a part of REIF project).

Other recommended important actions to improve infrastructure and services are:

- New railway hub in Ljubljana - to improve the capacities of the main railway station in Slovenia for freight and passenger trains
- Rolling stock replacement of the national rail carrier in Slovenia – to improve timetable stability, capacity and interoperability, reduce operational costs and noise
- Rail border crossings (physical and non-physical barriers at rail border crossings cause excessive and often inordinate delays, high costs and uncertainties in the entire transport process; border crossings are major bottlenecks for seamless international railway transport), the goals should be: simplification, standardization and harmonization of the legal, technical and operational requirements relevant for processes and procedures at railway border crossings

Thuringia

Thuringia has a lot of potential in terms of rail infrastructure development and services. Thuringia has very dense rail network comparing to other regions and the densest rail network (per capita) in Germany. A small share are electrified railway tracks. At the same time Thuringia has a small modal share in favour of rail (below-average of Germany) which is a vast potential to change modal share patterns. Especially in regional rail freight transport there are potentials of shift from road to rail (small modal share in comparison to road transport) and that goal can be easier achieved by improvement of rail network and services, such as:

- Development in digitalization and automatization (e.g. Digital Automatic Coupling)
- Reactivation of »Max-und-Moritz-Bahn« line
- Reactivation of »Werra-Bahn« line
- Reactivation and upgrading of the »Rennsteig-bahn« line
- Reactivation of terminal »Sonneberg«
- Expansion of the Erfurt -Vieselbach container terminal
- Reactivation of the »Ohratal-bahn«-line for rail freight transport
- Reactivation, modernization and expansion of the railport Nordhausen
- Reactivation and extension of private sidings
- Potentials in combined transport and single wagon traffic

West Pomerania, Lubusz, Lower Silesian

The area of the Baltic-Adriatic TEN-T core network corridor, has high business development potential. It is home to many companies from the Automotive industry, companies using metallurgical products, logistics centres of large food concerns, also mines and quarries. This potential is compounded by the wide access to railway sidings connected to modernised railway lines, which give access to sea ports. An opportunity for rail freight transport is an attractive offer of operator connections. Increasing the attractiveness of intermodal rail transport is particularly important in view of the difficult disadvantages of this type of transport, such as additional intermodal transport operations extending the service time of rail in the logistics chain and the low flexibility of rail services.

Recommendations for development of Poland regions:

- Reducing infrastructure access rates that will make rail and road transport more equal where alternatives are possible;



- Support for investments in intermodal terminals that will enable rail freight transport for companies that do not have railway sidings in their area;
- Maintain similar levels of funding for rail infrastructure projects under the new EU perspective;
- Using new sources and tools for financing infrastructure and rolling stock investments (e.g. investment loans, public-private partnerships);
- Increasing the significance of rail transport within port terminals by improving rail infrastructure in ports
- Improvement of infrastructure, such as: Construction of the Szczecin Podjuchy Most -Dziewoklicz link, reconstruction of the railway line No. 411 on the Stargard -Pyrzyce section, Reconstruction of the railway line No. 422 on the Pyrzyce -Głazówsection and the railway line No. 410 on the Barnówko -Myślibórz -Głazów section, construction of the Western Bypass of Szczecin, section Dołuje -Police Chemia with the construction of new linkages Dołuje -Kościno (429/408) and Stobno Szczecińskie -Warzymice (408/409), electrification of line 408 on the section Szczecin Gumieńce -state border and line 409 on the sect. Szczecin Gumieńce -the state border, electrification of railway lines 210 (Runowo Pomorskie -Szczecinek -(Chojnice) and 402 (Goleniów -Kołobrzeg), Improvement of operational parameters to the D3 standard (221 kN, min.600m) on lines: 202, 210, 402, 403, 404, 405, 406, 407, 408, 409, 418, 430, 431, implementing innovative transport traffic management systems and other.

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