REGIONAL ANALYSIS OF CHALLENGES AND NEEDS

for Bratislava Region

D.T1.2.5

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Institute of Spatial Planning (IPP)

CORCAP partner(s)	*Related catchment area (area of analysis)*	*Related cross-border relations*
IPP	Bratislavský kraj, Trnavský kraj, Nitriansky kraj	CZ-SK, SK-AT, HU-SK

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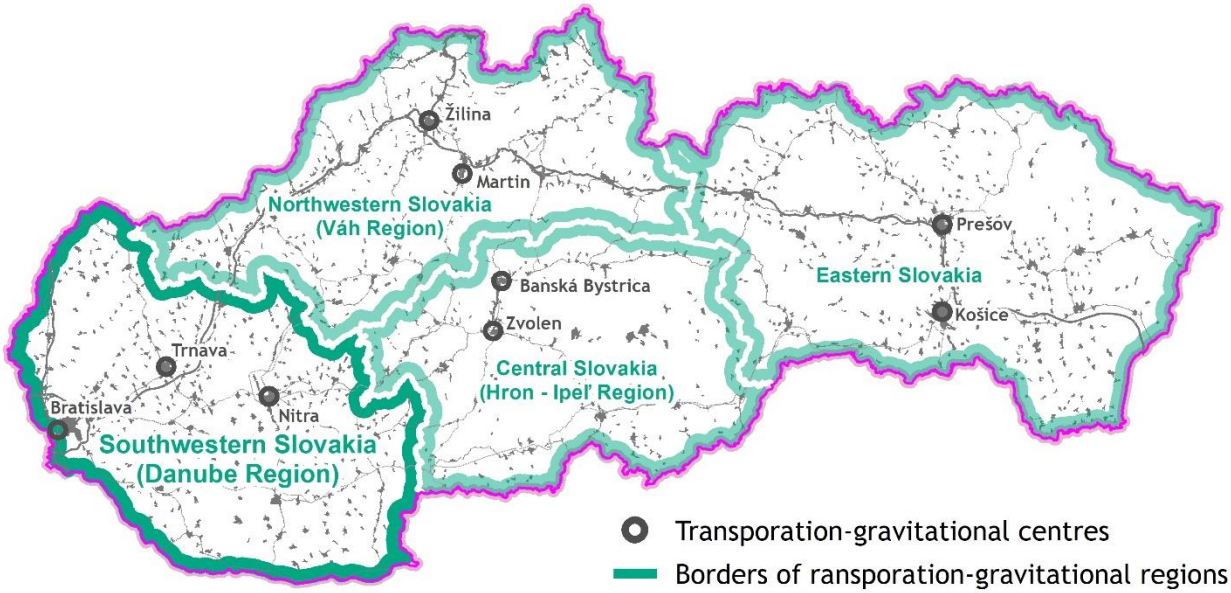
1. CURRENT SITUATION ANALYSIS

1.1. Geographical and socio-economic description of the area, delimitation and definition of its catchment area

The area of interest in Slovakia covers its Southwestern part. This area nearly coincides with the transport regionalization as done in the national document Slovak Spatial Development Perspective (Aurex 2012).

Figure. Transport regionalization of the territory of the Slovak Republic



Source: Aurex (2020)

Southwestern Slovakia consists of three administrative regions at regional level:

- Bratislava Region (Bratislavský kraj)
- Trnava Region (Trnavský kraj)
- Nitra Region (Nitriansky kraj)

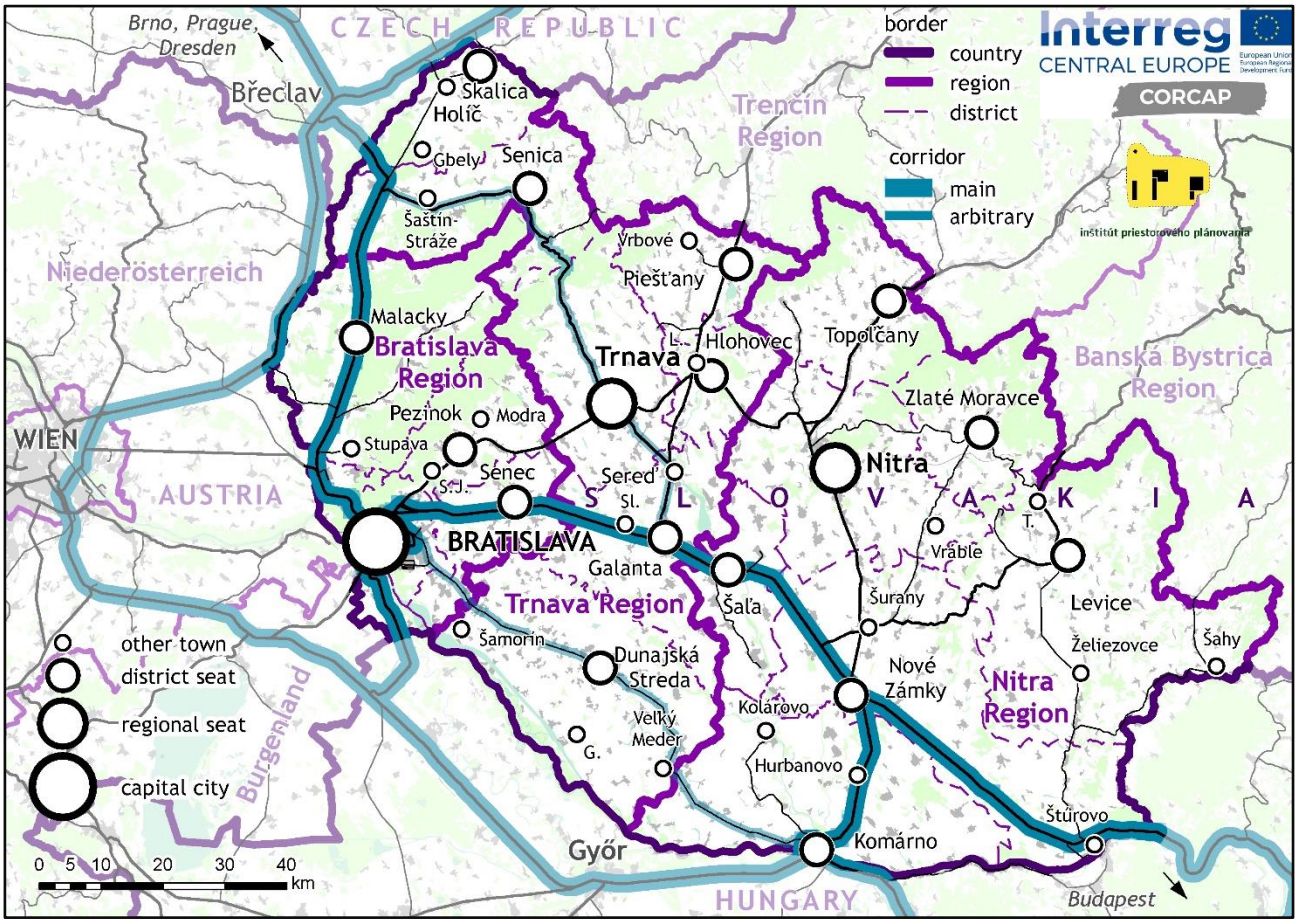
Bratislava Region lies in the westernmost part of Slovakia, it comprises the area of 2,053 km2 making it the smallest region in the country. From the broad geographical view, it has a very good central position in the Central European Area with very good accessibility. From the aspect of physical geography, it lies at the contact of two larger plains – Záhorie and Danube Lowlands – that are divided by Small Carpathians massive. The relief is flat to moderately undulated in lowlands and hilly in the Carpathians massive. Administratively the Region borders with Trnavský Region on the north and east, Austrian Niederösterreich and Burgenland Republics on the west and Hungarian Győr-Moson-Sopron Region on the south. Natural boundaries are formed by rivers Danube and Morava (both with Austria).

Trnava Region lies in western Slovakia and occupies an area of 4,146 km2. Geographically, the largest area is occupied by the Danube Lowland in the south and the Záhorie lowland in the north, which are separated by the Little Carpathians. The Danube lowland is covered by the most fertile soils in the country. Administratively Trnava Region borders with the Czech Republic, and Trenčín self-governing

region in the north, Austria and Bratislava Region in the west, and the Hungary (Magyarország) in the south and Nitra Region in the east. The natural borders are formed by Morava (Czech Republic and Austria) and Danube (Hungary) Rivers.

Nitra Region is situated in the south-western part of Slovakia and covers an area of 6,344 km2. The relief of the region has a mostly flat and lowland character interrupted by low hills. Almost the entire region is located on the Danube Lowland. It belongs to the hottest areas and the most productive agricultural centres of the Slovak Republic. In the north, the region is lined by Tríbeč Mountains, the northeast is lined by the foothills of the Štiavnické Hills. The administrative boundary of the Nitra region is formed in the south by Hungary, in the east by the Banská Bystrica Region, in the north by the Trenčín region and in the west by the Trnava Region. The Danube forms the natural border between the Nitra Region and Hungary.

Figure. Definition of the area of interest of this study



Source: IPP, TENtec (2020), RFC 7 (2020), Copernicus, SOSR (2020); Note – abbreviations of towns: S.J. – Svätý Jur, G. – Gabčíkovo, T. – Tlmače, Sl. – Sládkovičovo

1.1.1. Identifying the corridor and determining its catchment area

The subject of the CORCAP project is the solving of the issue of the nr. 4 TEN-T Orient / East-Med corridor (OEM corridor) linking Central and Southeast Europe. As shown on the Map (Figure above) the sections of the RFC 7 corridor were added to the TEN-T corridor on the territory of SW Slovakia - this is the section Bratislava - Nové Zámky - Komárno - Komárom (HU) / Štúrovo - Szob (HU) - Budapest. This is the reason why the Nitra region is also a part of the area of interest. The corridor conceived in this way both for freight and passenger traffic provides better possibilities for permeability of the territory.

Figure. The Orient / East-Mediterranean Corridor in its full length

Source: Grosch, M. (2018)

1.1.2. Connections with relevant TEN-T and RFC corridors in the area

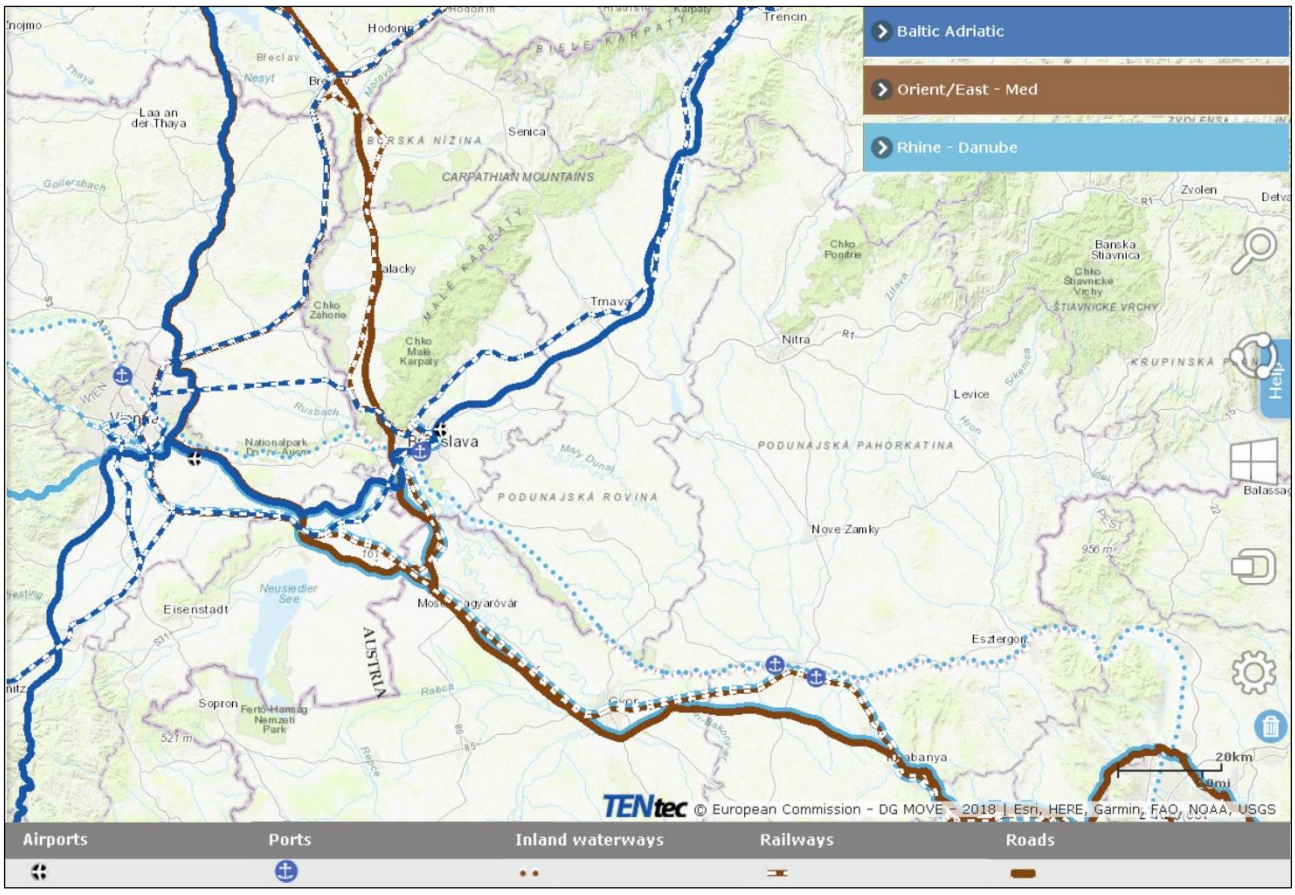
The location of Southwest Slovakia and especially the Bratislava Region is very convenient in terms of accessibility from Vienna, Budapest and Brno. Bratislava is an important transport hub with several modes of transport.

1.1.2.1. TEN-T corridors

Transport infrastructure of the Slovak Republic is part of three corridors of the TEN-T core network (MDVRR SR 2016a):

- **Baltic - Adriatic Corridor**: Katowice - Žilina - Bratislava - Wien
- **Orient / Eastern Mediterranean Corridor**: Köln - Pardubice - Brno - Wien / Bratislava - Budapest - Arad - Timișoara - Craiova - Calafat - Vidin - Sofia
- **Rhine-Danube Corridor:** München / Nürnberg (D) - Prague - Ostrava / Přerov (CZ) - Žilina - Košice - SK-UA border; Wels / Linz - Wien (A) - Bratislava - Budapest (H) – Vukovar (HR); Wien / Bratislava - Budapest - Arad - Brașov / Craiova - București - Constanța – Sulina

Figure. TEN-T corridors in the area of Southwest Slovakia



Source: TENtec (2020 - modified); Note: On the figure solid lines show the road corridors, broken lines the railway corridors and dotted lines the water corridors.

1.1.2.2. Multimodal Transport Corridors

Four multimodal transport corridors cross the Slovak Republic creating European connections in important North-South, West-East directions and towards the Balkans. These are:

- CORRIDOR NO. IV
- CORRIDOR NO. V
- CORRIDOR NO. VI
- CORRIDOR NO. VII

CORRIDOR NO. IV

The corridor connects Germany, Czech Republic, Slovakia, Hungary, Bulgaria, Turkey, and Greece. It represents a solid connection across the Danube. The corridor facilitates access to Italy, Switzerland, France, Spain and Portugal via the IVb (Wien - Győr) section.

In Slovakia the corridor is represented by the following sections:

- for rail transport: Brodské - Kúty - Malacky - (Marchegg) – (Bratislava-)Devínska Nová Ves - Bratislava - Bratislava-Petržalka - Kittsee / Bratislava-Rusovce; Bratislava - Galanta - Palárikovo - Nové Zámky - Štúrovo - Szob
- for road transport: Lanžhot - Bratislava-Jarovce - Kittsee / Bratislava-Čunovo

CORRIDOR NO. V

The corridor connects Italy, Slovenia, Hungary, Ukraine / Slovakia. The corridor is one of the most important points for building connections between southern and eastern European states.

In Slovakia the corridor is represented by the following sections:

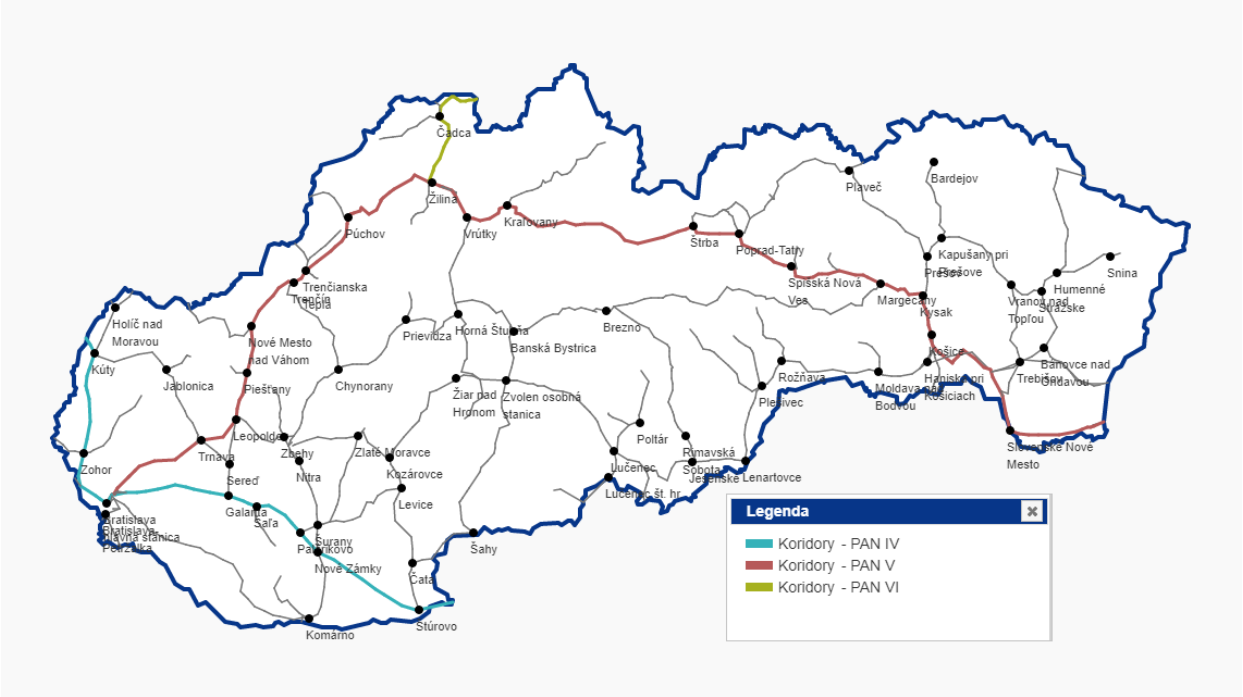
- for rail transport: Bratislava - Trnava - Leopoldov - Nové Mesto nad Váhom - Púchov - Žilina - Vrútky - Štrba - Poprad - Margecany - Kysak - Košice - Čierna nad Tisou – Чоп (UA).
- for road transport: Bratislava - Horná Streda - Nové Mesto n. Váhom - Chocholná - Nemšová - Ladce - Sverepec - Hričovské Podhradie - Višňové Dubná Skala - Hubová - Ivachnova - Hybe - Važec - Mengusovce - Janovce - Jablonov - Behárovce - Prešov - Budimír - Košice - Bidovce - Dargov - Pozdišovce - Vyšné Nemecké (Zahor).

CORRIDOR NO. VI

The corridor connects Poland and Slovakia. In terms of the integration of its transport routes into the European transport system, Slovakia considers corridor no. VI as the most significant. Its implementation in Bratislava will achieve a logical connection of this corridor to corridors no. IV and V. In Slovakia the corridor is represented by the following sections:

- for rail transport: Skalité - Serafínov - Svrčinovec - Čadca - Žilina
- for road transport: Zwardoň (PL) - Skalité - Kysucké Nové Mesto - Hričovské Podhradie

Figure. PAN European corridors in the Slovak Republic



Source: https://aplikacie.ŽSR.sk/infomapainternet5

CORRIDOR NO. VII - DANUBE WATERWAY

The corridor connects Germany, Austria, Slovakia, Hungary, Serbia, Romania, Bulgaria, and Moldova. In Slovakia, the corridor is represented by the Danube in the length of 172 km stretching from Devín in Bratislava through Komárno to Štúrovo – Szob (H).

1.1.2.3. AGC railways

Four railway lines of the AGC (European Agreement on Main International Railway Lines) pass through the territory of the Slovak Republic (MDVRR SR 2016a):

- **E 40** Ostrava (CZ) - Žilina - Poprad-Tatry - Košice - Čierna nad Tisou - Чоп (UA)
- **E 52** Bratislava - Galanta - Nové Zámky – Štúrovo - Szob (H)
- **E 61** Břeclav (CZ) Bratislava - Komárno - Komárom (H)
- **E 63** Žilina - Leopoldov / Galanta – Bratislava

Figure. AGC corridors in the Slovak Republic

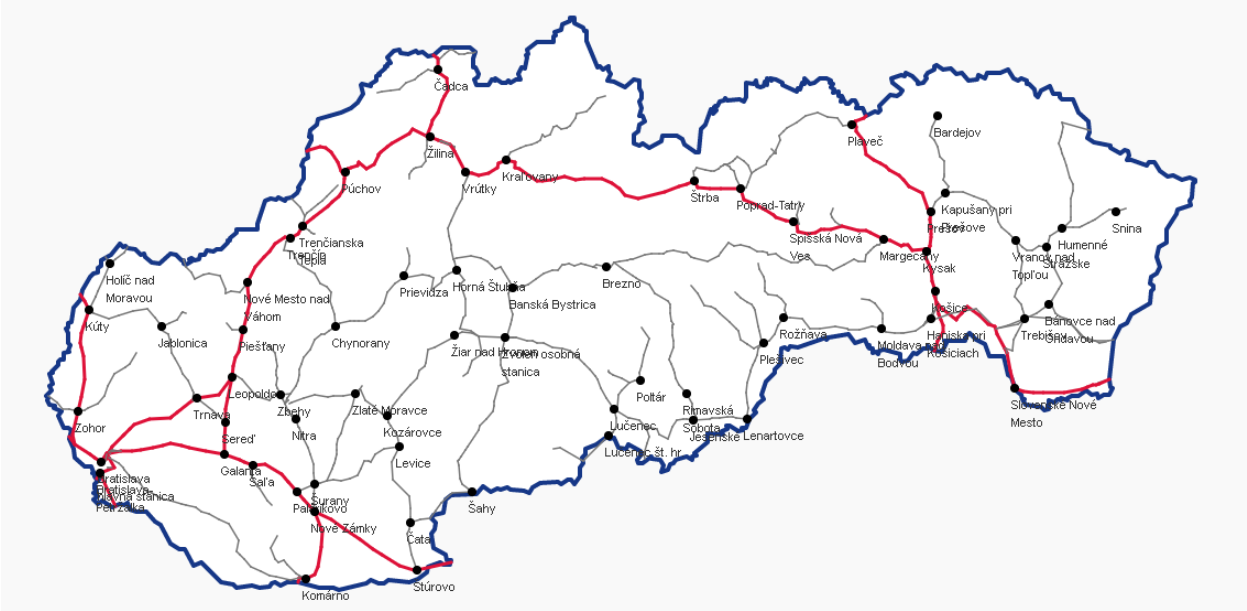
Source: https://aplikacie.ŽSR.sk/infomapainternet5

1.1.2.4. AGTC corridors

According to the AGTC Agreement (European Agreement on Important International Combined Transport Lines and Related Installations), five railway lines of international importance for combined transport pass through the territory of the Slovak Republic (INTERMODAL 2020: http://www.intermodal.sk/trate-dohody-agtc-v-slovenskej-republike/483s):

- **C - E 30/1** Krakow - Muszyna / PKP - Plaveč - Prešov - Kysak - Košice - Čaňa - Hidásnámeti / MAV - Miskolc
- **C - E 40** Le Havre – Paris (F) - Frankfurt - Nürnberg (D) - Pilsen - Prague
  - Hranice na Moravě - Ostrava - Mosty u Jablunkova (CZ) - Čadca - Žilina - Poprad-Tatry - Košice - Čierna nad Tisou - Чоп (UA).
  - Hranice na Moravě - Valašské Meziříčí - Horní Lideč (CZ) - Lúky pod Makytou - Púchov - Žilina
- **C - E 52** Wien - Marchegg (AT) - Devínska Nová Ves - Bratislava - Galanta - Nové Zámky - Štúrovo - Szob (H) - Budapest - Szolnok - Debrecen - Nyíregyháza
- **C - E 61** Dresden (D) - Nymburk - Kolín - Brno - Břeclav - Lanžhot (CZ) - Kúty
  - Bratislava - Galanta - Nové Zámky - Komárno - Komárom – Budapest (H)
  - Bratislava - Rusovce - Rajka (H) - Hegyeshalom - Budapest
- **C - E 63** Zwardoń (PL) - Skalité - Čadca - Žilina
  - Leopoldov - Bratislava - Kittsee (A) - Wien
  - Leopoldov – Galanta

Figure. AGTC corridors in the Slovak Republic



Source: https://aplikacie.ŽSR.sk/infomapainternet5

1.1.2.5. Railway freight corridors

In 2010, the European Parliament and the European Council established the rules for the establishment of a European rail network for competitive freight, composed of international rail freight corridors (RFCs).

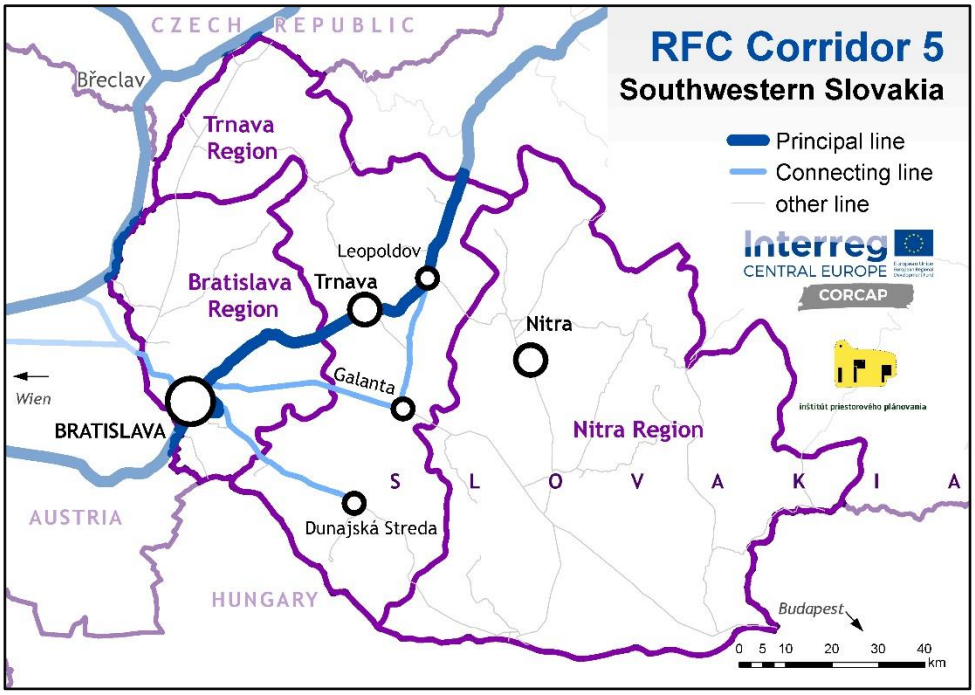
The aim is to achieve reliable and quality rail freight services that are competitive with other modes of transport.

The Slovak Railways (ŽSR) network contains parts of the railway freight corridors - "Baltic - Adriatic", "Orient / Eastern Mediterranean", "Czech - Slovak" and "Amber".

RFC 5 BALTIC-ADRIATIC CORRIDOR

The corridor provides the north-south rail link between the Baltic and the Adriatic Sea. RFC 5 crosses six states (Poland, Czech Republic, Slovakia, Austria, Italy and Slovenia) and forms part of the infrastructure of the infrastructure managers of those states.

Figure. RFC Corridor 5 in Southwest Slovakia

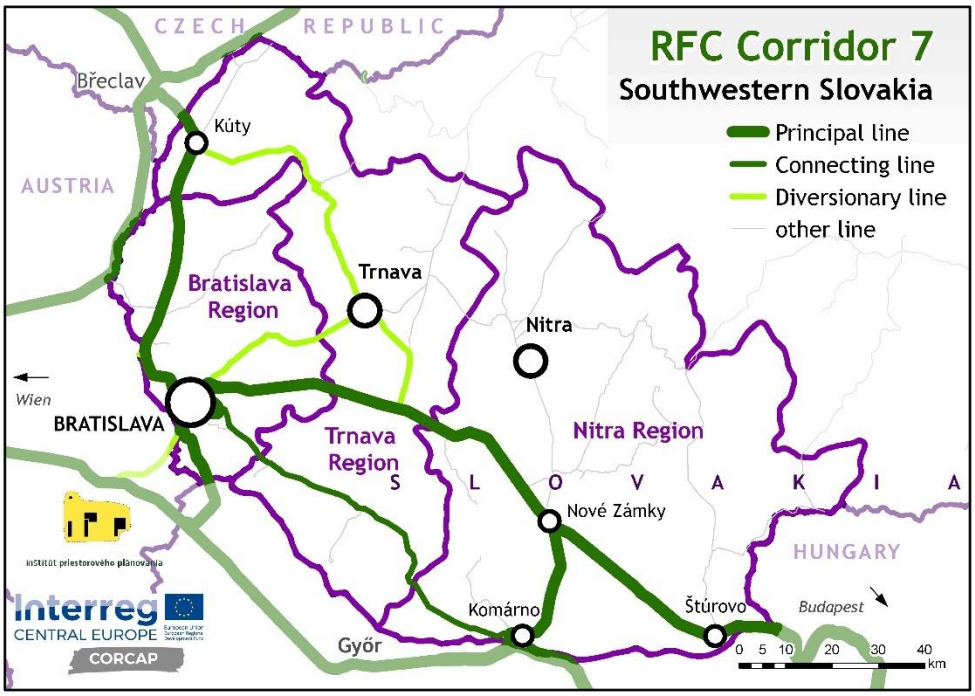


Source: RFC 5 (2020)

RFC 7 ORIENT / EASTERN MEDITERRANEAN CORRIDOR

The corridor provides rail links between Central Europe and the Black Sea coast (Romania: Constanta) and the Aegean coast (Greece: Thessaloniki and Athens). It passes through seven states and consists of selected infrastructure lines in Germany (DB), Czech Republic (SŽDC), Austria (ÖBB), Slovak Republic (ŽSR), Hungary (MÁV and Gysev), Romania (CFR), Bulgaria (NRIC), and Greece (OSE).

Figure. RFC Corridor 7 in Southwest Slovakia



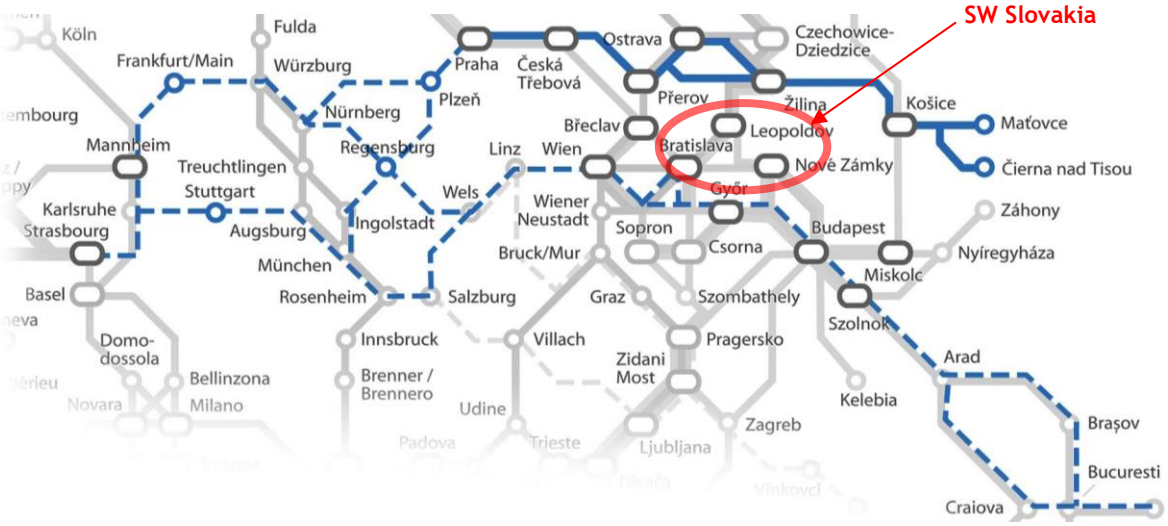
Source: RFC 7 (2020)

RFC 9 RHINE-DANUBE CORRIDOR

The corridor in the direction Prague - Horní Lideč / Ostrava / Žilina - Košice - Čierna nad Tisou (alternatively Maťovce) - the Slovak-Ukrainian border crosses two states and consists of designated parts of infrastructure in the Czech Republic (SŽDC) and the Slovak Republic (ŽSR). The corridor was named Czech-Slovak and is currently becoming part of the RFC9 corridor as its branch.

On 10 October 2020 the rail freight corridor "Rhine - Danube": Strassbourg - Munich - Wien - Bratislava - Budapest - Arad - Brașov / Craiova - București - Constanța/ Čierna nad Tisou (Slovak-Ukrainian border) - Košice - Žilina - Horní Lideč - Prague - Munich / Nürnberg will become operational.

RFC 9 Rail Freight Corridor Rhine-Danube

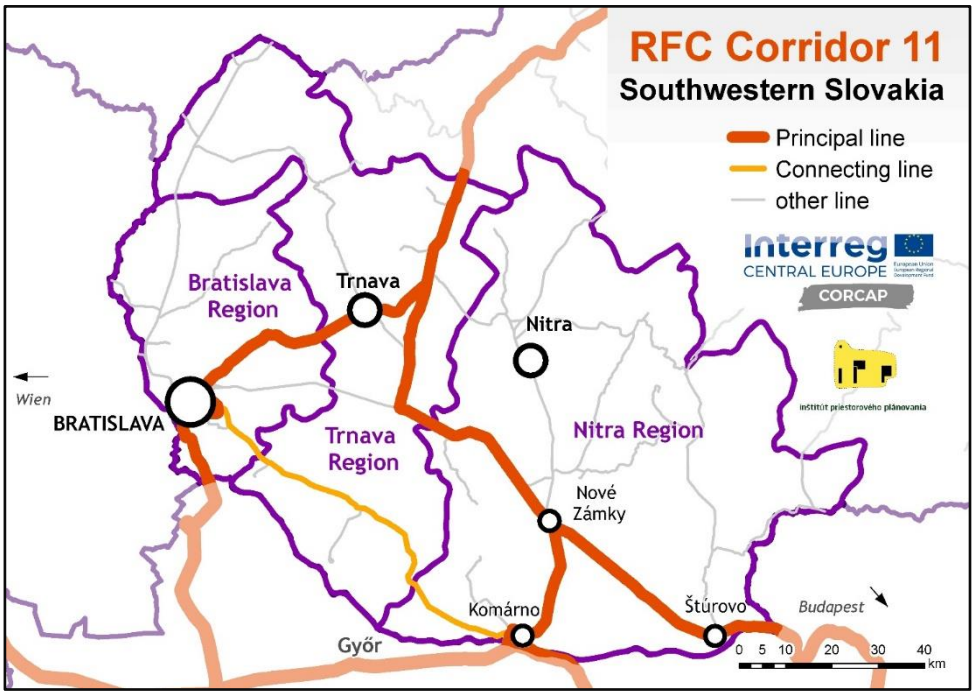


Source: RFC 9 (2020)

RFC 11 CORRIDOR "AMBER"

The corridor provides a south-north rail link between the Adriatic Sea and Belarus. RFC 11 crosses four states (Slovenia - Hungary - Slovakia - Poland) and is part of the infrastructure of the infrastructure managers of those states (ŽSR 2019).

Figure. RFC Corridor 11 (Amber) in Southwest Slovakia



Source: RFC11 (2020)

The objective of the CORCAP project is by utilizing and completing the existing infrastructure to redirect the flow of goods from automobile freight transport to rail transport and especially combined transport, which can meet current needs in goods logistics. Thus, a substantial part of the route would be realized by rail freight transport. Only shorter sections to and from customers from the nearest combined transport terminal would be realized by car freight.

The intention is to mitigate the environmental, but also urban, impacts of the constant increase in the volume of automobile freight transport. From the point of view of possible use of combined transport, besides quality and time, the basic criterion of its use is the economic efficiency of goods transport. It is thus important to establish a limited worked distance between direct road freight transport, rail transport and combined transport.

The transport price depends on the transport distance. Rail freight transport is preferable for long transport distances, road freight transport for short and medium distances. The limit between rail and road freight is determined by the limited worked distance.

While setting the limited worked distance external costs (internalisation of external costs), which arise for society from the operation of road freight transport, should be considered (including costs to eliminate the negative effects of transport on the environment and charging a fee of the infrastructure routes in individual transport sectors, taking into account the real costs of building and operating the infrastructure).

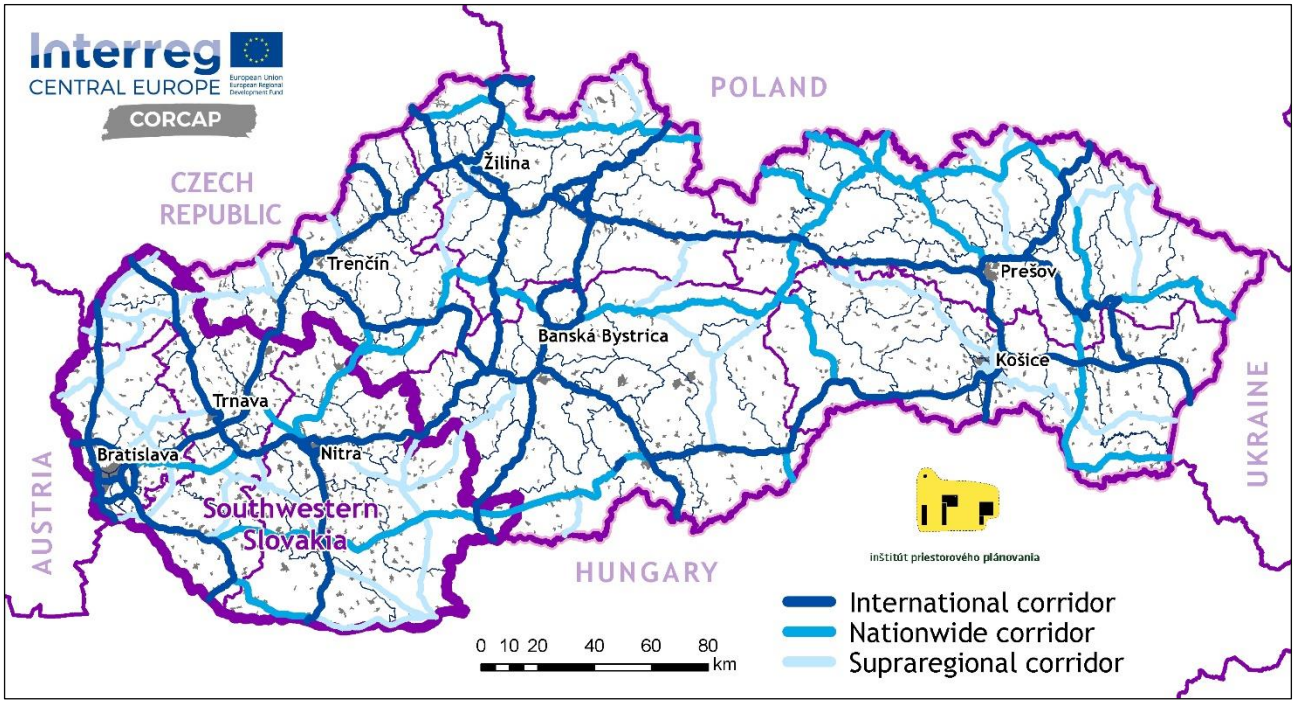
The internalisation of external costs affects the modal split, changing the limited worked distance in favour of railways and combined transport respectively. The limited worked distance between direct road and rail freight will decrease from 49.1 km to 15.1 km after internalisation of external costs (down by 69%). The limited worked distance between direct road and combined road-rail-road transport will decrease from 165.5 km to 132.8 km (down by 20%).

The observed limited worked distances are the average values obtained from the aggregate indicators for rail freight and road freight for the road tractor - trailer, semi-trailer. The limited worked distance varies depending on technical, technological and economic changes in road and rail transport, the type of goods transported, the transport link (VÚD 2005).

1.1.2.6. Other corridors

The national document Slovak Spatial Development Perspective (Aurex 2012) defines several road corridors.

Figure. Corridors of the road network of the Slovak Republic



Source: Aurex (2012)

1.1.3. Examination of technical parameters of the area

The technical parameters of rail, road, air and water transport network are part of the following Chapter 1.2. (Presentation of the transport infrastructure system). Further information regarding the railway freight as well as passenger transport is to be found in the Chapter 3, but mostly in Chapter 4.2. (Process of node development ...) and 4.3. (Networking activities).

1.1.4. Examination of intermodality and terminals in the area

Intermodal transport is the transport of several modes using the same combined transport unit without manipulating its contents during transport. In Europe, intermodal transport is an inseparable element of transport policy, mainly because of reducing the negative environmental effects of road transport, the fuel and energy consumption, the cost of maintaining motorways and roads, and the land grabbing. It is also an element for increasing the road safety. From the point of view of the user of intermodal transport, this transport - mechanical complex, providing transport of goods by one and the same transport unit from the sender to the recipient, is an uninterrupted process, using a combination of rail, road, water or air transport.

The intermodal transport infrastructure consists of **railway lines**, **transhipment points** at the intersection of transport modes (transhipment points, terminals) and **technical means**, i.e. the intermodal transport units (containers, swap bodies for road vehicles and transportable road trailers, carried on railway wagons or craft, hereinafter referred to as 'ITU'), handling equipment for their transhipment and road carriers for their delivery and distribution to and from terminals.

The geographical position of the Slovak Republic predetermines and emphasizes the importance of transit traffic in the west-east and north-south directions (MDV SR 2020b).

Combined transport in Slovakia is directed through its operators to overseas combined transport, also known as inland port service, for the distribution of goods between individual terminals of combined transport. There is also the development of railway connections with East Asia. Combined transport lines are routed from and to Slovakia via the Atlantic ports of Rotterdam, Bremen, Hamburg and the Mediterranean ports of Trieste, Koper and Piraeus.

The connection with East Asia is starting to develop in the form of a direct rail link with China, which will make it possible to significantly reduce the transport time compared to maritime transport and reduce the need for air freight transport, which is the transport with the most negative environmental impacts (BPG 2018).

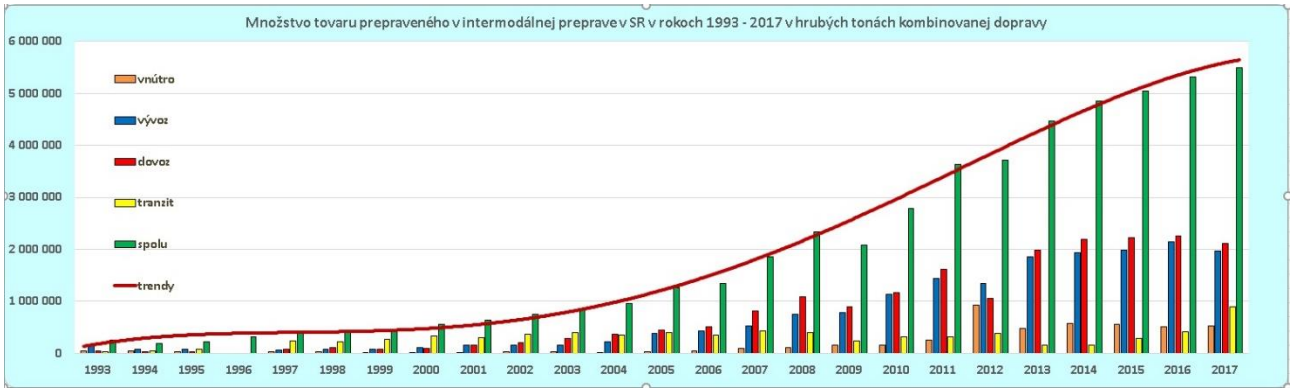
Given the undisputed environmental aspects, the growth in transport volumes is also expected in the future.

Table. The volumes of goods transported in intermodal transport in the SR in the years 1993 - 2015 in gross tonnes

year	national	export	import	transit	total	trends
1993	49,520	145,979	39,886	23,976	259,361	%
1994	43,497	81,633	27,424	39,456	192,010	-26
1995	27,880	77,380	34,353	80,688	220,301	15
1996	N/A	N/A	N/A	N/A	313,093	42
1997	28,346	54,263	70,045	232,983	385,637	23
1998	23,516	70,352	108,056	223,585	425,509	10
1999	13,043	70,057	81,206	268,134	432,440	2
2000	15,892	116,909	92,924	338,503	564,228	30
2001	15,634	156,604	155,641	304,619	632,498	12
2002	23,784	152,231	210,063	370,183	756,261	20
2003	22,159	153,867	280,929	397,675	854,630	13
2004	15,737	226,072	358,111	351,936	951,856	11
2005	28,000	388,000	445,000	395,000	1,256,000	32
2006	51,073	437,293	501,870	345,580	1,335,816	6
2007	93,302	526,885	807,757	431,382	1,859,326	39
2008	104,626	753,623	1,079,833	394,985	2,333,067	25
2009	163,787	782,839	899,104	229,236	2,074,966	-11
2010	163,024	1,129,479	1,162,635	323,988	2,779,126	34
2011	258,285	1,438,241	1,612,269	322,111	3,630,906	31
2012	933,180	1,343,196	1,054,039	376,305	3,706,720	2
2013	473,892	1,861,151	1,987,094	151,847	4,473,984	21
2014	574,291	1,933,303	2,186,747	160,284	4,854,625	9
2015	561,957	1,979,724	2,216,612,	278,577	5,036,870	4
2016	509,066	2,141,542	2,253,127	408,593	5,312,328	5
2017	530,791	1,962,902	2,118,877	886,191	5,498,761	4
Long-term annual average growth in% per year						14

Source: MDV SR (2020b)

Figure. Development of intermodal transport in Slovakia between 1993 and 2017 (gross tonnes)



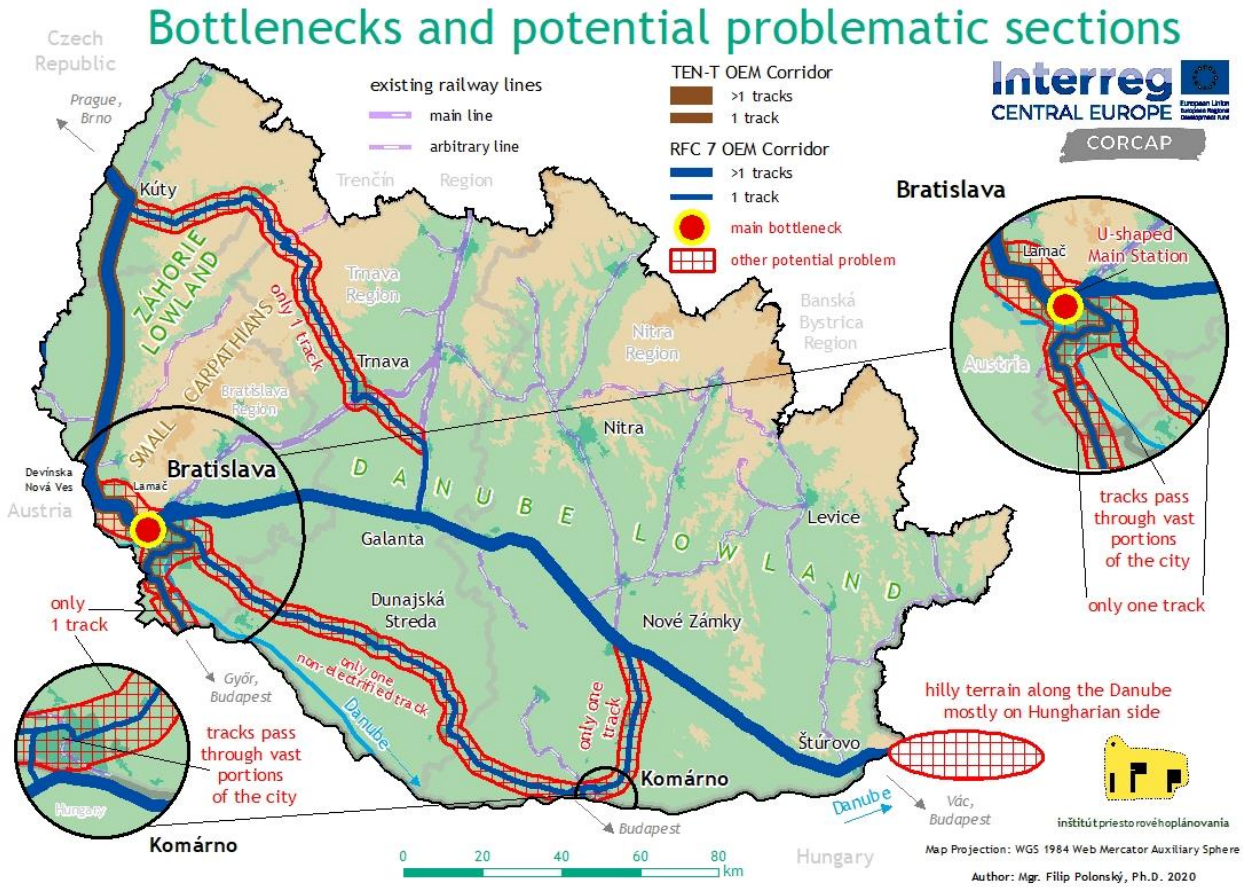
Source: MDV SR (2020b)

1.1.5. Bottlenecks, barriers

As already mentioned in the first chapters (mainly 1.1.1), the area of Southwest Slovakia is mostly plain with moderately undulated terrain. There is but only few exceptions, the most important is the Small Carpathians massif, bisecting the Great Lowland into two separate units (the Danube Lowland and the Záhorie Lowland). Main **railway** and **highway road lines** network in the north-south direction leading from the Czech Republic to Bratislava City (former historical so-called Czech route) are both passing through of the massif's broadest saddle called Lamačská Gate. The area of the saddle between Bratislava-Lamač and Bratislava-Staré Mesto (Old Town), where the city´s **Main Railway Station** is located, may be considered as the **main bottleneck of the area** (see the Figure below). The only way to increase the railway capacities in the near future is to build the third track including new tunnel pipe next to the two existing ones near Main Railway Station area in the length of 540 m (this track increase is already part of the short-term development plans formulated in SUMP 2020). In order to further increase the capacity and speed of (mainly transiting freight) trains, it would be recommended to build another tunnel crossing the Small Carpathians´ massif. In the Municipal and Regional Spatial Plans of Bratislava City and Region respectively, a tunnel connecting Bratislava-Lamač with Bratislava-Nové Mesto/Vinohrady stations, is planned, avoiding the bottleneck of the U-shaped Main Railway Station.

In the east parts of Bratislava another **problem** arises due to the fact, that the railway heading towards Rajka (Hungary) passes along/through the apartment quarters of Ružinov and Petržalka.

Figure. Bottlenecks and potential problematic sections in SW Slovakia Region

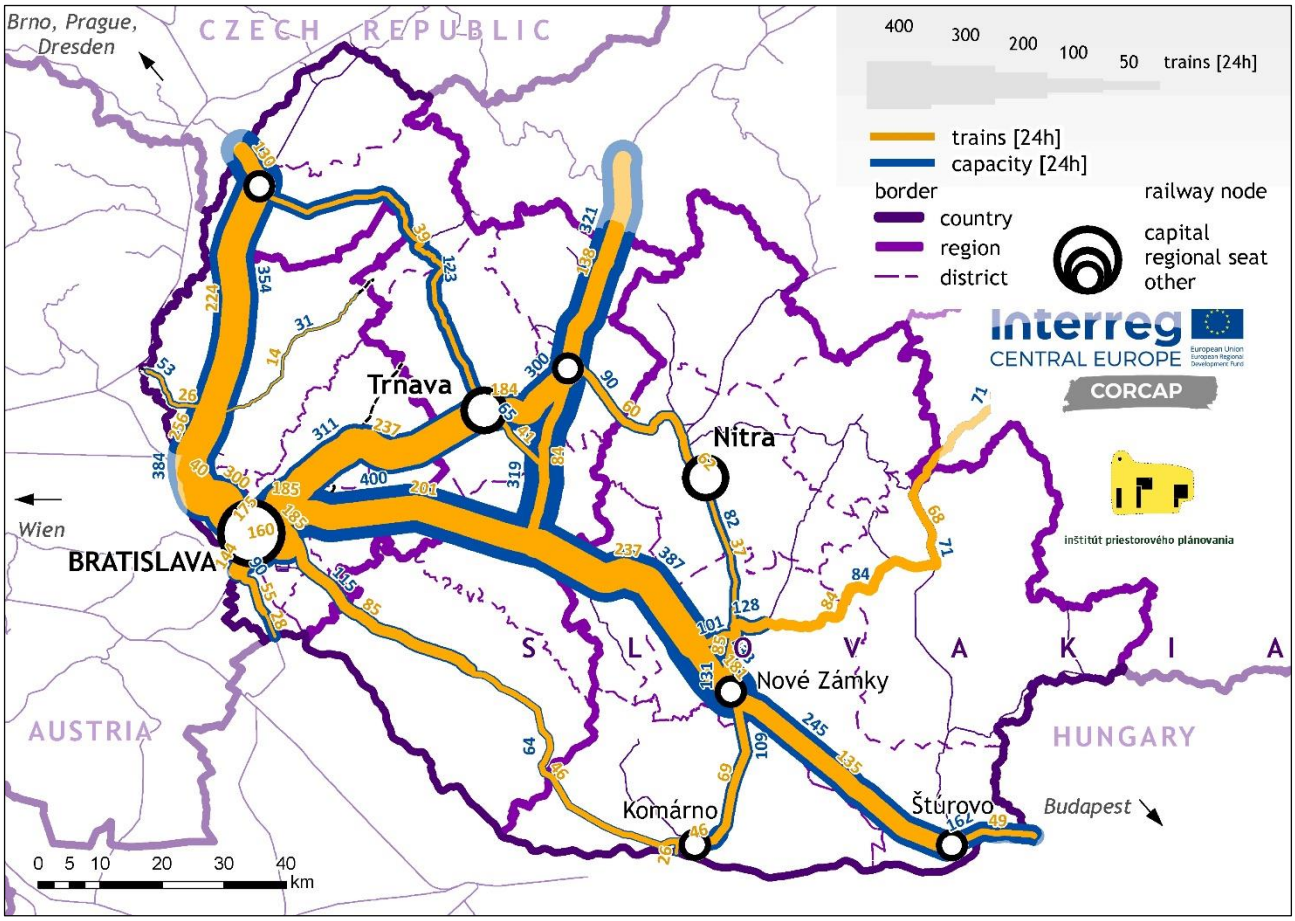


Source: RFC7 (2020), https://ipp-oz.sk/corcap

In case of the segment Bratislava – Nové Zámky – Štúrovo – Budapest, the terrain along the Danube river is rather hilly between Štúrovo and Vác (Hungary). This naturally causes the situation of lower speed limits of passing trains. As an alternative the arbitrary line connecting Nové Zámky with Komárno and Komárom cities may be used. Here, the problem of passing through large portions of Komárno arises, similarly to the above-mentioned case of Bratislava.

The **limitations** of using the 3 arbitrary lines (1. Nové Zámky – Komárno, 2. Kúty – Trnava – Galanta and 3. Bratislava – Dunajská Streda – Komárno) is the fact, that currently they have only one track and the third one is not electrified (see the Figure above).

Figure. Capacity of railway lines in Southwest Slovakia in 2018



Source: ŽSR (2020), https://ipp-oz.sk/corcap

In terms of **railway traffic intensity**, the highest capacity deficits are on the line Bratislava – Trnava (not part of the TEN-T Orient-East Med Corridor). It is followed by Bratislava – (Bratislava-) Devínska Nová Ves section that is part of Bratislava – Kúty – CZ section of the corridor. These are followed by Bratislava – Dunajská Streda section (that is part of RFC Corridor 7 connecting line between Bratislava and Komárno). It must be noted that the calculations of available capacities are only roughly approximate and were evaluated for 24 hours during the working day (see the Figure above).

In terms of **road traffic intensity**, according to SUMP (2019), the situation is critical at the entrances to Bratislava, especially on the D1 and primary roads I/61 and I/63. Capacities are also exceeded on the secondary roads II/502 from Pezinok (northeast of Bratislava) and II/572 from Most pri Bratislave (southeast of Bratislava).

Currently, the eastern and southern parts of the D4 motorway in the Bratislava-Jarovce - Ivanka pri Dunaji-sever – Bratislava-Rača (II/502) section are being implemented along with the R7 expressway in the Bratislava - Holice section (southeast of Bratislava). Both projects are to be completed by 2021. The reconstruction of the D1 motorway into an eight-lane road in the section Bratislava - Senec and a six-lane road in the section Senec - Trnava are under preparation. Further information about traffic plans and proposals are part of the chapter 3.3.

From the development of the freight transport and especially of the combined transport point of view of, it is crucial to complete the planned motorway network as quickly as possible. This network will enable fast access to the combined transport terminals, minimizing the impact on the built-up areas of individual cities and municipalities.

1.2. Presentation of the transport infrastructure system

1.2.1. Transport infrastructure characteristics (road, railways, waterways, airports)

The transport infrastructure in Slovakia consists of several transport modes. Regarding the road transport infrastructure, the backbone network consists of highways (motorways), expressways, 1st, 2nd, and 3rd class roads and local roads. Railway network is divided to main and arbitrary (regional) lines. Water transport is presented mainly on the Danube River.

1.2.1.1. The Railway Infrastructure

The railway network in the Bratislava Region consists of 49.5 km of single-track lines and 199.3 km of double-track lines.

The Integrated Transport System in the Bratislava Region, launched in 2013, allows passengers to travel on a single ticket on Slovak Lines suburban buses, on trains of Slovak Railway Company, and RegioJet and in the vehicles of the DPB (Public Transport Company Bratislava).

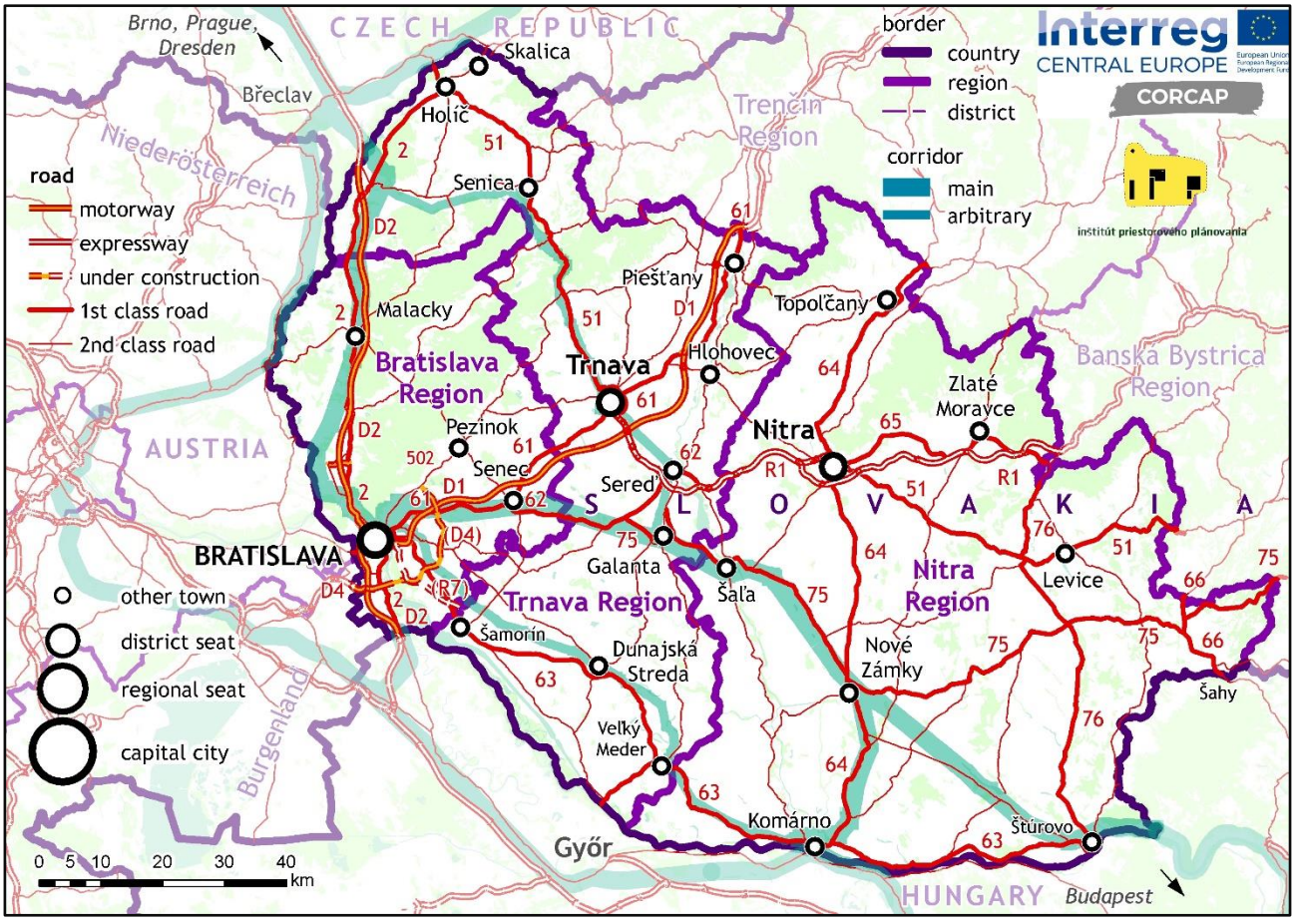
In Bratislava Region the railway junction Bratislava is of decisive importance for the functioning of rail transport. In 2019 a feasibility study of The Slovak Railways (ŽSR 2019) was completed. The project was aimed at increasing the technical and technological level of railway infrastructure on the territory of the Bratislava railway junction by means of modernization and reconstruction. This is a prerequisite for improving the performance of the junction in the required locations, based on the concept of traffic flows solutions in passenger and freight transport.

1.2.1.2. Road Infrastructure

The development of the **Bratislava Region** transport system is directly linked to national and supra-regional transport relations. Bratislava Metropolitan Region has a major impact on the shape and density of transport networks in the area. The highest density of the roads is in the capital city of Bratislava. All major roads already achieve the highest traffic intensities compared to the rest of Slovakia. The total length of roads in the region reaches 808.83 km with a network density of 0.394 km/km^2, which is above the country´s average (0.368 km/km^2). The highest-level roads passing through the region are the **motorways D1, D2** and **D4**. The **D1** motorway runs on the route Bratislava (Petržalka - intersection with D2) - Senec - Trnava - Trenčín - Žilina - Košice. The section between Bratislava and Trnava was reconstructed in 2009 into a limited 6-lane motorway. The route of the **D2** motorway runs from the SK/CZ border near Kúty - Malacky - Bratislava – Bratislava-Rusovce – SK/H border. The **D4** motorway currently represents a short section between the SK/AT border and the intersection with D2 at Bratislava-Jarovce. The trans-regional road network, which is important in international and national transport, is represented by **1st class** roads I/2 Kúty - Malacky - Bratislava – SK/H border, I/61 SK/AT border - junction with D2 - Senec - Trnava, I/62 Senec – Sládkovičovo and I/63 Bratislava - Dunajská Lužná - Dunajská Streda. A complementary road network of regional importance, is represented by **2nd class** roads II/501 intersection with I/2 - Lozorno - Pernek – Jablonica, II/502 Bratislava - Pezinok – Trstín, II/503 Šamorín - Senec - Pezinok - Malacky - Záhorská Ves – SK/AT border, II/504 Pezinok - Budmerice – Trnava, II/505 Bratislava – Bratislava-Devínska Nová Ves – Stupava, II/510 Most pri Bratislave - Tomášov – Bratislava Region border, II/572 Bratislava - Most pri Bratislave - Bratislava Region border, II/590 Malacky - Studienka - Bratislava Region border. From these the tertiary (**3rd class**) roads serve for local transport relationships.

In **Trnava** and **Nitra** Regions **motorways** (highways), **expressways** and **primary** (1st class) **roads** serve for transit supra-regional transport relations and for fast connections between important cities. The R1 expressway runs west-east from the D1 **motorway** through the regional city of Nitra. From the city of Nitra is led in the direction of Zlaté Moravce to the neighbouring Banská Bystrica region. Similarly, the west-east connections are provided by **1st class** roads I/65 Nitra - Zlaté Moravce - region border, I/51 Nitra - Levice - Krupina, I/75 Šaľa - Nové Zámky –Šahy and I/63 Veľký Meder - Komárno - Štúrovo. North - south transport relations are provided by roads I/64 Topoľčany - Nitra - Nové Zámky - Komárno and I/76 Hronský Beňadik – Kalná nad Hronom - Štúrovo. The expressway R1 together with route I/51 are included in the international road network E 571, the route I/66 from Šahy is classified as E 77. The primary roads are followed by a network of secondary (**2nd class**) roads that provide crucial regional transport relationships within the region. From these the **3rd class** roads serve for local transport relationships (NSK 2017).

Figure. Road transport network in Southwest Slovakia



Source: IPP, BSK (2017), TTSK (2019), NSK (2017), https://ipp-oz.sk/corcap

1.2.1.3. Air transport, airports

The TEN-T international Milan Rastislav Štefánik´s Airport Bratislava (BTS) is the largest airport in Slovakia. It is located just 9 km north-easterly from Bratislava City Centre. It has 2 rectangular runways: 13-31 (3 190 m long and 45 m wide) and 04-22 (2 900 m long and 60 m wide). Annually around 2 million passengers and more than 26,000 tons of air cargo move through its gates. Around 99 % of country´s air cargo is handled here. The handling area is 143,000 m^2 large and it contains 33 aviation parking lots. The

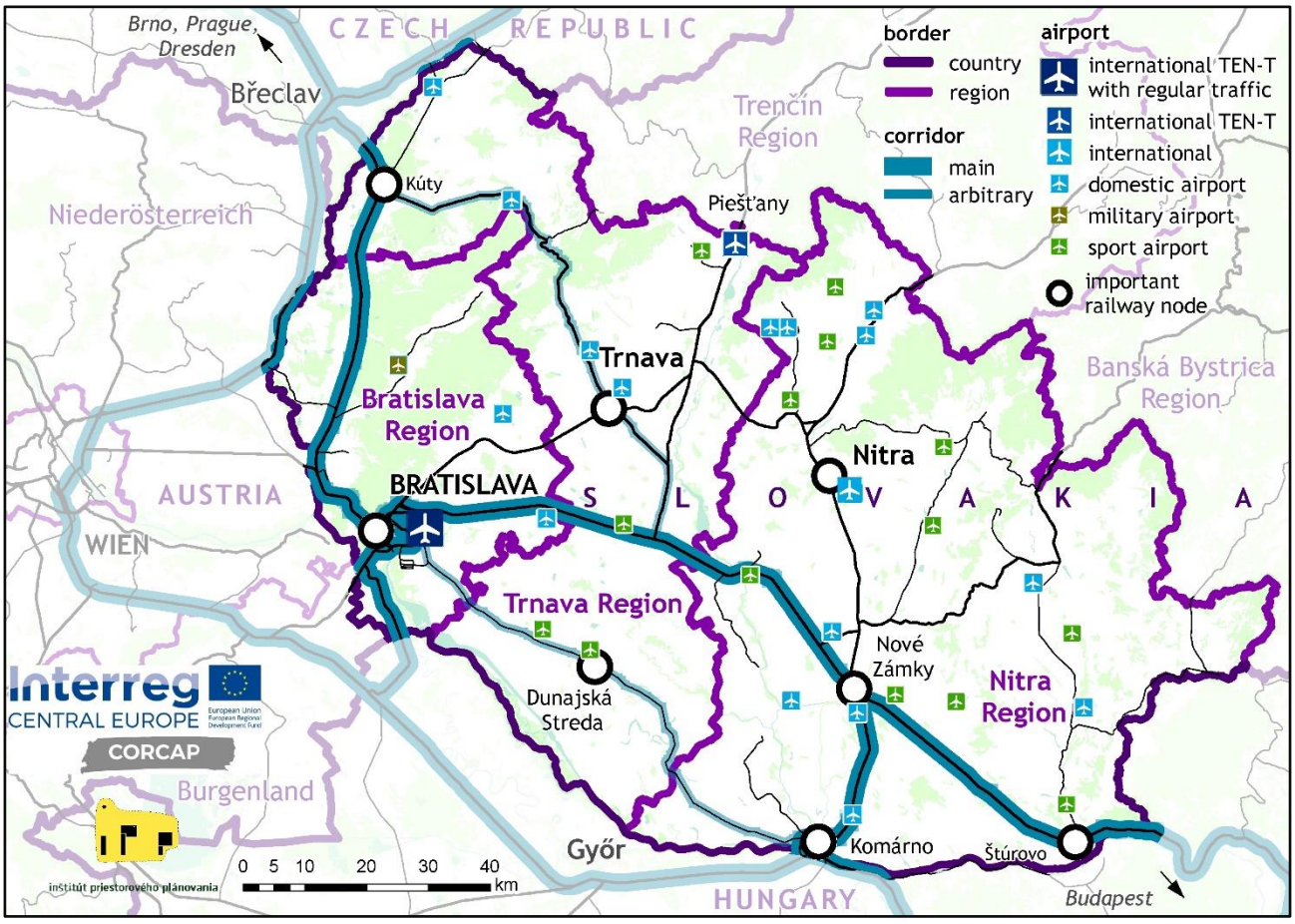
international ICAO code of BTS Airport is LZIB. Air freight (cargo) traffic statistics are part of the chapter 1.4.2.

The closest international airports of higher rank are Wien-Schwechat (Vienna International Airport) and Budapest Ferencz Liszt International Airport.

Several smaller airports are dispersed in Bratislava, Trnava and Nitra Regions. These include:

- Bratislava Region (BSK 2017):
  - 1 military airport (Kuchyňa in Malacky District)
  - 2 civil airports (Dubová in Pezinok District and Kráľová pri Senci in Senec District)
- Trnava Region (TTSK 2019):
  - 1 civil airport for international transport with irregular traffic (Piešťany)
  - 4 civil airports for domestic transport with irregular traffic (Trnava, Holíč, Senica, Boleráz)
  - 4 sports airports (Dunajská Streda, Krakovany, Masníkovo, and Sládkovičovo)
- Nitra Region (NSK 2017):
  - 1 civil airport for international transport with irregular traffic (Nitra)
  - 11 civil airports for domestic transport with irregular traffic (Nové Zámky, Šurany, Chotín, Ludanice, Nemčice, Pohronský Ruskov, Šalgovce - Orešany, Hrádok, Veľké Janíkovce, Veľké Ripňany & Zemné)
  - 10 sports airports (Jasová, Bojná, Čab, Dvory nad Žitavou, Horné Obdokovce, Horný Jatov, Choča, Kamenný most, Šarovce & Vráble)

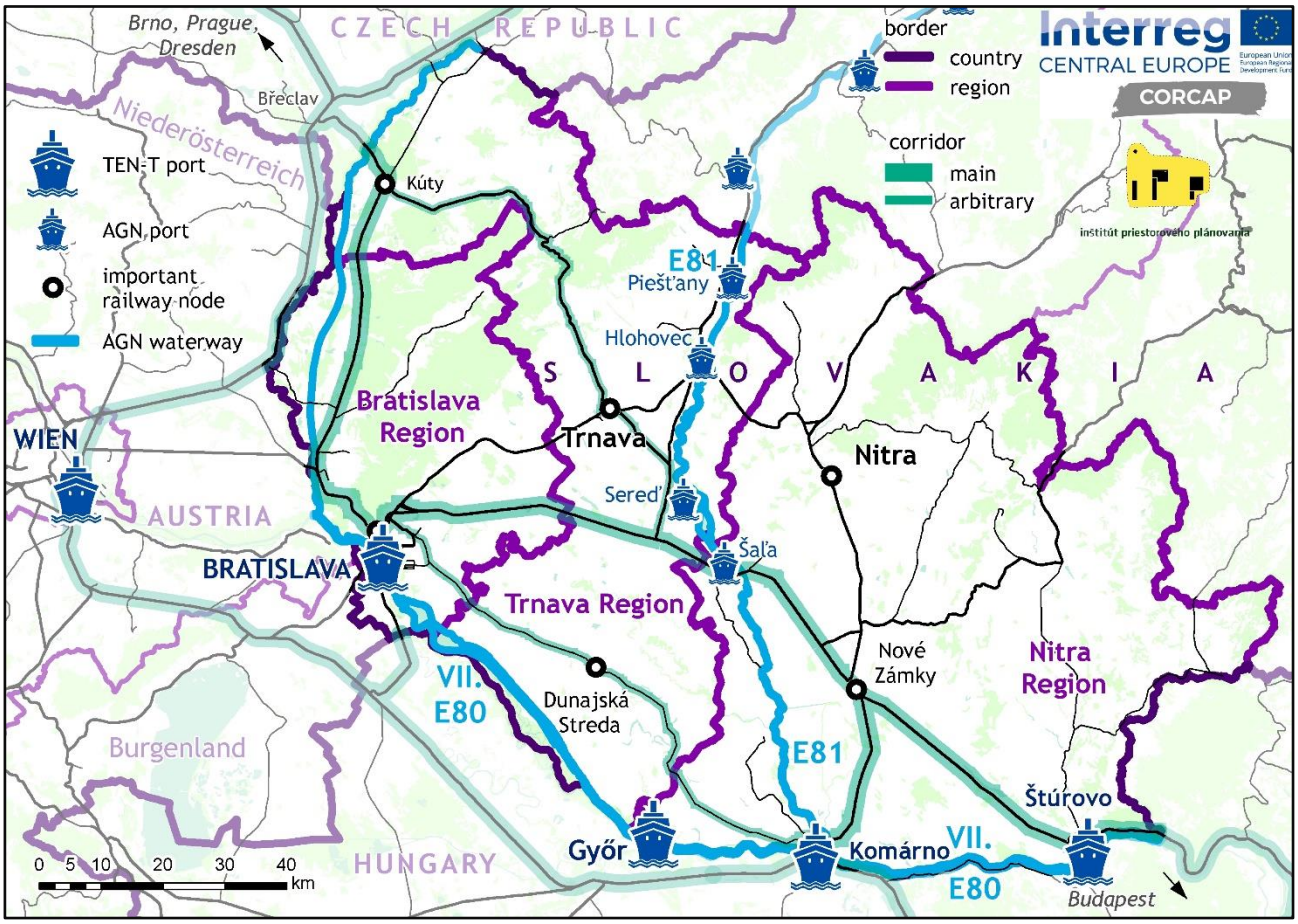
Figure. Air transport in Southwest Slovakia



Source: IPP, BSK (2017), TTSK (2019), NSK (2017), https://ipp-oz.sk/corcap

1.2.1.4. Water transport

Figure. Water transport in Southwest Slovakia



Source: IPP, Aurex (2012), https://ipp-oz.sk/corcap

1.2.2. Multimodal interfaces

Combined transport terminals

Currently there are 11 terminals for combined transport in operation in Slovakia. These include the terminals in Bratislava - Pálenisko Port, Central Freight Station in Bratislava, Sládkovičovo, Dunajská Streda, Žilina, Žilina - Teplička, Ružomberok, Košice, Košice - Veľká Ida, Haniska near Košice and Dobrá near Čierna nad Tisou.

On the territory of the Bratislava Region there are 2 terminals that are both located in Bratislava.

Regarding the attractive circuit of the combined transport terminals, approximately 80 km, the combined transport terminals located outside its territory also have an impact on the territory of the Bratislava Region. These are the terminals in Dunajská Streda and Sládkovičovo in the neighbouring Trnava Region. From foreign terminals, there are terminals in Zlín in the Czech Republic, Vienna in Austria and Sopron in Hungary (MDV SR 2020c).

Terminals in Southwest Slovakia

Existing terminals have the following parameters:

BRATISLAVA – PÁLENISKO PORT

It is the only **trimodal** container **terminal** in country. It connects the rail freight, road freight and river freight transports. The operator is Slovenská plavba a prístavy, a.s. The terminal has an area of approximately **24,000 m^2**. There is a storage area of about **11,000 m^2** with a capacity of about 1,400 TEU.

The terminal is equipped with two rails with lengths of 300 and 150 meters.

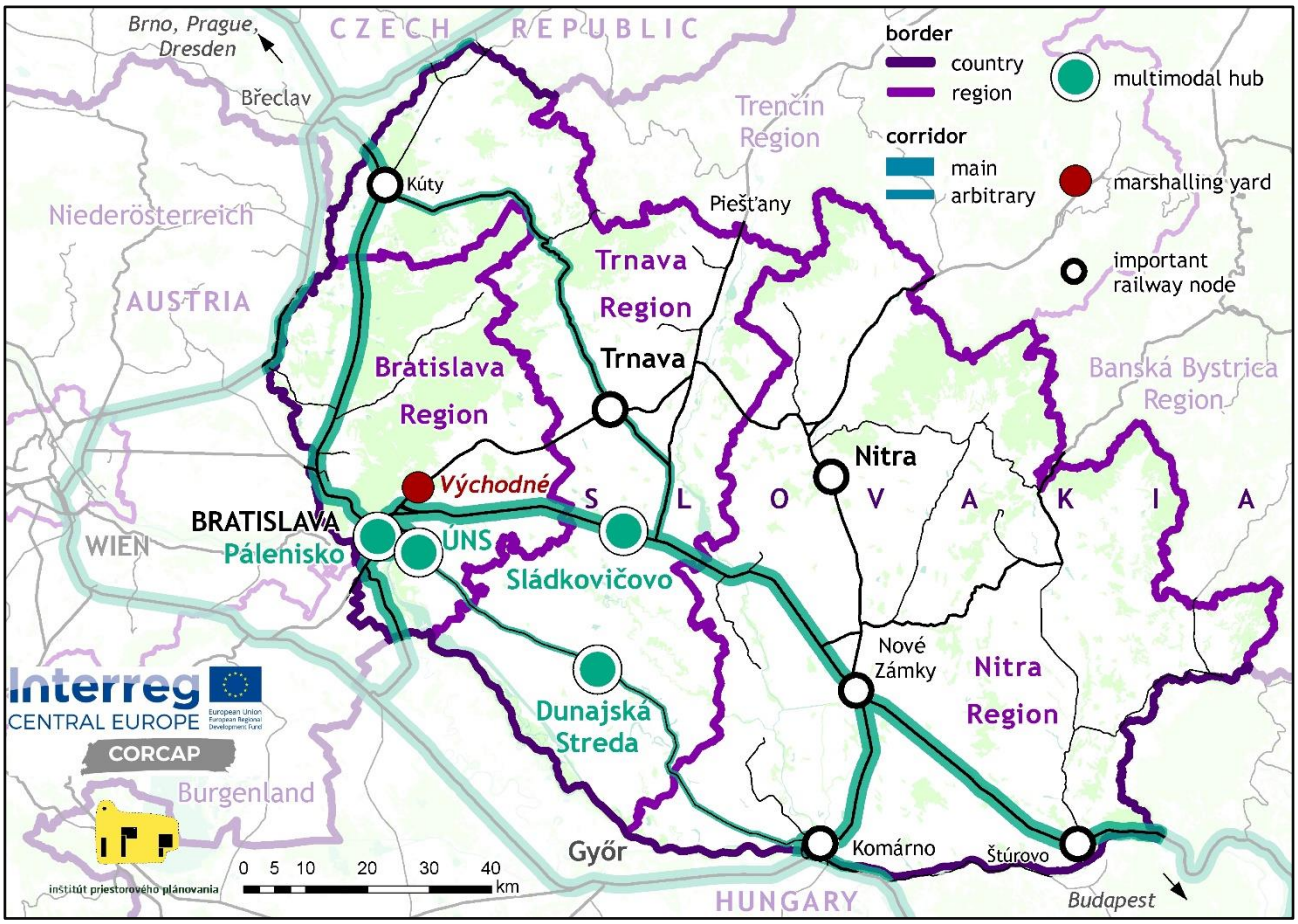
The transport connection of the terminal is provided from Prístavná Street. The R7 expressway is currently under construction, which will ensure the direct connection of the port to the network of motorways and expressways. The connection to the railway is provided from the Central Freight Station (Ústredná nákladná stanica).

In the terminal, the following are used as handling means:

- 3 gantry cranes (total container weight 20´ = 24 tons / 40´, 45´ = 28 tons)
- 3 Reach stacker truck, (container weight 20´, 40´, 45´ = 45 tons)

Terminal provides transhipment of containers ISO 1 series A-C (20´, 40´, 45´).

Figure. Multimodal hubs in Southwest Slovakia



Source: IPP, Aurex (2012), https://ipp-oz.sk/corcap

CENTRAL FREIGHT STATION (ÚSTREDNÁ NÁKLADNÁ STANICA) IN BRATISLAVA

This **bimodal** container **terminal** connects the rail freight and road freight transports. The operator is Rail Cargo Group. This company carries out container transport between Austria and Bratislava terminal, which is a hub for railway logistics to Europe. The company also operates container terminals in other cities of Slovakia including Košice, Ružomberok and Žilina.

The terminal has an area of about **34,500 m^2** and a storage area of about **16,000 m^2**. The terminal is equipped with three rails with lengths of 325, 297 and 290 meters.

The terminal is accessible from Slovnaftská Street. The R7 expressway is currently under construction, which will ensure the direct connection of the port to the network of motorways and expressways. The connection to the railway is provided from the Central Freight Station (Ústredná nákladná stanica).

In the terminal, the following are used as handling means:

- 1 gantry crane with capacity of 32 tons
- 1 side Reach stacker
- 1 front Reach stacker
- fixed front *RoLa* platform

The terminal offers:

- Direct connection from Koper to Bratislava and back or from Koper to Žilina and back
- Up to 5 transport cycles from / to Bratislava or from / to Žilina per week
- Daily transport to the Czech Republic, Austria (Vienna) and Hungary

Near the Bratislava Region´s borders there are two terminals located in Dunajská Streda and Sládkovičovo in the neighbouring Trnava Region. These terminals have the following parameters:

DUNAJSKÁ STREDA TERMINAL

This **bimodal** container **terminal** connects rail and road freight transport. The operator is the company METRANS (Danubia) a.s. that also operates container terminals in Haniska near Košice in the Eastern Slovakia and Terminal TIP Žilina – Teplička (METRANS 2020).

The terminal has an area of about 280,000 m^2 and stacking area of about 250,000 m^2 with a capacity of 25000 TEU and a storage capacity of 15 000 empty containers.

The terminal is equipped with 9 rails with lengths of 5 x 650 and 4 x 550 meters.

The terminal is accessible from Povodská cesta, which is connected to the I/63 road. The R7 expressway is currently under construction, which will ensure the direct connection to the network of motorways and expressways. Connection to the main railway track is provided from the station Dunajská Streda.

In the terminal, the following are used as handling means:

- gantry cranes with a lifting capacity of 36 tons, which provide the service of 5 tracks with a length of 650 meters
- 4 front Reach stackers with 45 tonnes load capacity
- 6 front Reach stackers with 10 tonnes load capacity

At the terminal it is possible to provide simultaneous transhipment of 9 trains, it has a capacity for 190 trucks, and it offers:

- handling of 20 trains per day, in peak season 24 trains per day
- daily connections to / from Česká Třebová (further to Hamburg, Bremen, Rotterdam, Duisburg, Malaszewice)
- daily connections - to / from Hamburg directly
- daily connections - to / from Budapest - METRANS Csepel
- daily connections - to / from Haniska near Košice
- daily connections between HUB Dunajská Streda - TIP Žilina, currently set 4 times weekly full train loads
- connection 2-3 times a week - to selected Austrian terminals - Vienna (Wiencont, Containex, Wien-Sud), Enns, Linz, Ybbs
- connection 1-2 times a week to / from Krems an der Donau (Austria)
- connection 4-5 times to / from Trieste (Italy), 2 times a day two-way - to / from Koper (Croatia), 2 times a week to / from Piraeus (Greece)

744,540 TEUs (twenty-foot equivalent units) were handled in 2017 and 890,662 TEUs in 2018. The terminal has long been the most efficient of all combined transport terminals in Slovakia (METRANS 2020).

SLÁDKOVIČOVO

The **bimodal** container **terminal** connects rail and road freight transport. It is operated by Green Integrated Logistics. The company deals with production logistics for the key customer Samsung. Furthermore, it is engaged in procurement of road, air, sea transport, warehouse logistics. It provides road transport for its customers within Europe and the Russian Federation.

The terminal has an area of about 60,000 m2, it is equipped with one rail with a length of 290 meters. The terminal is accessible from the local road, Košútská Street, which provides its connection with the road I/62. Connection to the railway is provided from the Sládkovičovo station.

In the terminal, the following are used as handling means:

- 1 Gantry crane
- 3 Reach stackers

The annual turnover of the terminal is on average 75,000 TEU and the daily storage capacity is 2,800 TEU.

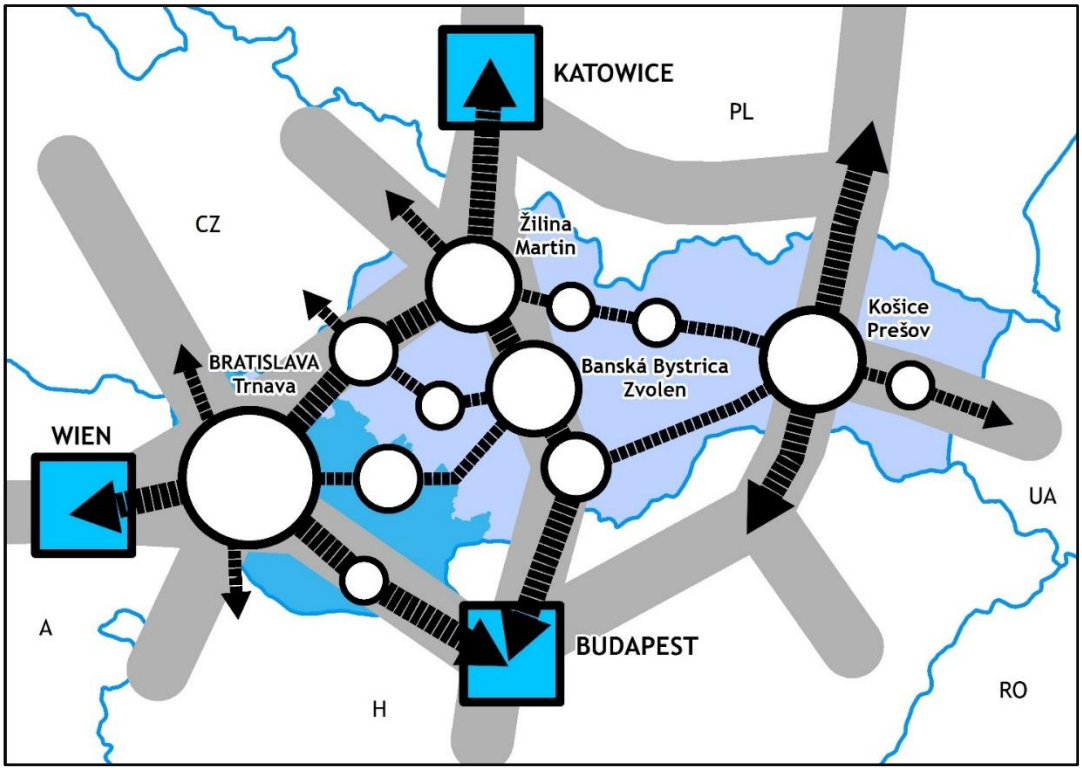
The mentioned terminals within their catchment area cover the entire territory of the Bratislava self-governing region and the majority of the Trnava and Nitra self-governing regions.

In order to ensure their optimal accessibility, it is necessary to complete the road infrastructure, which limits the import of goods by road freight transport. The Záhorie Region has the worst conditions in this respect, from which access routes to the terminals run through the territory of Bratislava and are therefore limited by its congested road network.

In addition to the existing terminals of the Slovak Railways (ŽSR), they plan to build additional combined transport terminals in Bratislava - Pálenisko, Hlohovec near the Leopoldov railway station, Lužianky near Nitra for the Jaguar Land Rover industry area and in Budeč near Zvolen.

1.2.3. Cross-border links

Figure. International issues of the settlement core areas of the Slovak Republic



Source: Aurex (2012)

1.3. Presentation of major economic activities and the settlement system

1.3.1. Description of the settlement system

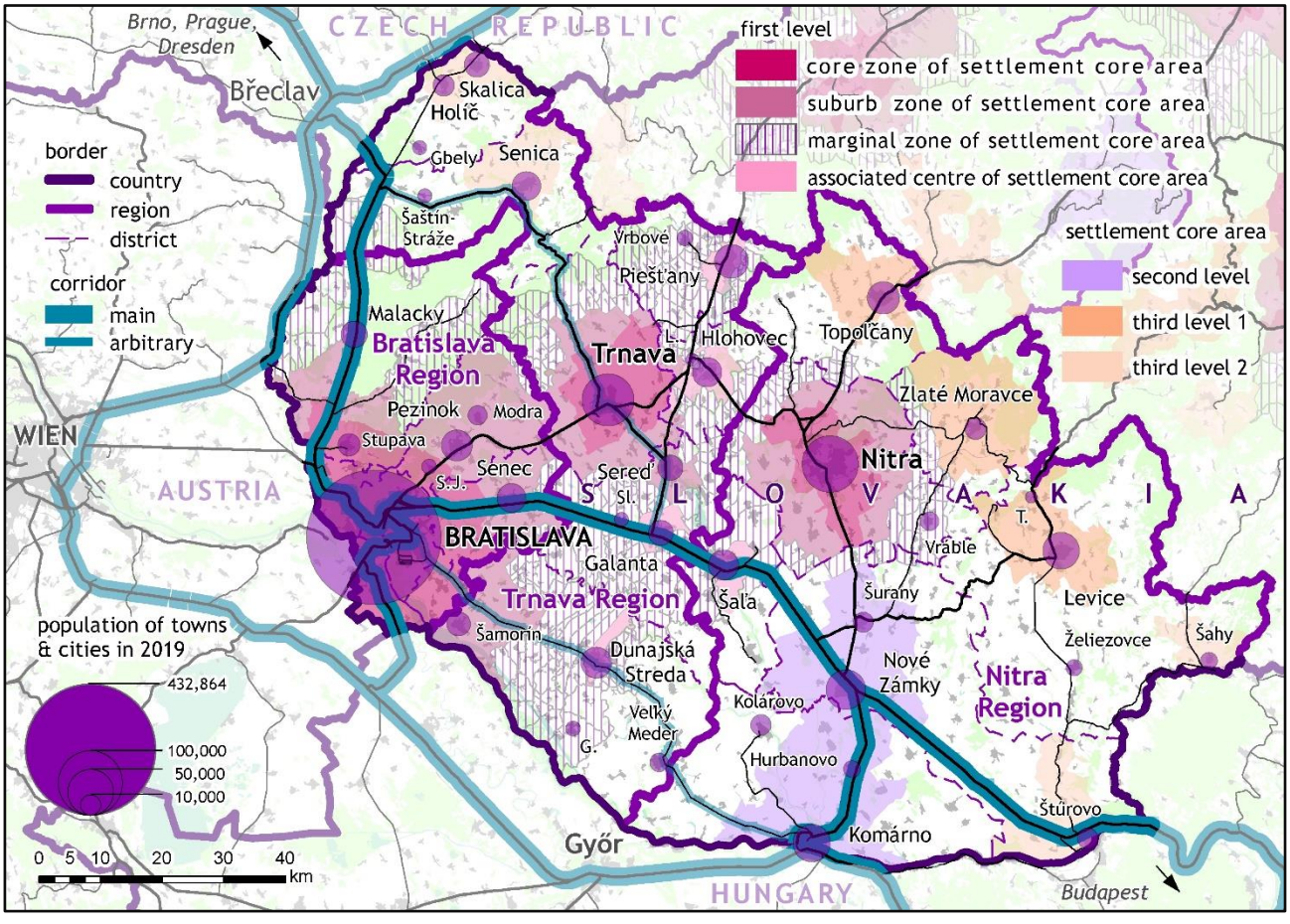
Southwest Slovakia consists of 3 regions that coincide with NUTS3 level. These regions are built-up of districts (LAU1 level) and basic territorial units (LAU2) level.

The territorial and settlement structure of the **Bratislava Region** consists of 73 municipalities, of which 1 has the status of the capital city of the Slovak Republic (Bratislava) and 6 have the status of the city/town (Malacky, Stupava, Svätý Jur, Pezinok, Modra, and Senec). Bratislava, Malacky, Pezinok and Senec are also district towns. The proportion of urban population is 79.5%. The Bratislava Region occupies 4.19% of the area of the Slovak Republic, it is the smallest region in Slovakia.

Trnava Region is divided into 7 districts: Dunajská Streda, Galanta, Hlohovec, Piešťany, Senica, Skalica and Trnava. It consists of 251 municipalities, of which 17 have the status of a city/town. Besides the above mentioned these are: Gbely, Šaštín-Stráže, Holíč, Vrbové, Leopoldov, Sereď, Sládkovičovo, Šamorín Gabčíkovo, and Veľký Meder.

Nitra Region consists of 350 municipalities, 15 of which have the status of a city/town. The region is divided into 7 districts: Komárno, Levice, Nové Zámky, Šaľa, Nitra, Topoľčany and Zlaté Moravce. The other towns are: Tlmače, Vráble, Želiezovce, Šahy, Šurany, Kolárovo, Hurbanovo, and Štúrovo.

Figure. Settlement system of Southwest Slovakia



Source: IPP, Aurex (2012)

Table - Administrative division units in the area of interest

unit	LAU1 units	LAU2 units	municipalities
Bratislava Region	8	89*	73*
Trnava Region	7	251	251
Nitra Region	7	354	354

Source: PSR BK (2020); Note: * - City of Bratislava consists of 17 basic territorial units (LAU2)

1.3.2. Demographical and socio-economic situation

The **Bratislava Region** as the most efficient region in the economy of the Slovak Republic. Its share in the gross domestic product of the Slovak Republic is about 26%. When calculating GDP per capita in purchasing power parity (PPP), the Bratislava Region exceeds the EU-25 average by 15.9%. The Bratislava Region has been showing the lowest unemployment rate among all regions of the Slovak Republic. In 2018, the registered unemployment rate was 2.62%. Since 2001, when the unemployment rate was 5.79%, this percentage has ranged from 6.17% (in 2013) to 1.98% (in 2007). The achieved average nominal monthly wage is above the national average monthly wage.

In 2000, the Bratislava Region had 616,982 inhabitants. Subsequently, most of the following years decreased, in 2011 it had 599,931 inhabitants. Since that year, it has been rising every year, until in 2018 it increased to 650,838 inhabitants. The Bratislava Region is specific in that most of the territory is occupied by the capital Bratislava, which had a population of 448,292 in 2001 and 410,492 in 2011, as most people moved to the countryside as part of the suburbanisation processes. Subsequently, since 2011, this trend has changed, and the population of Bratislava has grown again. In 2018 there were 429,564 inhabitants in Bratislava. These figures represent only the official residents of Bratislava, in fact it was inhabited by more people (SOSR 2020).

The **Trnava Region** is one of the most productive agricultural regions in the Slovak Republic. Of the total area of the region, agricultural land occupies 69.4%. The unemployment rate was 2.31% in 2018, which is the lowest unemployment rate since 2001, when it was 15.51%. In 2000, the number of inhabitants was 551,287. Since then it was gradually increasing, 554,021 in the year 2001 and by 2018 the number of inhabitants increased to 562,372.

The **Nitra Region** manages the largest agricultural land area of all regions of the country (4646 km^2). It is one of the most important producers of agricultural crops. As for the unemployment rate, it was 3.12% in 2018, the lowest rate since 2001 when it was 23.12%. Since this year, the rate has been gradually decreasing. The population of the Nitra region in 2000 was 715,841. Subsequently, it decreased annually, in 2011 there were 690,311 inhabitants. In 2018 the population was 678,692 (SOSR 2020).

1.3.3. Description of cross-border relations

Bratislava, Trnava and Nitra Regions are part of several cross-border cooperation projects and institutions.

CENTROPE is a joint initiative of the Austrian federal states of Vienna, Lower Austria and Burgenland, the Czech region of South Moravia, the Slovak regions of Bratislava and Trnava, and the Hungarian counties of Győr-Moson-Sopron and Vas. It was based on the Kittsee Declaration of 2003 (Stadt Wien 2020). The area covers 44,500 km^2 and it is characterized by very high economic growth and is one of the fastest developing and most promising regions in Europe. Four 4 major cities are located in the region, including Brno in the Czech Republic (370,000 inhabitants), Győr in Hungary, Vienna in Austria (1,890,000 inhabitants) and Bratislava in Slovakia (430,000 inhabitants). Its imaginary centre consists of the cities of Vienna and Bratislava (metropolitan region Bratislava-Vienna), a so-called agglomeration "Twin City".

Table. Basic statistics of regions of CENTROPE as of 2018

Region	Population	Area
Wien	1,888,776	415
Niederösterreich	1,670,668	19,186
Burgenland	292,675	3,962
Jihomoravský kraj	1,209,879	7,196
Bratislavský kraj (Bratislava Region)	650,838	2,053
Trnavský kraj (Trnava Region)	562,372	4,158
Györ-Moson-Sopron	461,518	4,208
Vas	253,305	3,336
total	6,990,031	44,514

Source: West-Pannon (2020), Stadt Wien (2020)

The Danube Strategy includes 9 states of the European Union and 5 states outside the European Union. The main pillars are:

- Connecting the Danube Region
- Protecting the environment in the Danube region
- Developing the prosperity in the Danube region
- Strengthening the Danube region

Euroregions and EGTCs (European Grouping of Territorial Cooperation)

There are several cooperation groupings between Southwest Slovakia on one side and Hungary, Austria or Czech Republic on the other. Slovak-Hungarian cooperation bodies include Arrabona, Pontibus, Ister Granum, Pons Danubii and Rába – Duna – Váh. A Slovak-Austrian-Czech cooperation body is Weinviertel.

1.3.4. Presentation of companies in the area (manufactures, logistics, transport), identifying their activities

1.3.4.1. TOP companies

From the TOP 22 **companies** of Slovakia based on their revenues in 2018 13 are located in the Southwest Slovakia (https://finstat.sk/databaza-financnych-udajov?sort=sales-desc), and 10 in Bratislava Region in Bratislava City. These companies are focused on (1) energetics (Slovnaft, Slovenské elektrárne, SPP, ZSE Energia, Západoslovenská distribučná and OMV), (2) food processing and distribution (TESCO, Lidl, Kaufland and BILLA), (3) industry (Volkswagen, PSA, Samsung, Foxconn, SAS Automotive, Faurecia), (4) IT and telecommunication (OKTE, T-Com, Orange), and (5) other (Pheonix, niké, IKEA). It need to be noticed some companies have its branches and employees located throughout the Slovakia (i.e. Slovenské elektrárne, Slovenský plynárensky priemysel, Tesco Stores SR, Lidl and Kaufland) however its seat is in Bratislava.

Table. List of TOP 22 companies in Southwest Slovakia based on revenues (over 500 million EUR in 2018)

	Volkswagen		SAS Automotive
	Slovnaft		Faurecia Automotive Slovakia
	Slovenské elektrárne		ZSE Energia
	PSA Slovakia		Slovak Telekom
	Samsung Electronics Slovakia		Billa
	Slovenský plynárenský priemysel		Phoenix Zdravotnícke zásobovanie
	OKTE		Orange Slovensko
	Tesco Stores SR		Niké
	Lidl		OMV Slovensko
	Foxconn Slovakia		IKEA Components
	Kaufland		Západoslovenská distribučná

Source: web pages of particular company

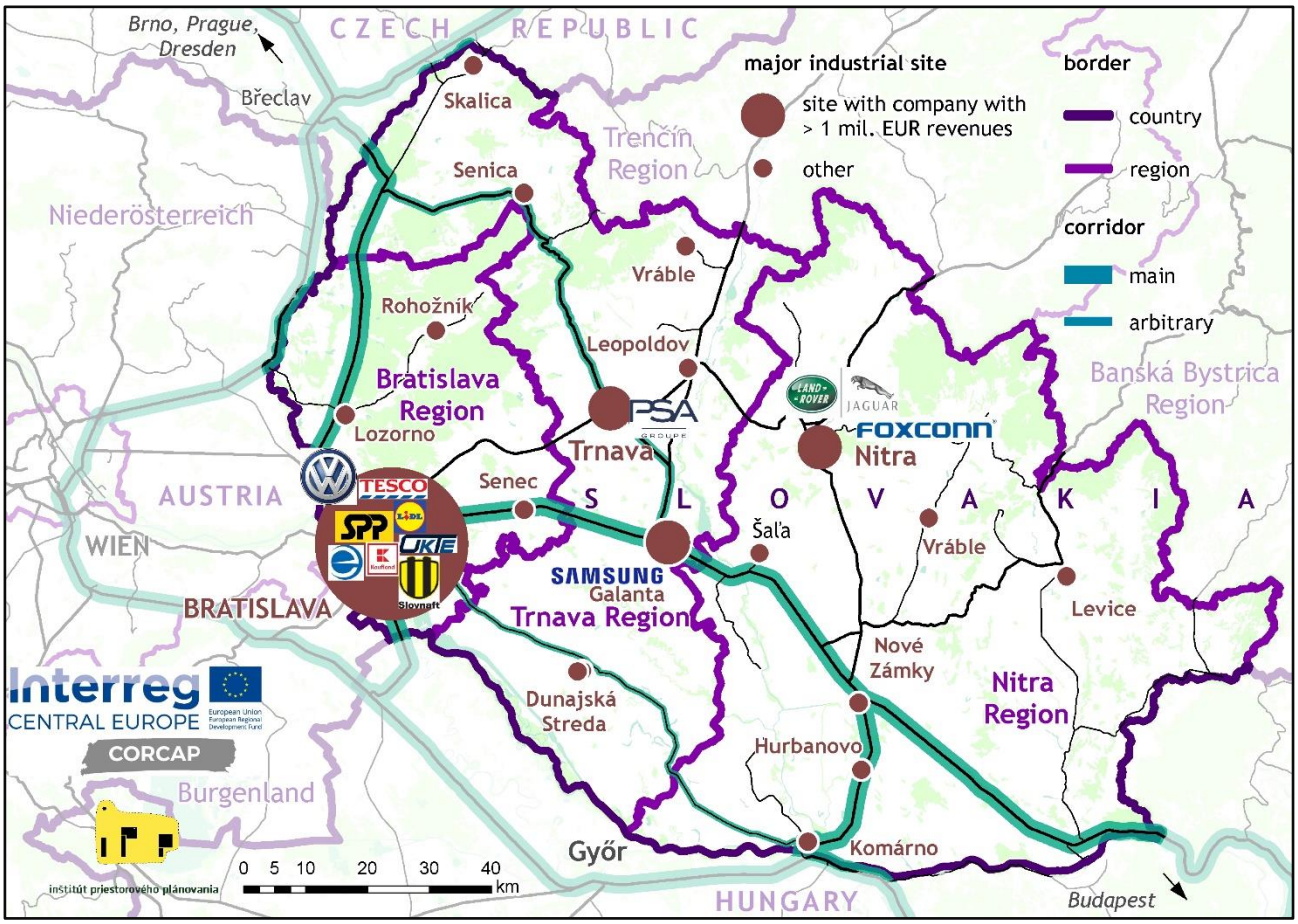
The **Volkswagen Slovakia** plant in Bratislava is the only automotive plant in the world to produce five-brand vehicles under one roof. More than 99% of production is exported to 158 countries. For more than a quarter of a century, the plant has become one of the most modern in the Volkswagen brand and concern. Its uniqueness lies in innovative technologies and complexity. In addition to the plant in Devínská Nová Ves, Volkswagen also has a plant in nearby Stupava, which specializes in the production of tools for automotive production. The currently company employs approximately 14,800 employees (VW 2018).

The second most important company in the country is the **Slovnaft** refinery (a joint stock company). The production plant of the company is located in Ružinov, part of Bratislava. The areal size of the production site is the largest in Bratislava Region. The company is also the second largest company in Slovakia. Slovnaft is a refinery-petrochemical company with annual processing of 5.5 - 6 million tons of oil. It is one of the three most modern refineries in Europe. Up to 80% of the produced motor fuels are exported, mainly to the markets of EU member states. Since 2004 Slovnaft is part of the most important Central European integrated oil group - MOL Group. Combining the new processing capacities and the expanded product portfolio of Slovnaft and MOL Petrochemicals, the MOL Group's petrochemical division can supply up to 1.2 million tonnes of polyethylene and polypropylene to the European plastics market annually, making it one of the largest Central European polyolefins granulate producers (Slovnaft 2020).

Groupe PSA Slovakia car manufacturer is leader in the production of small vehicles (Peugeot, Citroen) in the B-mainstream segment (so-called platforms 1). Since 2006, it has produced more than 3 million vehicles. Car factory is located in the third largest city of the Southwest Slovakia. It employs about 4,500 workers and it is the 4th largest exporter in Slovakia. 80% of its production goes to EU markets, while the rest is directed mainly to Japan, Egypt, Latin America and New Zealand (PSA 2019).

British car manufacturer **Jaguar Land Rover** (not listed in the table above) of the Indian concern Tata Motors is located in the Strategic Park Nitra. The company plans to produce 150,000 cars per year at the Nitra plant. The total production capacity of the plant is about 300,000 vehicles per year. Currently Land Rover Discovery and Land Rover Defender are produced here (Jaguar Land Rover 2020).

Figure. Major industrial production sites with TOP 22 companies in Southwest Slovakia



Source: IPP, ETREND (2020). Note: Companies with more than 1 mil. EUR are also depicted by their logos, https://ipp-oz.sk/corcap

1.3.4.2. Transport companies

Most important transport companies are located in Bratislava. List of the largest and most important companies are part of the following tables.

Table. Transport and logistics companies operating in Southwest Slovakia based on revenues in 2018

	ZSSK Cargo		Slovak Railway Company
	Budamar Logistics		Šped-Trans Levice
	Gefco Slovakia		DHL Exel Slovakia
	METRANS		Duvenbeck Slovensko
	Samsung SDS Global SCL Slovakia		

Source: web pages of particular company, ETREND (2020)

Table. Other transport companies

	Slovak Railway Company		Slovenské plavby a prístavy
	RegioJet		Bratislava Airport
	Rail Cargo Operator		Airport Piešťany
	GREEN Integrated Logistics		ARRIVA

Source: web pages of particular company

Most of **road transport logistics companies** have their bases in Bratislava (C. S. Cargo Slovakia, Mesaroli Transports, Duvenbeck Slovensko, Műller-Transporte, Geodis Slovensko, Autuori Group Logistics, Express Group, Tirex, Prapol, CCS – Cargo Customs Service, Arcese Slovensko, Kuehne + Nagel, ČSAD Invest Logistics, cargo-partner SR, MO Slovakia, and Budamar Logistics). Other are located in Senec (Galliker Slovakia, Raben Logistics Slovakia, Nagel Slovensko), Lozorno (Dachser Slovakia), Pezinok (Hopi SK), Rohožník (TransPlus), Trnava (Trnavská NAD), Senica (NAD – RESS), Nitra (NAD Nitra), Nové Zámky (ATO Trans, T.P.D. Transport), Levice (Almatrans, TransLog Slovakia), Sereď (Brantner Transports Slovakia), Komárno (Terravia).

Largest **river, sea and combined transport companies** are located solely in Bratislava - Slovenská plavba a prístavy, Slovfracht Slovakia, Kuehne + Nagel, Express Slovakia, Cargo Partner SR, ABC European Air & Sea Cargo Distribution SR, Lindbergh, Frans Maas Slovakia, and M&G Group, Bratislava (ETREND 2020).

Public passenger railway transport is provided by national carrier Železničná spoločnosť (The Railway Company, main and regional lines throughout the region), ARRIVA EXPRESS (line from Nitra to Prague), and

RegioJet (Bratislava – Dunajská Streda – Komárno). **Public passenger bus transport** is provided by 4 companies in Bratislava Region (Dopravný podnik Bratislava, Slovak Lines, Bratislavská integrovaná doprava, Integrovaný dopravný system Bratislavského kraja), 3 companies in Trnava Region (ARRIVA, SKAND, SAD Dunajská Streda), and 2 in Nitra Region (ARRIVA Nitra and ARRIVA Nové Zámky). Express and international transport is provided by several companies including Slovak Lines, RegioJet, and Flixbus.

1.3.5. Industrial production, major floater (origin) and destination points

Industrial production in the Bratislava Region is one of the important factors ensuring economic performance not only within the metropolitan region, but also at the supranational level. The key industrial plant in the territory is Volkswagen Slovakia, which is located in Devínska Nová Ves, part Bratislava. It is the largest company in Slovakia. The company´s production activity belongs to the branch of the engineering industry, the automotive industry. The operation of the plant is supported by an extensive network of subcontractors, which are mainly concentrated in the locality of Záhorie (north of Bratislava). Major actors of industrial production were described already in the previous chapter.

Automotive industry is represented mainly by three large car factories:

- **Volkswagen in Bratislava**
- **PSA Group in Trnava**
- **Jaguar Land Rover in Nitra**

Several subcontractors and local companies are located in Bratislava (SAS Automotive, Faurecia Automotive, Adient Slovakia, Rehau), Lozorno (HBPO, Inteva Products Slovakia, Plastic Omnium, IAC Group), Malacky (Benteler Automotive), Trnava (ZF Slovakia, Boge Ellastmetall Slovakia), Senica (ArcelorMittal Gonvarri SSC Slovakia), Vráble (Matador Automotive Vráble, Kongsberg Automotive). Other machine industry is localised in Senec (Tomra Sorting), Skalica (Vaillant Industrial Slovakia, Protherm Production), Trnava (ŽOS), and Dunajská Streda (Schindler).

Major producer of **building material** in Slovakia is located in Rohožník (CRH). Other important plants are then concentrated in Bratislava (Saint-Gobain Construction Products, Baumit, Zapa beton SK) and Lužianky (GU Slovensko) at Nitra.

Major **producers of chemical** and pharmaceutical industry are in Bratislava (Slovnaft, BASF), Leopoldov (Enviral, Meroco), Šaľa (Duslo), Lozorno (Plastic Omnium), Levice (de Miclén).

Major producers of **electro-technical industry** are in Bratislava (Prysmian Kablo), Galanta (Samsung), Zavar (Datalogic), Vrbové (Semikron), Nitra (Foxconn), and Nové Zámky (Osram).

Food-processing industry is represented by companies in Bratislava (Rajo, I.D.C Holding), Leopoldov (Poľnoservis), and Hurbanovo (Heineken).

From other fields metallurgy is present in Senica (ArcelorMittal Gonvarri SSC Slovakia), extractive industry by Nafta Bratislava, shoe manufacturing industry in Komárno (Rieker Obuv).

Largest **energetics companies** are situated in Bratislava (Slovenské elektrárne, Slovenský plynárenský priemysel, OKTE, ZSE Energia, Západoslovenská distribučná, Eustream, SPP – distribúcia, Slov. elektrizačná prenosová sústava, ČEZ Slovensko, LE Trading, Innogy Slovensko, Pow-en, Vodohospodárska výstavba, Slovakia Energy, Bratislavská vodárenská spoločnosť, and Energie2), Piešťany (Magna Energia) and Nitra (Energy Trading Company).

1.3.6. Agriculture production, food processing

Favourable soil-climatic conditions rank the Southwest Slovak part of the area - defined by the Bratislava, Trnava and Nitra regions - to the regions with the highest agricultural potential in Slovakia. The lowland character of the area and the higher proportion of irrigation make it a natural prerequisite for intensive crop production in almost the entire area under investigation, which is one of the highly productive agricultural areas in Slovakia. Climatic and soil conditions allow the cultivation of warm-requiring crops. The area has sufficient quality and quantity of feed for cattle and quantity of grain feed (feedstuff for pigs and poultry). In the Trnava and Nitra regions the area of agricultural land reaches about 70% of the total area, while in the Bratislava region it is 43%.

Table. Percentage of selected types of agricultural land from total area of regions

Region	agricultural land (%)			arable land (%)			vineyards (%)		
	1999	2009	2019	1999	2009	2019	1999	2009	2019
Bratislava	46.78	45.21	43.81	37.49	35.75	34.78	2.39	2.21	2.12
Trnava	71.01	70.05	69.36	63.82	62.86	62.22	1.04	1.02	0.99
Nitra	74.07	73.74	73.18	64.30	64.01	63.83	1.94	1.91	1.80
total	68.59	67.85	67.11	59.75	59.01	58.55	1.72	1.66	1.59

Source: SOSR (2020)

According to the land registry data (cadastre), several categories of land types - arable land, hops, vineyards, garden, orchard and permanent grassland - fall into the agricultural land. The category of arable land is significantly represented in the Trnava and Nitra regions where it accounts for more than 60% of the total land area. According to the above data, from the point of view of food security and self-sufficiency, the negative phenomenon is the loss of agricultural land, but also the loss of arable land, which is the significant part of it. In case of wine production, it is important to preserve the vineyard areas in each of the regions as it they are also gradually decreasing. Vineyard areas are under the greatest pressure especially in the Bratislava region, where they are urbanized.

In the area of crop production, the most represented are densely sown grains and cereals, oilseeds, sugar beet, potatoes and fodder crops on arable land. Wheat and barley are dominant in cereals. Cereals for farmers are high-yielding crops with the lowest cost. As part of crop rotation, the growing areas of oilseeds are growing, especially sunflowers and oilseed rape.

Table: Hectare yields of selected crops in tonnes per hectare

Region	grains			cereals			oilseeds		
	1999	2009	2018	1999	2009	2018	1999	2009	2018
Bratislava	4.10	4.32	5.06	4.18	4.37	5.12	1.81	2.26	2.60
Trnava	4.86	4.98	5.84	5.00	5.01	5.88	2.11	2.42	3.05
Nitra	4.48	4.66	6.17	4.60	4.69	6.23	1.68	2.30	3.12
total	3.78	4.30	5.38	3.86	4.33	5.43	1.67	2.23	2.83
Region	**potatoes**			**sugar beet**			**multiannual fodder**		
	1999	2009	2018	1999	2009	2018	1999	2009	2018
Bratislava	21.78	30.12	34.96	44.01	55.39	58.11	8.33	3.39	2.98
Trnava	17.02	24.45	28.80	44.23	58.77	59.45	8.30	6.50	6.40
Nitra	19.16	21.38	20.27	42.83	55.08	61.12	7.86	7.05	6.20
total	14.33	18.60	21.90	40.77	56.34	59.88	5.75	4.27	4.36

Source: SOSR (2020)

Development, production orientation and intensity of crop production directly influence the development of animal production. Livestock breeding results can only be expected with sufficient quality and quantity of feed for cattle and grain feed (hard fodder) - feedstuff for pigs and poultry.

The basic structure of livestock production consists of cattle, pigs, poultry and, to a lesser extent, sheep. Non-traditional breeds are not excluded, but their possible establishment is of local importance only.

Table: Livestock numbers

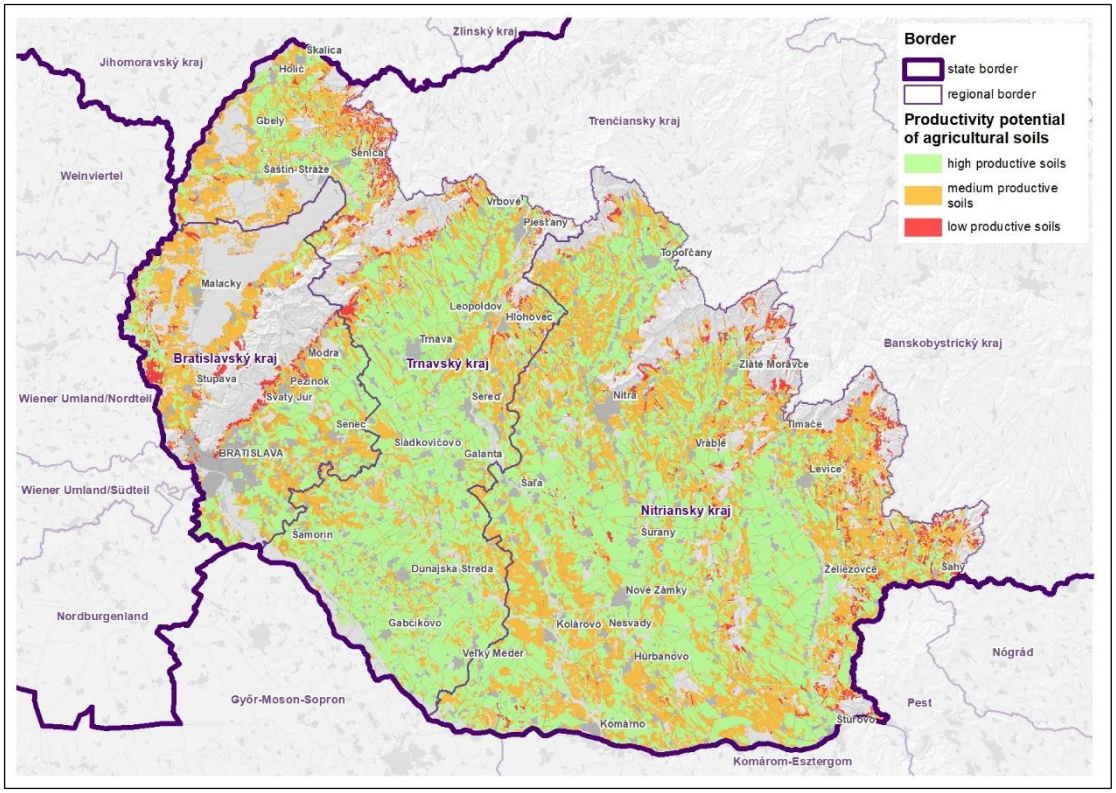
Region	cattle		pigs		sheep		poultry	
	2012	2018	2012	2018	2012	2018	2012	2018
Bratislava	13,616	13,666	217,36	27,888	835	1,270	867,415	1,096,068
Trnava	76,939	56,518	211,350	235,752	2,682	2,674	1,399,638	1,548,506
Nitra	66,502	54,344	147,705	152,009	10,832	9,109	3,010,906	3,937,456
total	471,091	438,855	631,464	627,022	409,569	35,1122	11,849,818	14,056,914

Source: SOSR (2020)

Given the significant impact of agriculture on ecological stability and the self-regulatory ability of ecosystems, it is essential to ensure the greening of farming in the country. In the area of organic agricultural production, Act No. 189/2009 Z. z. on organic agricultural production.

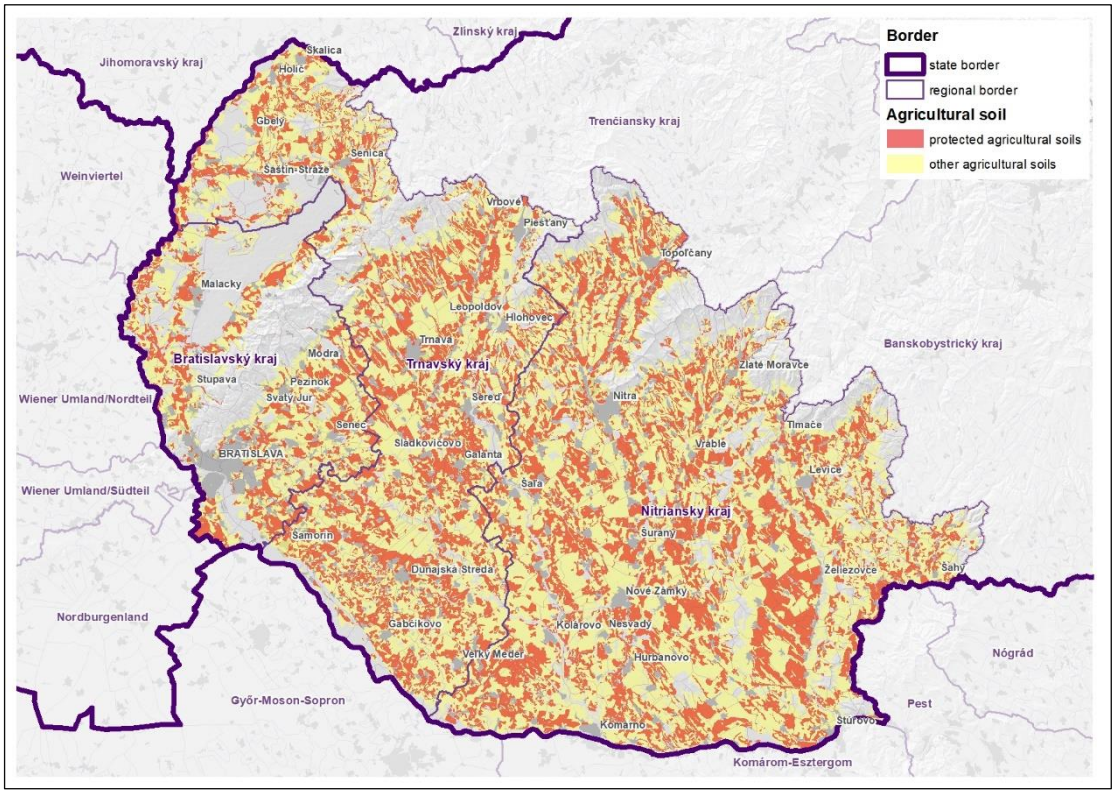
As of the development of transport equipment, it should be noted that agriculture can be a limiting phenomenon in the implementation of transport infrastructure and logistics. Soils of high production quality are represented in the area, the protection of which is ensured by the protection of the highest quality agricultural land in the cadastral territory according to the code of **farmland classification units** (BPEJ), which is given in Annex no. 2 to Government Order no. 58/2013 Z.z. on levies on the removal and unauthorized seizure of agricultural land.

Figure. Spatial arrangement according to the quality of agricultural land



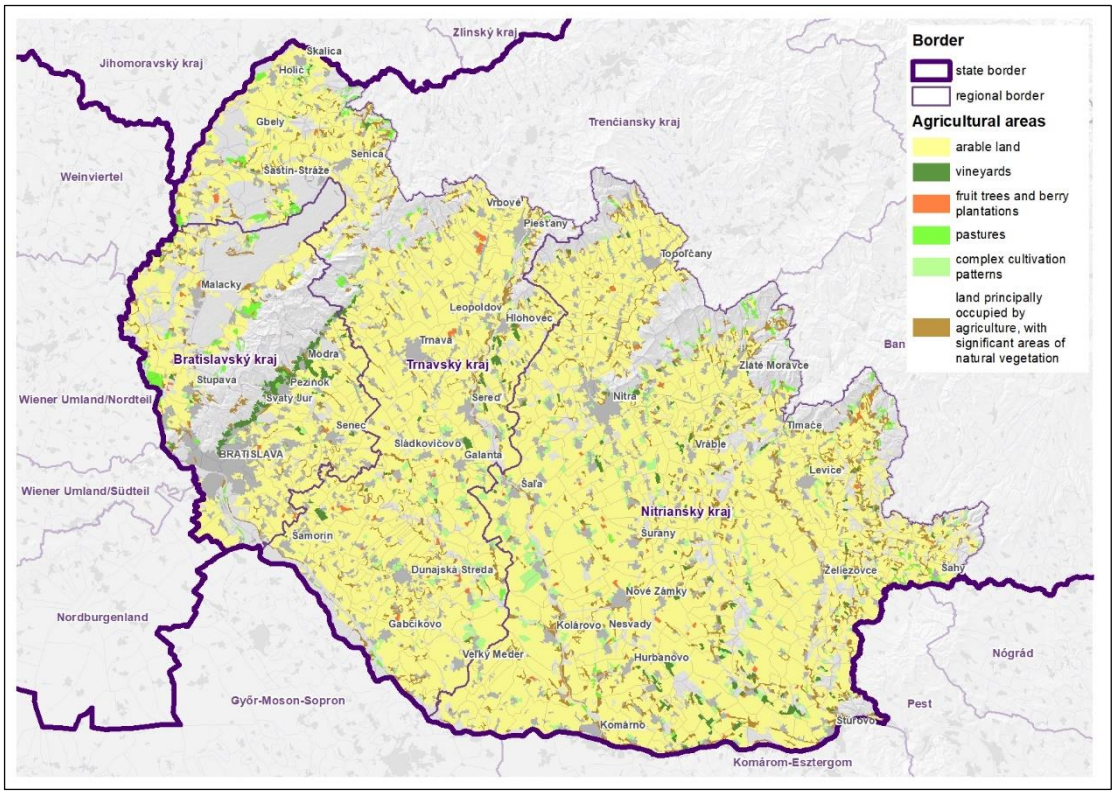
Source: IPP, NASES (2020)

Figure. Spatial delimitation of protected agricultural land according to valid legislation



Source: IPP, NASES (2020)

Figure. Spatial arrangement of agriculturally used areas

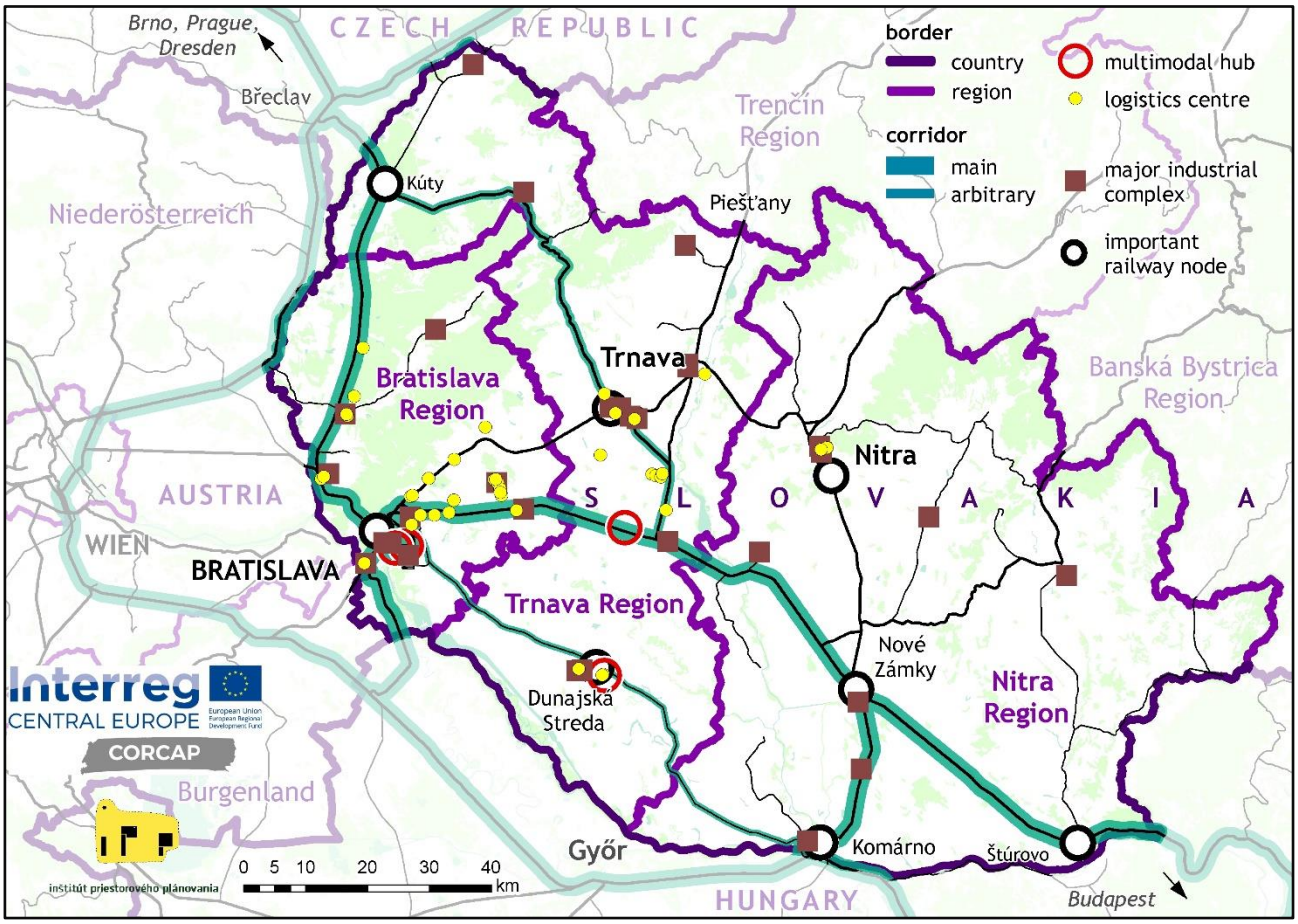


Source: IPP, COPERNICUS (2020)

1.3.7. Logistic, storage and distribution points

In Slovakia most of the logistic, storage and distribution points are located in Southwest Slovakia, mainly in the Bratislava – Trnava – Nitra agglomeration. Here they are mostly localised along the most important road and railway corridors.

Figure. Logistics centres, multimodal hubs and major industrial complexes in Southwest Slovakia



Source: IPP, ETREND (2020), https://ipp-oz.sk/corcap

1.4. Presentation of freight characteristics

1.4.1. Partners (market actors)

Intermodal transport companies

The most important company engaged in intermodal transport in Slovakia is **METRANS** (Danubia), a.s. (joint stock company), which operates as a combined transport operator at the Dunajská Streda terminal, Haniska near Košice and the TIP terminal Žilina - Teplička.

An important company operating in Slovakia is also **Rail Cargo Operator**, which operates as a combined transport operator at terminals in Bratislava - ÚNS, Žilina and Košice.

The container terminal in Bratislava - Pálenisko in Bratislava is operated by **Slovenské plavby a prístavy** (**SPaP**, a. s. - Slovak Cruises and Ports, joint stock company).

The company **GREEN Integrated Logistics** (Slovakia), s.r.o. (Ltd.), is the operator of a container transhipment terminal in Sládkovičovo.

Railway transport companies are shown in table below.

Table. Companies operating in the area of interest

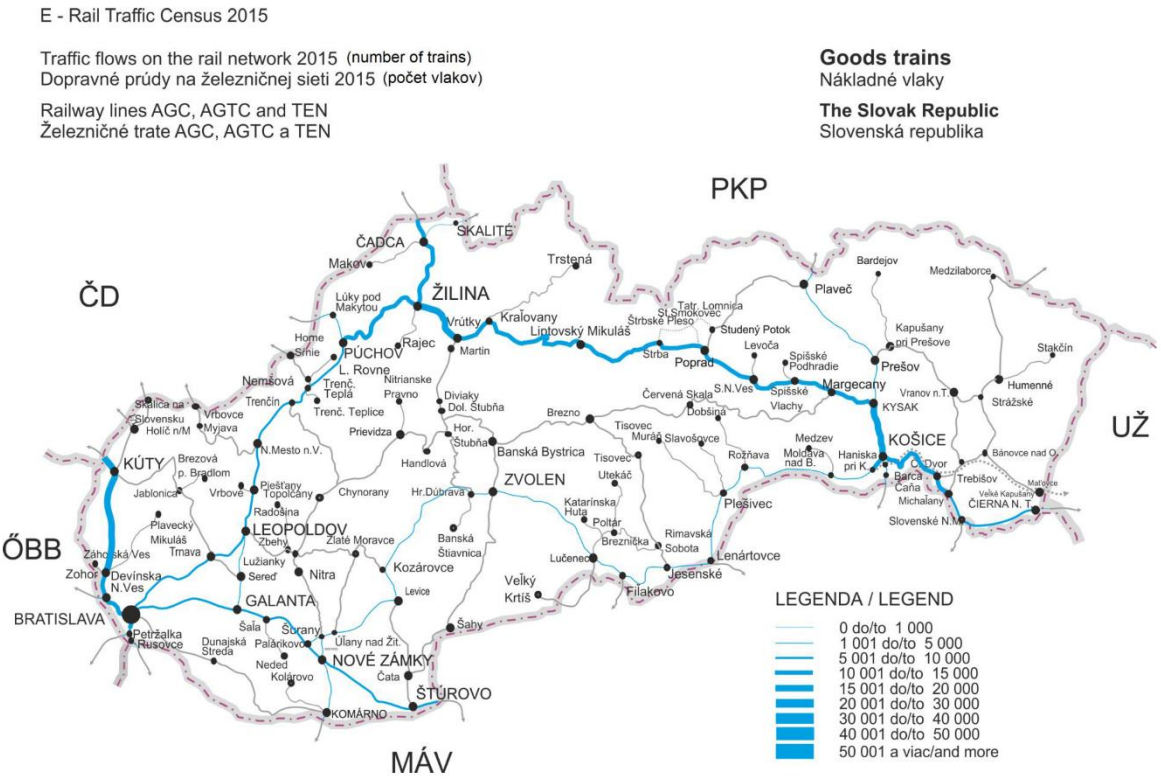
Intermodal transport companies		Railway transport companies	
METRANS	METRANS	ŽELEZNIČNÁ SPOLOČNOSŤ SLOVENSKO	Slovak Railway Company
Rail Cargo Group Member of ÖBB	Rail Cargo Operator	ŽSR	Slovak Railway Company
Slovenská plavba a prístavy a.s.	Slovenská plavby a prístavy	ZSSK CARGO	ZSSK Cargo
GREEN	GREEN Integrated Logistics	REGIOJET STUDENT AGENCY	RegioJet

Source: web pages of particular company

1.4.2. Current major directions

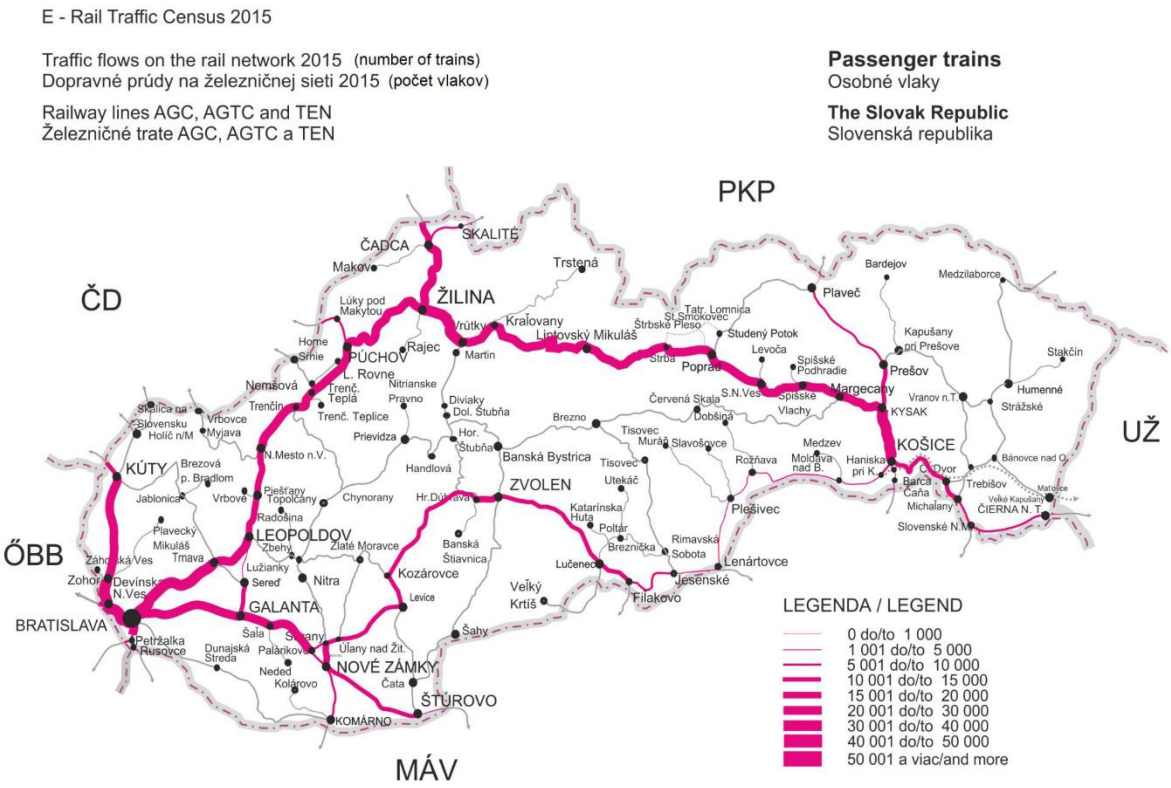
Following figures show the traffic flows of freight and passenger rail network.

Figure. Traffic flows of freight trains on the Slovak rail network in 2015



In the territory of Bratislava Region, the most heavily loaded line with freight trains is Bratislava - Kúty. The heaviest loaded line with passenger rail trains is Bratislava – Trnava, followed by Bratislava – Kúty and Bratislava – Šurany.

Figure. Traffic flows of passenger trains on the Slovak rail network in 2015



1.4.3. Dimensions of the freight traffic

At the supranational level freight transport is dependent primarily on the state of international relations between individual states. Their positive condition is a prerequisite for the dynamic growth of international trade, expressed by import and export values, flows of goods and commodities. In most cases, the choice of transport mode depends on the section on which the commodity is transported. It is also influenced by the quality of transport and its price.

In 2018 229,413 mil. tonnes of goods have been transported. This volume represented an increase of 1.3% compared to 2017.

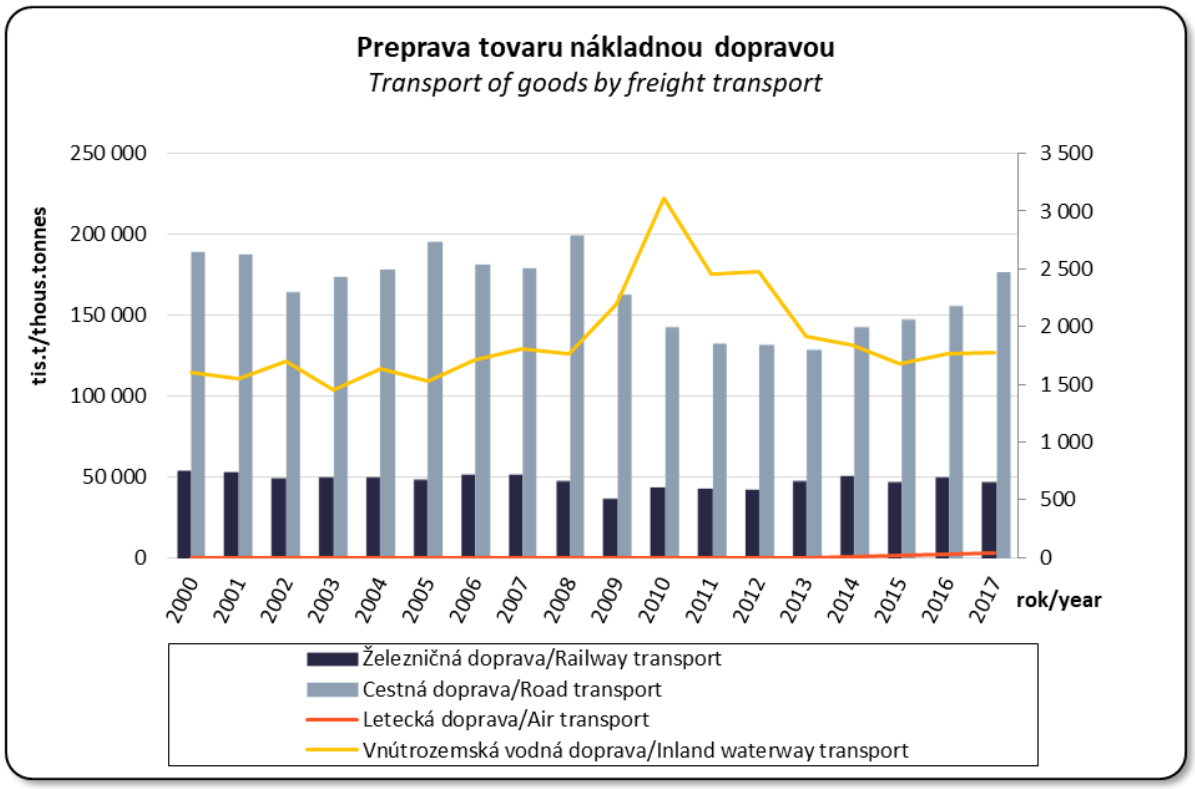
The development of the quantity of goods transported in the previous period is shown in the following tables and graphs. Overall, since the financial crisis in 2008, which caused a significant drop in the quantity of goods transported, there has been an increase in the quantity of goods transported, which is slowly approaching the pre-crisis situation.

Table. Transport of goods by type of transport

	1995	2000	2005	2010	2015	2016	2017
Total transport of goods (1,000 tonnes)	***266,356***	***244,686***	***246,241***	***190,507***	***196,340***	***208,804***	***226,403***
rail transport	60,776	54,177	49,310	44,327	47,358	50,727	47,790
road transport	203,918	188,901	195,405	143,071	147,275	156,279	176,790
inland waterway transport	1,661	1,607	1,526	3,109	1,683	1,769	1,780
air transport	1.3	0.7	0.2	0.01	24.1	28.6	42.8

Source: MDV SR (2020a); Note: railway transport total since 2004 including non-public transport and transport operated under licenses

Figure. Transport of goods using freight transport



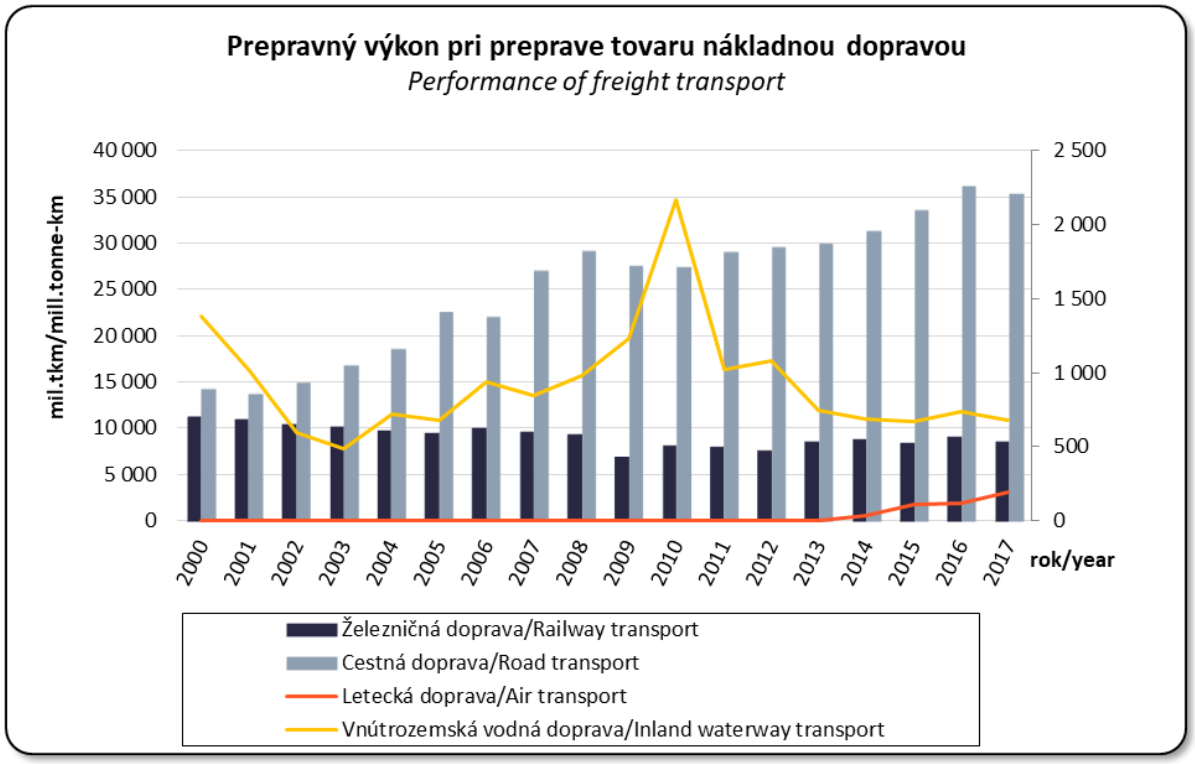
Source: MDV SR (2020a)

Table. Performance of freight transport by type of transport

	1995	2000	2005	2010	2015	2016	2017
Performance of freight transport in total (mill. tonne-km)	***41,680***	***26,957***	***32,694***	***37,682***	***42,745***	***46,075***	***44,724***
rail transport	13,674	11,234	9,463	8,105	8,439	9,111	8,486
road transport	26,536	14,340	22,550	27,411	33,525	36,106	35,362
inland waterway transport	1,468	1,383	680	2,166	674	740	679
air transport	1.8	0.2	0.8	0.01	106.8	118.0	197.1

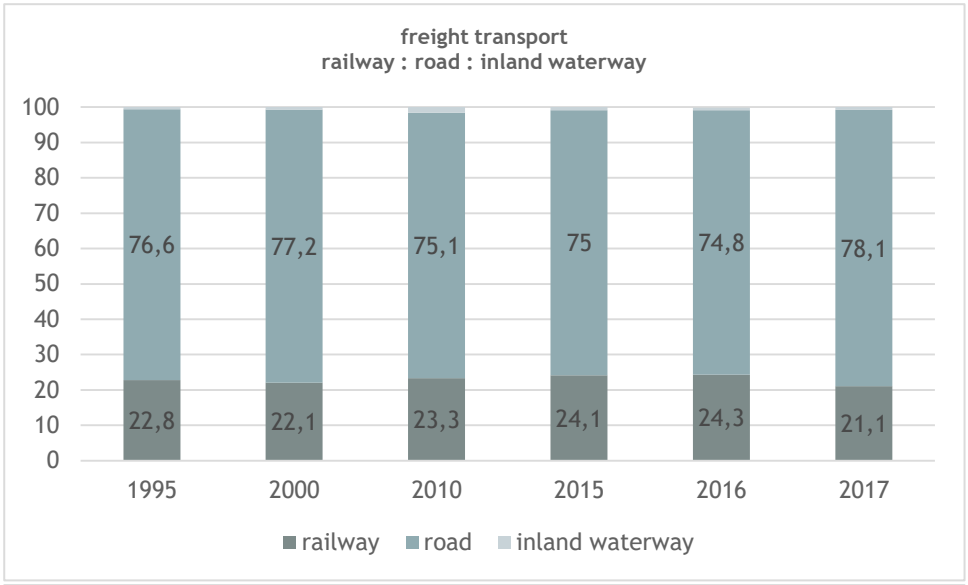
Source: MDV SR (2020a); Note: railway transport total since 2004 including non-public transport and transport operated under licenses

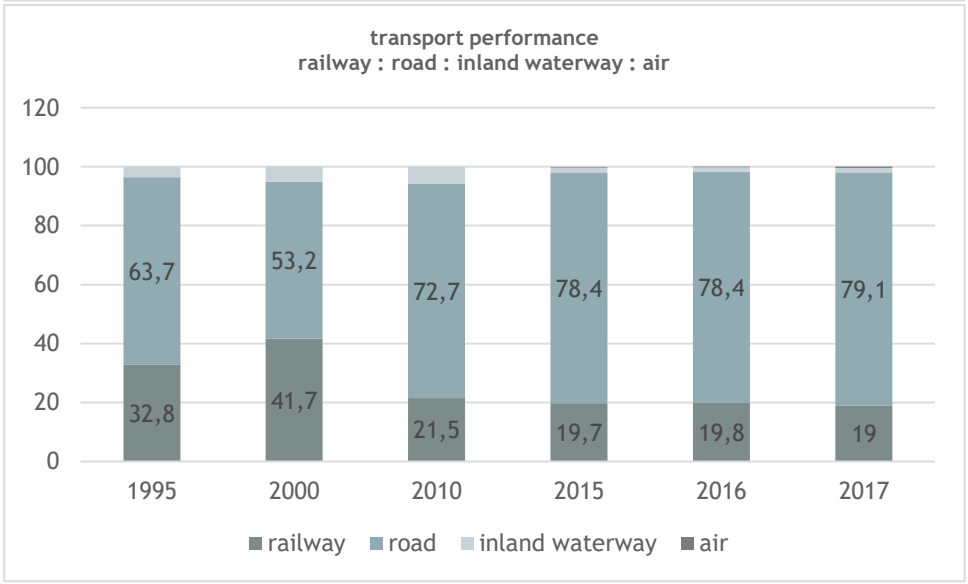
Figure. Performance of freight transport



Source: MDV SR (2020a)

Figure. Modal split of transport performance in %

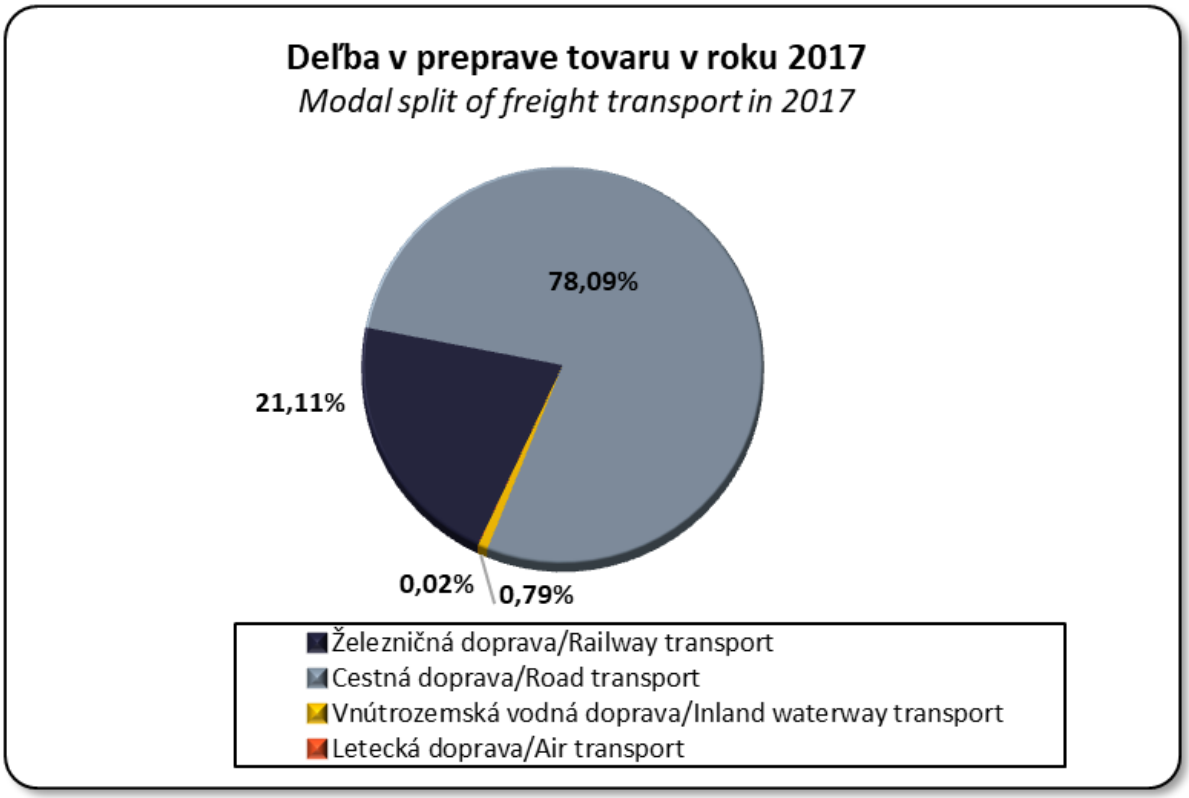




Source: MDV SR (2020a)

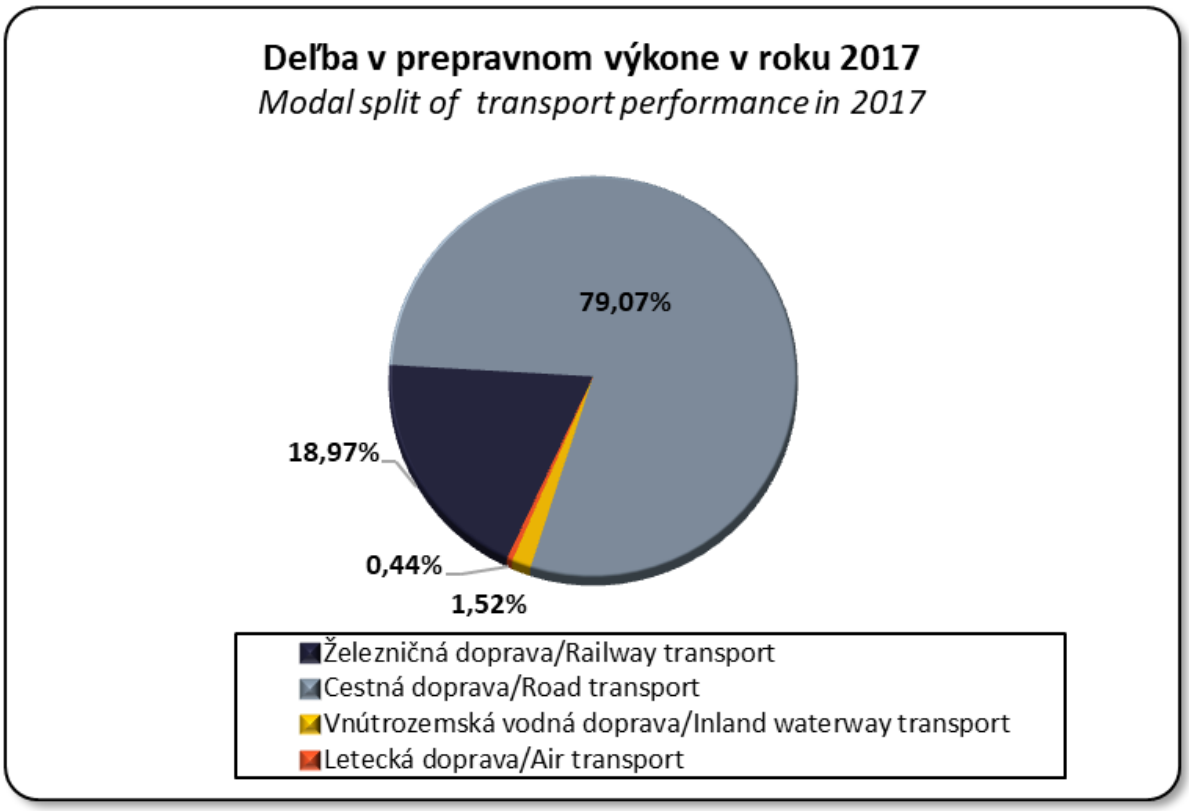
Based on the modal split of freight transport, road transport clearly dominates, transporting more than 3/4 of all goods.

Figure. Modal split of freight transport in 2017



Source: MDV SR (2020a)

Figure. Modal split of transport performance in 2017



Source: MDV SR (2020a)

From the average transport distance of freight transport the point of view, it has been possible to observe a slight decrease in rail and inland waterway transport in recent years.

Table. Average transport distance of freight transport

Indicator	2015	2016	2017
Railway transport	178,2	179,6	177,6
Transport of goods by road (for hire or reward and own account)	227,6	231,0	200,0
Road public transport	363,5	336,3	322,3
Inland waterway transport	400,5	418,3	381,5

Source: SOSR (2018)

Road freight transport

Road freight transport is the most used transport of goods in Slovakia. In 2018 177.2 mil. tonnes of cargo were transported, which represented an increase of 0.24% compared to 2017.

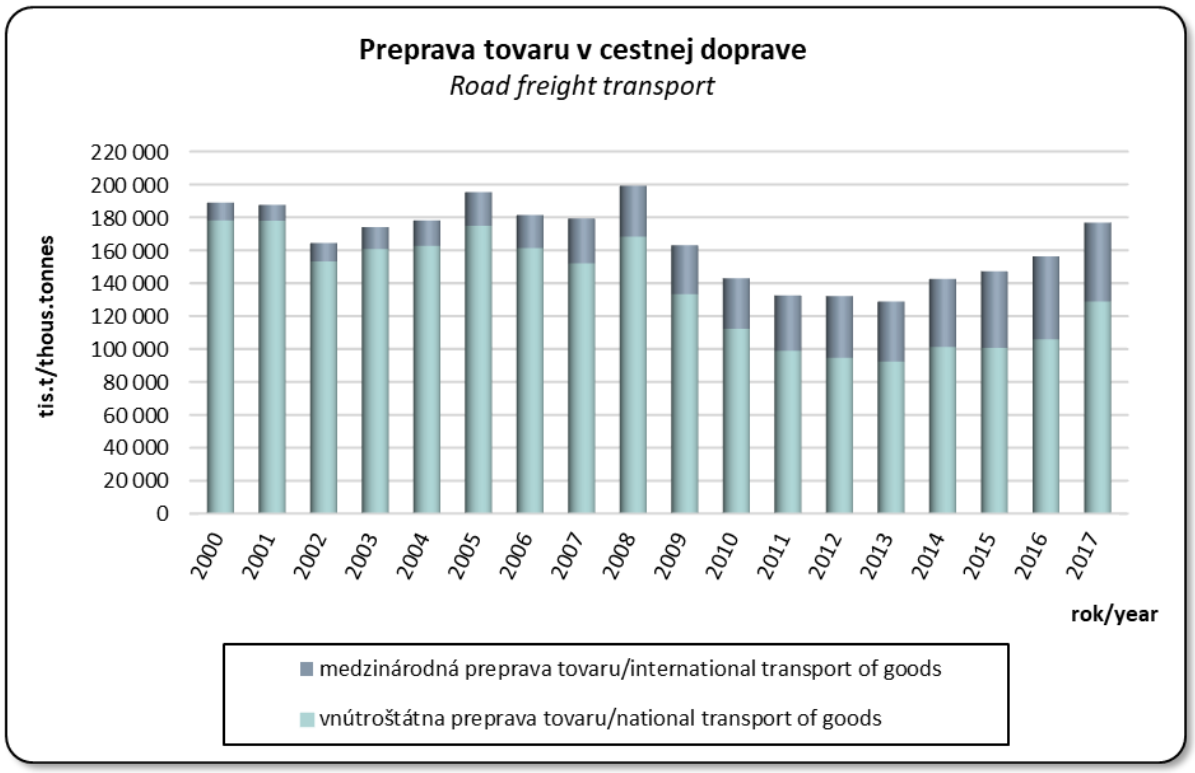
The overall performance of road freight transport has been increasing since 2013, which is also documented by the development of the quantity of goods transported in the following table.

Table. Transport of goods using road freight transport

		1995	2000	2005	2010	2015	2016	2017
Transport of goods in total (1,000 tonnes)		***203,918***	***188,901***	***195,405***	***143,071***	***147,275***	***156,279***	***176,790***
international transport total		N/A	10,697	20,494	30,866	46,581	50,432	47,951
of which	import	N/A	3,345	6,528	8,207	9,958	11,474	11 168
	export	N/A	5,165	8,773	10,300	12,506	12,671	12 496
	cross trade transport and international cabotage	N/A	2,187	5,193	12,359	24,117	26,287	24 287
domestic transport		N/A	N/A	174,911	112,205	100,694	105,847	128,839

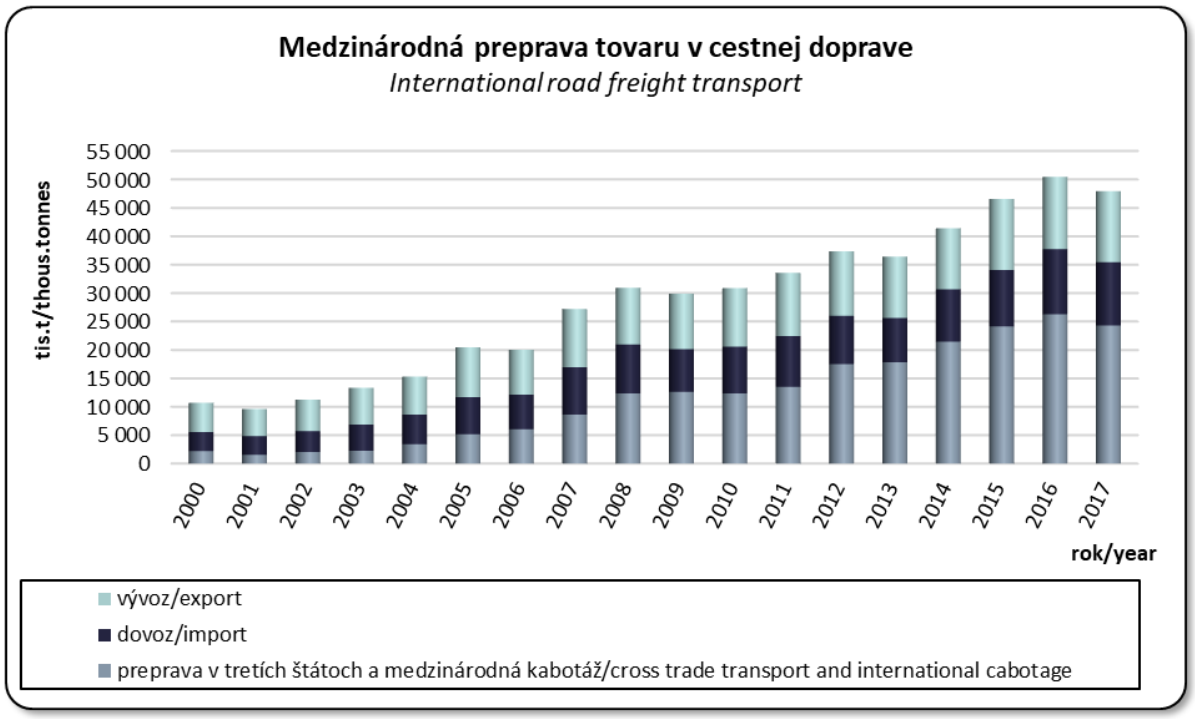
Source: MDV SR (2020a)

Figure. Road freight transport



Source: MDV SR (2020a)

Figure. International road freight transport



Source: MDV SR (2020a)

Domestic road freight transport

The volume of domestic road freight transport in 2017 reached 128.84 mil. tonnes, which represented 72.9% of the total volume of road freight transport.

The highest volumes of commodities in 2017 were metal ores and other raw materials (57.1 million tonnes), agricultural products (11.2 million tonnes) and food products, beverages and tobacco (11.1 million tonnes).

Regarding domestic transport of goods by transport distances, most goods were transported over distances up to 49 km.

Table. Domestic transport of goods by transport distances in 1,000 tonnes

indicator	2015	2016	2017
transport of goods in total in 2015	100,694	105,847	128,839
0 - 49 km	67,456	69,320	88,172
50 - 149 km	22,321	24,926	28,021
150 - 499 km	10,645	11,383	12,277
more than 500 km	272,000	218,000	69,000

International road freight transport

The volume of international road freight transport in 2018 reached 26.98 mil. tonnes, which represented 15.2% of the total volume of road freight transport.

Volume of transport by commodity group

In general, the Slovak Republic has been exporting rather than importing by road freight transport in the long term.

Table. Transport of goods in 1,000 tonnes

	2015	**2016**	**2017**
import	9,958	11,474	11,168
export	12,506	12,671	12,496
total	22,464	24,145	23,664

Source: Hamanová - Pálinkásová - Žužič (2019)

In terms of commodities, the highest volumes of goods were **imported** in the year 2017. The commodities mostly comprised base metals and metal products (1.62 million tonnes), metal ores and other mineral resources (1.47 million tonnes) and transport facilities (1.16 million tonnes).

In terms of **exports** the highest volume of goods was recorded for basic metals and metal products (2.45 million tonnes), agricultural products (1.66 million tonnes) and transport equipment (1.46 million t).

In view of the objective of shifting the maximum of goods from road freight to combined transport, the target groups of goods are goods transported by international road transport and goods transported in general by domestic transport over distances of 200 km.

Railway freight transport

Railway freight transport is the second most used transport of goods in Slovakia. Freight rail transport in is fully liberalized and not subsidized by the state. The most important carrier is the state railway company Železničná spoločnosť Cargo Slovakia (ZSSK CARGO, a joint stock company). A few other carriers also operate on the market. In most of its operations, ZSSK CARGO is focused on the metallurgical segment (i.e. the iron ore, coal and metals). In 2018, 50.93 tonnes of freight were transported by rail freight, which represents an increase of 6.57% compared to 2017.

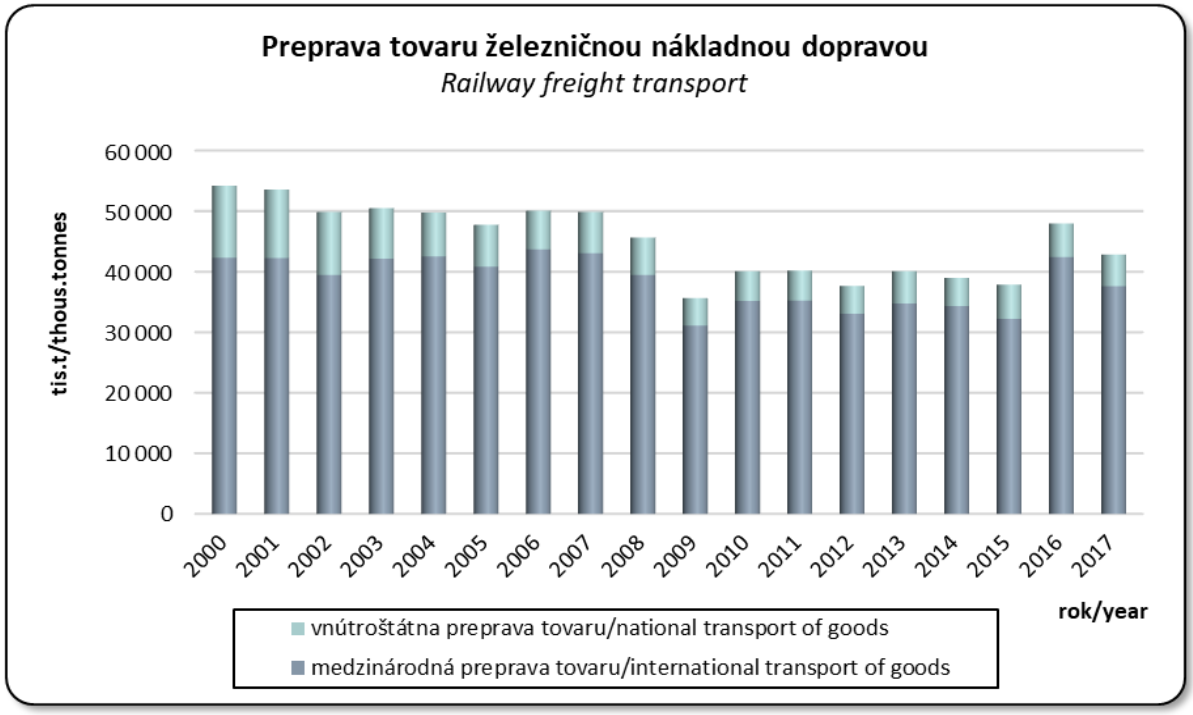
The overall performance of railway freight transport has been gradually increasing since 2012, as documented in the following table.

Table. Transport of goods by rail freight

		1995	2000	2005	2010	2015	2016	2017
Transport of goods total (1,000 tonnes)		***60,776***	***54,177***	***49,310***	***44,327***	***47,358***	***50,727***	***47,790***
of which transport of goods by operators of transport with the number of employees 20 and more								
Transport of goods total (1,000 tonnes)		***60,776***	***54,177***	***47,745***	***40,100***	***37,841***	***47,982***	***42,846***
international transport total		43,956	42,300	40,841	35,175	32,202	42,419	37,601
of which	import	21,184	18,525	17,825	16,346	14,218	16,440	16 736
	export	16,863	14,749	11,686	9,634	9,358	12,694	11 912
	transit	5,909	9,026	11,330	9,195	8,626	13,285	8 953
domestic transport		16,820	11,877	6,904	4,925	5,639	5,563	5,245

Source: MDV SR (2020a); Note: railway transport total since 2004 including non-public transport and transport operated under licenses

Figure. Railway freight transport



Source: MDV SR (2020a)

In 2017 the volume of transport reached 47.790 mil. tonnes, of which the transport carried out by enterprises with more than 20 employees, totalled 42.846 mil. tonnes, of which international transport accounted for 37.601 mil. tonnes (87.76%) and national 5.245 mil. tonnes (12.24%). In international transport, imports were 44.51% (16.736 mil. tonnes), exports 31.68% (11.912 mil. tonnes) and transit amounted to 23.81% (8.953 mil. tonnes).

International transport accounted for the largest share of rail freight transport. The trend in the development of the volume of international rail freight traffic is therefore decisive for the overall trend of rail freight development.

In terms of the intention to increase the share of combined transport in the carriage of goods, the volumes of rail freight, together with passenger rail capacity, are decisive for the capacity of railway lines that could be used for the development of combined transport. Given the considerably lower costs of rail transport compared to combined transport, there is no presumption of shifting goods from rail to combined transport.

Water freight transport

Freight water transport is used very little in comparison with road and rail transport. According to the Statistical Office of the Slovak Republic in 2017, 1.78 mil. tonnes of cargo were transported using water transport. This represented 0.79% of the total transport volume. In 2018 it was 1.23 mil. tonnes.

Inland waterway freight transport in Slovakia is currently carried out on the waterways of the Danube river (European waterway of international importance) and Váh (national waterway of international importance and the Danube tributary). The length of navigable waterways within the country has been constant since 2000 and has been 250.85 km long. These include the navigable Danube in the length of 172.0 km, the Váh in the length of 78.85 km and artificial canals in the length of 38.45 km. However, inland waterway freight transport is insignificant in terms of the total quantity of goods transported.

Public ports in Slovakia are located on the Danube waterway in Bratislava and Komárno (Nitra Region). The location of the ports is given historically. In these ports, a service, transhipment, storage and partly also a distribution service is provided.

According to the AGN Europe Agreement, the nomenclature of Slovak inland ports of international importance is as follows:

- P 80 - 38 Bratislava (Danube, 1 867.0 km)
- P 80 - 40 Komárno (Danube, 1 767.1 km)

The largest Slovak carrier operating water freight transport is the company Slovenská plavba a prístavy, (Slovak Sailing and Ports, joint stock company). This company deals with sailing and port services in the ports of Bratislava and Komárno.

The following table documents the quantities of goods transported by inland waterway freight.

Table. Quantities of goods transported by inland waterway freight

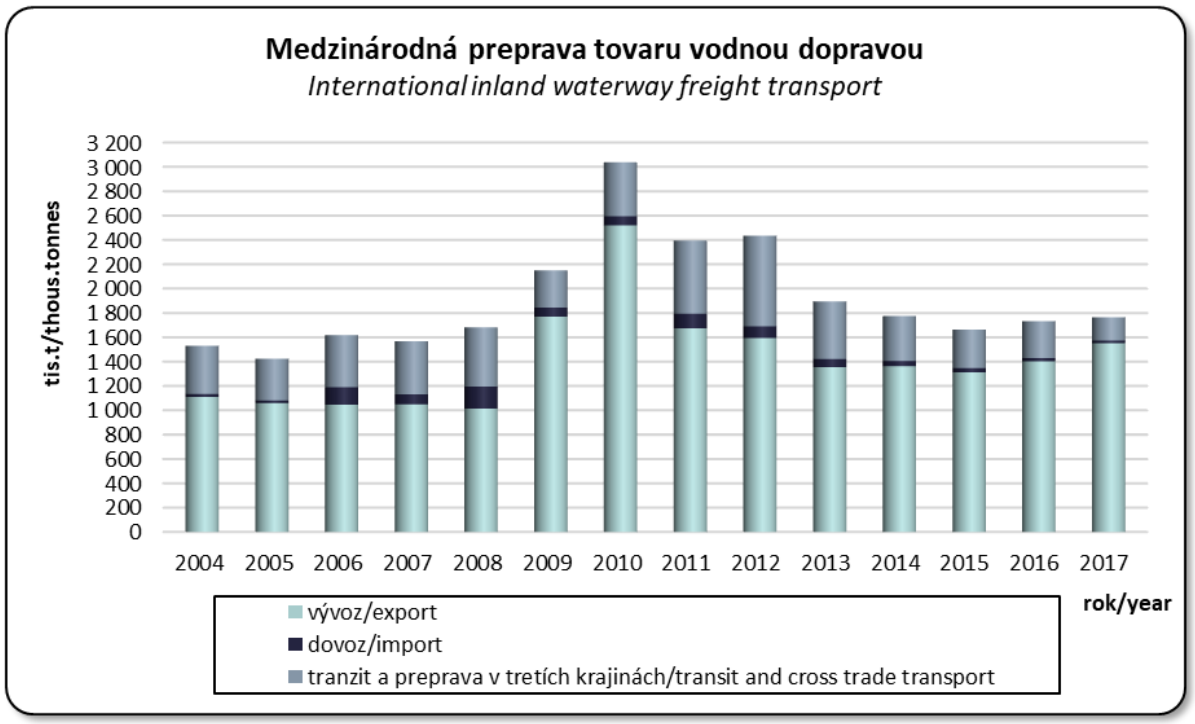
		1995	2000	2005	2010	2015	2016	2017
Total transport of goods (1,000 tonnes)		***1,661***	***1,607***	***1,526***	***3,109***	***1,683***	***1,769***	***1,780***
international transport total		N/A	N/A	1,425	3,038	1,664	1,733	1,765
thereof	import	N/A	N/A	23	73	34	27	21
	export	N/A	N/A	1,059	2,521	1,313	1,402	1 551
	transit and cross trade transport	N/A	N/A	343	444	317	304	193
domestic transport		N/A	N/A	N/A	71	19	36	15

Source: MDV SR (2020a); Note: railway transport total since 2004 including non-public transport and transport operated under licenses

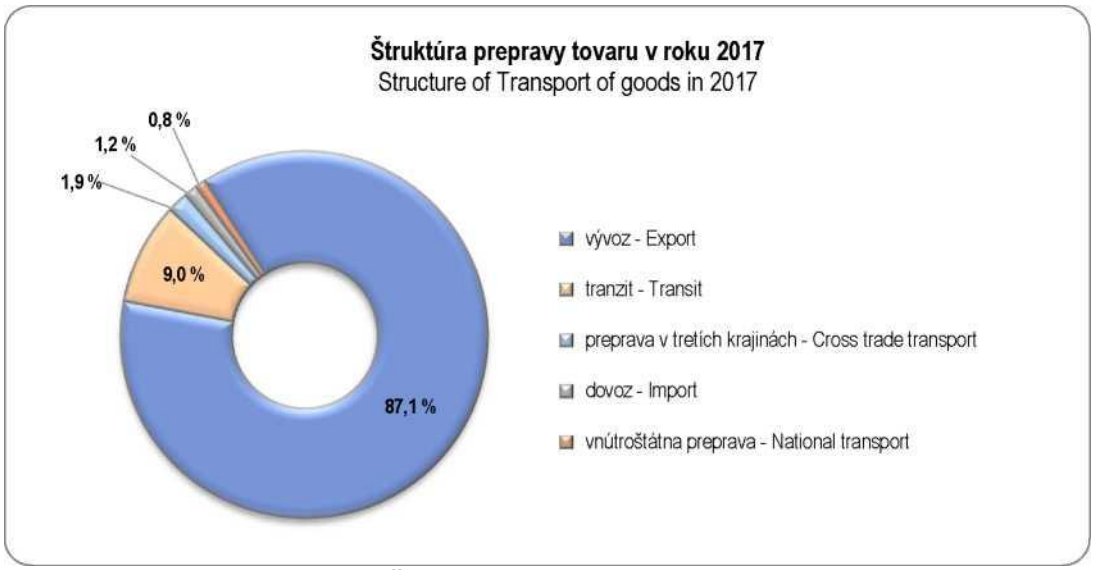
Figure. Inland waterway freight transport

Source: MDV SR (2020a)

Figure. International inland waterway freight transport



Source: MDV SR (2020a)



Source: Hamanová - Pálinkásová - Žužič, M. (2019)

Water freight transport is clearly export-oriented, accounting for 87.1% of the total goods transported.

For the combined transport, the use of inland waterway transport in Slovakia is currently insignificant. Any future development is limited by the speed of transport. The current problem of inland waterway transport is becoming the climate change, causing more frequent restrictions on the navigability of flows and the uncertainty about the timing of delivery.

Air freight transport

Compared to road, rail and water transport, the air freight transport is used minimally. Its advantage is the possibility of fast transport of goods but at significantly higher costs. In 2018, 30,040 tonnes of goods were transported by air freight transport.

Table. The volume of goods transported by air freight transport

	1995	2000	2005	2010	2015	2016	2017
Transport of goods total (tonnes)	***1,280***	***697***	***230***	***11***	***24,106***	***28,552***	***42,778***
international transport	417	665	230	10	24,106	28,322	42,778
international transport	863	32	0	1	0	230	0

Source: MDV SR (2020a)

The key objective of the intention to develop the combined transport is to minimize the effects of freight transport on the environment. In this respect, the share of air freight transport needs to be minimized since its negative environmental impacts are the highest among all types of transport.

Combined (Intermodal) transport

The share of combined transport in freight transport (the share of net tons) was 2.21% in 2017. The share of rail freight transport was 10.46% and the share of road freight transport was 2.83%. The long-term trend of the share of total freight transport is increasing. Between 2010 and 2017 the amount of goods transported by combined transport increased by 80%.

Table. Volume of goods transported in the intermodal transport

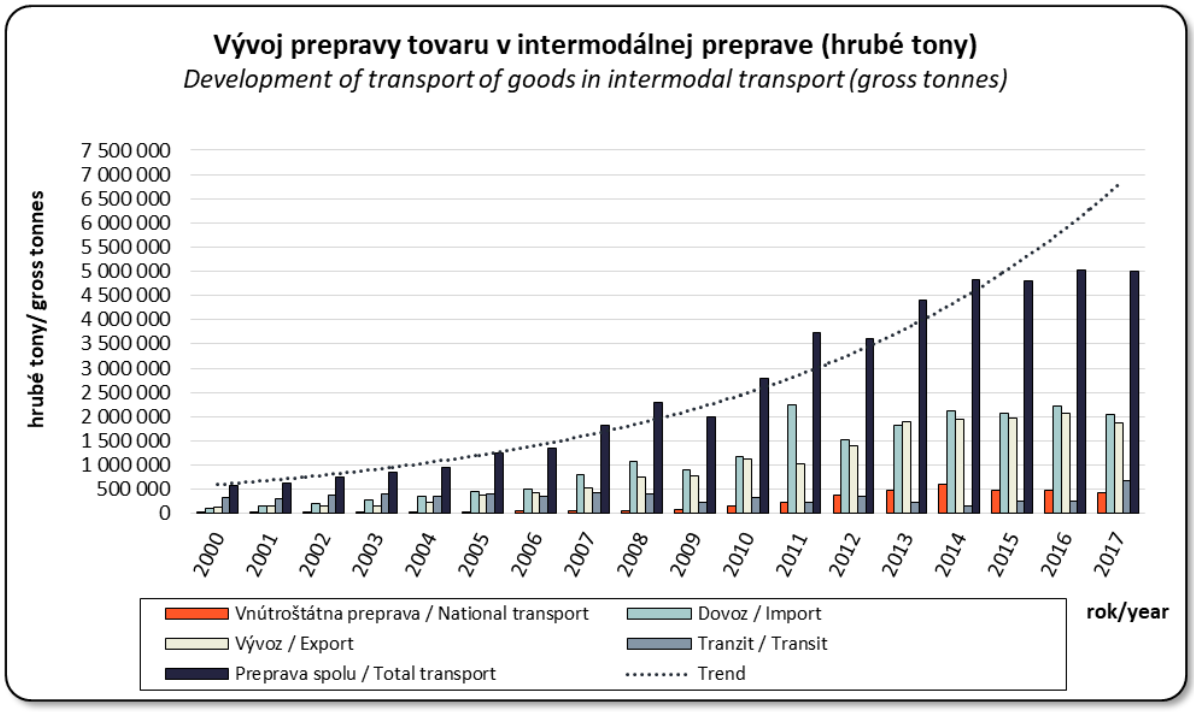
year	1995	2000	2005	2010	2015	2016	2017
Transport of goods total (tonnes)	***220,301***	***564,228***	***1,256,000***	***2,779,126***	***4,791,633***	***5,022,921***	***5,000,332***
domestic	27,880	15,892	28,000	163,024	482,370	473,680	433,338
export	77,380	116,909	388,000	1,129,479	1,980,692	2,076,067	1,862,582
import	34,353	92,924	445,000	1,162,635	2,068,072	2,224,576	2,032,631
transit	80,688	338,503	395,000	323,988	260,499	248,598	671,781

Source: MDV SR (2020a): Slovak Railways/ŽSR (until 2000), MDV SR (since 2005), state statistical survey KD (MDV SR) 2-01 (since 2015); Note: transport of intermodal transport units (containers) by railway https://www.mindop.sk

Table. Number of transported containers (combined transport)

indicator	2014	2015	2016	2017
containers ISO in total of which:	**386,221**	**371,702**	**378,109**	**386,497**
domestic	43,352	36,228	32,250	31,601
export	163,411	156,831	160,421	155,895
import	167,316	155,471	164,263	152,602
transit	12,142	23,172	21,175	46,399

Source: Hamanová - Pálinkásová - Žužič (2019)



Source: MDV SR (2020a)

Currently there are 11 terminals for combined transport in operation in Slovakia. These include the terminals in Bratislava - Pálenisko Port, Central Freight Station in Bratislava, Sládkovičovo, Dunajská Streda, Žilina, Žilina - Teplička, Ružomberok, Košice, Košice - Veľká Ida, Haniska near Košice and Dobrá near Čierna nad Tisou.

Performance of the terminals

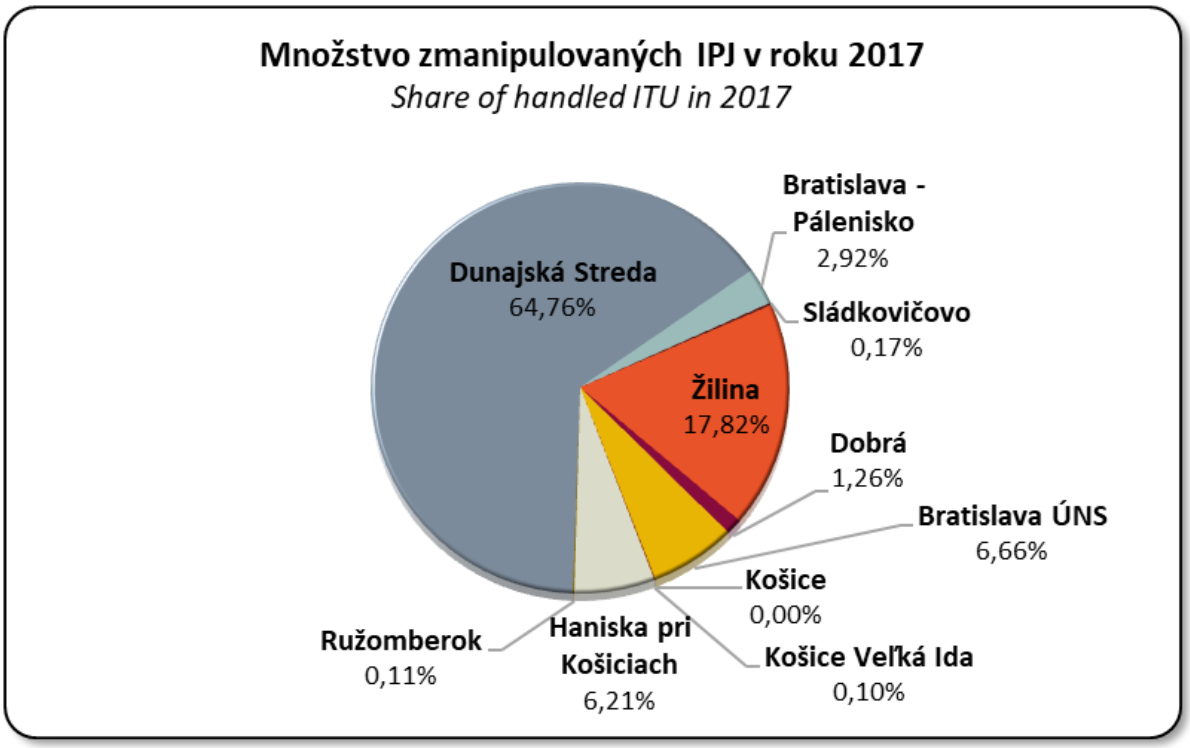
In 2017, 5 million tonnes of freight were transported by combined transport. The most significant share had the Dunajská Streda terminal (67.86%), followed by the terminal in Žilina (11.59%) and Haniska near Košice (9.3%). Other intermodal terminals accounted for 11.25% of the total.

The shares of intermodal terminals in the amount of goods transported in 2017 are shown in the following table.

Table. Reloading capacity of the intermodal terminal in 2017

intermodal terminal	Quantity of goods transported (%)	Quantity of manipulated ITU (%)
Dunajská Streda	67,86	64,76
Bratislava – Pálenisko	3,48	2,92
Sládkovičovo	0,04	0,17
Žilina	11,59	17,82
Dobrá	1,61	1,26
Bratislava ÚNS	5,79	6,66
Košice	0,00	0,00
Košice Veľká Ida	0,16	0,10
Haniska pri Košiciach	9,30	6,21
Ružomberok	0,17	0,11
Total	***100,00***	***100,00***

Source: MDV SR (2020a)



Source: MDV SR (2020a); ITU - intermodal transport units

1.4.4. Presentation of loading devices

Loading devices that are part of intermodal hubs (terminals) are described in the chapter 1.2.2 (Multimodal Interfaces).

1.4.5. Presentation of current technology (workflow and operation), capacity limits

There are 11 terminals for **combined transport** in Slovakia. Due to the fact that part of the terminals was built before 1993 for the container transport system of the COMECON countries, the terminals were built on the basis that the basic intermodal transport unit was a 20' large ISO 1 series container with a total weight of up to 24 tonnes. For this reason, in certain terminals gantry cranes have a lower load capacity than current needs. These deficiencies are compensated by mobile reach stackers. Other shortcomings of most of the terminals are (1) insufficient length of handling rails, which does not allow for the processing of a full train load of combined transport on one track, as well as (2) insufficient connections of handling rails and connection of the terminal to main roads and railways. Due to technological constraints, most terminals are not able to fulfil the AGTC agreement.

From the point of view of the Bratislava Region, the limiting element in the development of combined transport is mainly the state of transport infrastructure, both railway and road. Some sections of railway lines are on the limit of their capacity and at the same time there is a current trend of strengthening passenger railway transport, which also increases the demands on the capacity of railway lines.

Two of the three Slovak RFC corridors are routed through the node of Bratislava. The Bratislava - Pálenisko Port is the main access point of Slovakia to the European network of inland waterways. It should be noted that there is a great potential to increase the number of passenger trains at the Bratislava Hub and the whole Bratislava Region. And that many lines in important transport directions (especially cross-border lines and the Bratislava - Dunajská Streda - Komárno - HU border) are only monorail. Nevertheless, the problem of undercapacity may remain hidden. Unlike road transport, rail transport is firmly organized, and the rail operator does not offer unreliable freight routes. As a result of the (positive) development of passenger transport, freight train paths are pushed to unattractive exposures and their quality deteriorates (frequent stops, long stays due to traffic reasons). Thus, the potential demand for freight traffic is discouraged, without being visible in the form of standing line of vehicles like on the road. In order to limit this phenomenon, it is necessary to maintain a slight prevalence of infrastructure capacity (supply) over current demand and to maintain the acceptable quality of the routes offered for freight trains.

In particular, the lack of electrification, the lack of a uniform ERTMS (European Railway Traffic Management System), locally limited spatial throughput, insufficient maximum length of station rails and frequent frequency gaps should be addressed as soon as possible in terms of interoperability constraints.

The connection of terminals to road transport is limited mainly due to terminals´ locations directly in the capital, whose road network is already congested, causing frequent delays. The situation in this respect should be improved by the construction of the D4 motorway and the R7 expressway, which will provide direct access to both Bratislava terminals.

Due to their location close to the wider city centre, both Bratislava terminals also lack the areas for the development of logistics centres, where (1) shippers, carriers would be able to process combined transport consignments and deliver to terminal, and (2) logistics companies which would organize logistic transport chains of combined transport on order of the combined transport participants.

Unlike neighbouring countries and other EU countries, Slovakia currently does not have a national combined transport operator International Union of Combined Road-Rail Transport Companies (UIRR 2020). The operation of combined transport in the Slovak Republic is organized by several domestic and foreign operators.

From the legislative point of view, there is a lack of state support for combined transport.

1.5. SWOT analysis

1.5.1. SWOT analysis of the system of freight transport

Strengths	Weaknesses
Transport network and connection to international routes Location at several TEN-T and RFC corridors Existence of road, rail, water and air (freight) transport Network of logistics facilities and distribution centres Currently majority of sections at the Bratislava node have enough capacity (throughput) for the current volume of regular transport	Excess traffic loads on the roads leading to Bratislava, especially during rush hours Bratislava Main Railway Station has insufficient capacity of transport tracks for the current volume of regular transport Insufficient railway capacity in the section Bratislava-Nové Mesto - Bratislava Main Railway Station Several railway sections with low line speed Low preference of public passenger transport In some terminals, gantry cranes have a lower load capacity than current needs Insufficient length of handling rails in terminals Insufficient loading infrastructure in the intermodal terminals Freight transport routes crossing the residential quarters of the Bratislava (i.e. Petržalka district) High share of road transport compare to rail freight transport
Threats	**Opportunities**
Ever increasing traffic intensity at the entrances to Bratislava Section between Bratislava Main Railway Station and Kvetoslavov on the regional line Bratislava - Dunajská Streda - Komárno is overloaded (in terms of parameters from UIC 406) Insufficient capacity of some sections and railway stations already for the current volumes of transport (direction Bratislava - Dunajská Streda and partly direction Bratislava – Kúty – Czech Republic) Average age of critical infrastructure elements is high (it applies to both technical and technological equipment) Preferences of passenger transport without adequate conditions for freight transport Weak coordination and support of transport corridor(s) development and capitalisation Decrease in volume of international transport due to global pandemics issues	Modernisation of Bratislava Main Railway Station Construction of new railway stations and terminals of integrated passenger transport (TIOP) and reconstruction of existing railway stations Increasing the capacity of railway stations and railway lines (double-track or triple-track of existing tracks) in Bratislava City Improvement of road traffic situation after completion of strategic transport structures (D4 highway and R7 expressway) Completion of Outer Bratislava Highway Ring (D4 tunnel under Small Carpathians and connection to Austrian road network) Interconnection of international airports Bratislava and Vienna by railway connection Building of sufficient loading infrastructure in the intermodal terminals will enable to strengthen the position of combined transport in the region (country) Connection the Bratislava to the high speed trans-European network Capitalisation of existing broad gauge connection (to Ukraine) and effective usage of capacity of existing multimodal terminals in Slovakia Effective usage of Bratislava port within intermodal transport

1.5.2. SWOT analysis of the framework conditions for the Pilot Action

Due to the fact that the Pilot Action and Regional Analysis are very close and interconnected documents, the SWOT analysis of the framework conditions for the Pilot Action is same as for the Regional Analysis in chapter 1.5.1.

2. ANALYSIS OF FREIGHT TRENDS (TIME RANGE 2030 / 2050)

The basic development trend in freight transport is the focus on fast and reliable transport with minimum energy consumption and minimum environmental impact. These requirements are currently best met by combined transport, aiming for (1) unification, in order to simplify the requirements for means of transport and handling as well as (2) automation, which would speed up and streamline the transition between the different transport modes involved in the transport chain.

In the field of freight transport the global objective is to ensure competitive freight transport with modern logistics requirements. In this respect, it is necessary to ensure:

- plenty of freight routes (in peak and saddle alike),
- in rail transport, minimize the impact of freight transport on the operation of the main passenger terminals,
- the efficient use of existing and, where necessary, to support new freight locations and
- increase the cooperation of rail transport with other modes of transport and increase its share in modern logistics processes, particularly in long-distance transport.

2.1. Possible directions of developments

The development of the Slovak economy and the globalization of the economy create a prerequisite for further growth in goods transport.

In addition to these European potentials, there is the expected increase in goods transport from Asia to Europe. This may be the reality if some of these transports will move from maritime transport to inland-based railways, such as the Trans-Siberian Railway via Russia or other railways from China.

In the interest of sustainable transport development, the main challenge for transport is to cope with the expected increase in transport volumes. This should be done keeping in mind the environment by focusing on more environmentally friendly goods transport systems. Clearly, such systems also include the intermodal transport.

In spite of these problems, combined transport in Slovakia has started to develop at a faster pace in recent years and it can be expected, with more effective support, to reach the level of the other countries of the Visegrad Group.

A prerequisite for the efficient operation of combined transport is the efficient infrastructure, technology and organization of the shipment of combined transport of loading units (MDV SR 2020d)

The share of the different combined transport systems will be determined by the transport market. Based on developments in EU countries, we can assume that container transport will dominate in transit (the current trend is towards the use of larger containers of 40´ ISO 1A containers (12m)). In case of customers' interest, the share of swap bodies for road vehicles will gradually increase in domestic combined transport.

In terms of projected traffic volumes, alongside some other measures, the White Paper on Transport 2011 (Roadmap to a Single European Transport Area - Developing a competitive and resource efficient transport system, European Commission, 2011) defines a clear intention to move 30% of longer road transport (over 300 km) to 2030 and 50% by 2050 for more sustainable transport modes, in particular for electric rail.

Due to the reasons mentioned in chapter 1.2.1 in order to increase the share of rail transport in the freight as well as passenger transport, in the future it is necessary to consider:

- building of the 3rd track in the section Devínska Nová Ves - Bratislava-Lamač,
- increasing the performance of the entire section Komárno – Bratislava-Podunajské Biskupice,
- increasing the performance of the Trnava – Bratislava-Rača section,
- increasing the performance of the section Senec – Bratislava-Vajnory,
- implementation of the 2nd track to increase the performance of the Devínska Nová Ves – SK/AT border – Marchegg,
- building of the 2nd track to increase the performance of the Bratislava-Petržalka – SK/AT border – Kittsee,
- reconstruction of the line in the section Bratislava-Devínska Nová Ves – Kúty – SK/CZ border and
- ensuring enough capacity of the Bratislava-Petržalka - Rajka railway line.

2.2. Possible new connections

Possible new connections include "Breitenspur" **Broad-Gauge** railway Project.

The main idea of the project is to connect directly the East with the West – from Ukraine via Slovakia to Austria.

Further development was defined in **Regional Spatial Plans** of particular Self-Governing Regions. In Bratislava Region there is planned development of tunnel in Bratislava under Small Carpathians that will enable the freight trains to bypass the main bottleneck of the region, The Main Railway Station (Bratislava hlavná stanica).

2.3. Terminating links (if any)

Since the end of the Communist period, several local lines were terminated in Bratislava, Trnava as well as Nitra Regions. None of these lines have direct influence on the main railroads along the Orient / East-Med Corridor.

3. PRESENTATION OF PLANNED DEVELOPMENTS (SCREENING OF DOCUMENTS)

3.1. Identification and presentation of strategies and documents with relevance for spatial planning and infrastructure planning

Table. List of strategies and documents with relevance for spatial planning and infrastructure planning

	Name	Year	contractor	submitter
01	Predĺženie širokorozchodnej železničnej trate na území Slovenska s prepojením na územie Rakúska - ZÁMER - **Extension of the broad-gauge railway line in the territory of Slovakia with connection to the territory of Austria - A Plan**	October 2018	Breitspur Planungsgesellschaft mbH (BPG)	
02	**European Silk Road**	August 2018	The Vienna Institute for International Economic Studies - Mario Holzner (coordinator), Philipp Heimberger and Artem Kochnev	
03	Aktualizácia koncepcie rozvoja verejných prístavov 2010 (Verzia po zapracovaní pripomienok VP a.s. a MDPT SR - **The Update of the Development Perspective of Public Ports 2010**	July 2010	Deloitte (for MDPT SR)	
04	**Orient East Med - Third Work Plan of the European Coordinator**	April 2018	European Commission, Mathieu Grosch - European Coordinator	
05	Strategický plán rozvoja dopravy SR do roku 2030 - Fáza II - **Strategic Transport Development Plan of the Slovak Republic until 2030 - Phase II**	December 2016	MDVaRR SR	
06	Dopravné modelovanie - **Traffic modelling**			
061	Vyhodnotenie prieskumu železničnej osobnej dopravy - **Rail Passenger Traffic Survey**	October 2015	AF&partners, zastúpená AF-CITYPLAN s.r.o	MDVaRR SR
062	Prieskum autobusovej dopravy - **Bus Traffic Survey**	September 2015	AF&partners, zastúpená AF-CITYPLAN s.r.o	MDVaRR SR
063	Prieskum leteckej osobnej dopravy - **Air Traffic Survey**	September 2015	AF&partners, zastúpená AF-CITYPLAN s.r.o	MDVaRR SR
071	Územný plán regiónu BSK - smerná časť - **Spatial plan of BSK Region - indicative part (2013)**	2013	Aurex, s.r.o.	BSK
072	Územný plán regiónu BSK Zmeny a doplnky č. 1 - **Spatial plan of Bratislava Self-governing Region as amended (2017)**	2017	Aurex, s.r.o.	BSK
08	Program hospodárskeho rozvoja a sociálneho rozvoja Bratislavského samosprávneho kraja na roky 2014-2020 - **Program of Economic Development and Social Development of the BSK**	2015	Aurex, s.r.o.	BSK

	Region for 2014-2020 – The Analytical Part			
09	Regionálna integrovaná územná stratégia Bratislavského kraja 2014-2020 - **Regional Integrated Territorial Strategy of the Bratislava Region 2014-2020**	2015	BSK & City of Bratislava	
10	Koncepcia územného rozvoja Slovenska (KURS) - **Slovak Spatial Development Perspective (KURS)**	2012	Aurex, s.r.o.	MDVaRR SR
11	ŽSR, dopravný uzol Bratislava – štúdia realizovateľnosti - **Transport Node Bratislava - Feasibility Study**	2019	Združenie Uzol Bratislava: Reming consult, a.s., Sudop Praha a.s., Prodex s.r.o., Dopravoprojekt a.s.	Železnice Slovenskej republiky (Slovak Railways)
12	Dopravný model SR - Traffic Model of the Slovak Republic			
121	Prieskum nákladnej dopravy - **Freight Transport Survey**	October 2015	AF&partners, zastúpená AF-CITYPLAN s.r.o	MDVaRR SR
122	Záverečná správa – **Final Report**	March 2016	AF&partners, zastúpená AF-CITYPLAN s.r.o	MDVaRR SR
13	Územný plán hlavného mesta SR Bratislavy - **Spatial plan of Bratislava the capital city of Slovakia**	May 2007	City of Bratislava	

Note: MDVaRR SR – Ministry of Transport, Construction and Regional Development of the Slovak Republic, BSK – Bratislava Self-governing Region

3.2. Analysis of contents of identified strategies and documents

3.2.1. Preliminary feasibility study of the broad-gauge railway between Košice and Vienna

Title: Extension of the broad-gauge railway line in the territory of Slovakia with connection to the territory of Austria – A Plan

Date (when the study was published): October 2018

Author: Breitspur Planungsgesellschaft mbH (BPG)

Subject: Assessment of the environmental quality of the broad-gauge railway extension project

Specifics:

- Broad-gauge 1520 mm differs from the normal gauge 1435 mm
- Study proposed building dates: 2024-2025
- In operation: 2033-2034
- Expenses: around 6 milliard EUR.
- Operating and maintenance costs: around 200 million EUR annually
- Expected volume of good in 2050: 23 mil. tonnes
- 36 container trains (daily) in both directions
- Travel time between East China and Vienna: 15 hours
- A rough estimate of the total land take: 750 hectares

At present no level of land-use planning documentation has this intention included in the outlook for the territorial reserve and land use. This will have to be addressed thoroughly (BPG 2018).

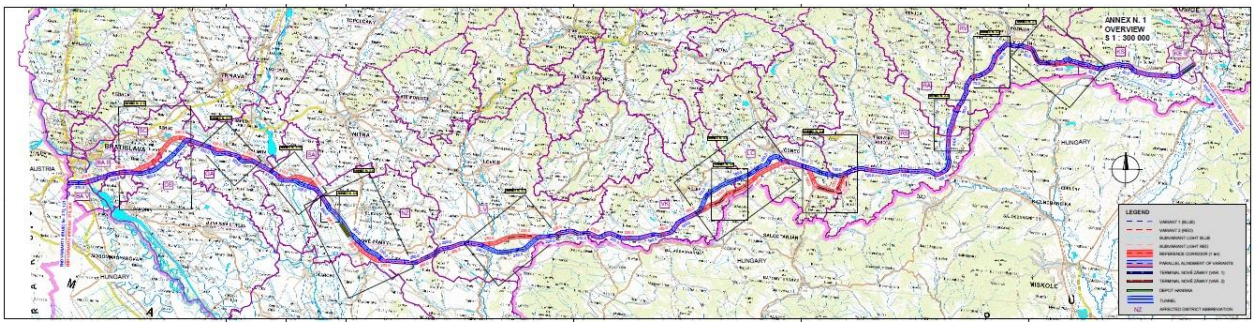
Conclusions

The implementation of the project would represent a significant intervention in strengthening of the railway interconnection between east and west of Slovakia along its southern border. This is also one of the long-term plans of the Slovak railway network. Similar considerations are not new, but no sufficient resources have been found for such a project so far. The plan envisages the use of existing railway lines, but at the same time, predicting the construction of a new line, especially in the south of the Banská Bystrica Region. Implementation of the project in the area of the Bratislava Railway Junction would strengthen the flexibility of its use, especially for the freight transport. The stated intention must be considered only as a preliminary one. Its implementation will require harmonization of its basic objective, which is the interconnection of the Russia-Ukraine on the one side with Vienna Port on the other, with the intentions of the development of railway transport in Slovakia.

However, due to its parameters, the use of the line will be prepared only for transit traffic and will not serve for the domestic connection between the west and the east of Slovakia. For these reasons, the open question remains the possibility of using the existing railway infrastructure with an increase in the capacity of existing lines and the possible completion of the missing sections. With this solution, the existing lines would be modernized and, in addition to transit traffic, the railway connection of western and eastern Slovakia would also be improved (MDV SR 2020b).

In relation to the CORCAP project, the objective of the project is to strengthen the Bratislava Railway Junction.

Figure. Broad-gauge railway between Košice and Vienna



Source: BPG (2018)

3.2.2. European Silk Road

Title: A European Silk Road

Date: August 2018

Author: The Vienna Institute for International Economic Studies - Mario Holzner (coordinator), Philipp Heimberger and Artem Kochnev

Subject: Analysis of the possibilities of developing the idea of Silk Road in the context of TEN-T development

Content: An expert group of the platform has for instance presented a short list of projects that are complementary to the BRI (Belt and Road Initiative) in the scope of the Trans-European Transport Networks (TEN-T). It contains for example seaport projects in Italy, inland waterway project in Poland, intermodal terminals in Slovakia and motorways in Bulgaria.

Slow expansion of the TEN-T networks since 1990: Ways through Slovakia – Rhine-Danube, Orient/East Mediterranean, Baltic-Adriatic.

European Silk Road could possibly have two main routes, which in essence will connect the centres of Western European industry with the eastern neighbourhood in greater Europe.

A northern route could reasonably start from Lyon (an old French industrial centre and important transport and logistical hub) – via Paris, Brussels and the southern Netherlands directly to the most densely populated metropolitan region of Germany in the Rhine-Ruhr area (it is home to the port of Duisburg, one of the world´s largest inland ports and one of the most significant logistics centres in the northwest of the continent) then via Berlin, Warsaw, Lisbon, Moscow, Nizhny Novgorod and Samara to the Russian-Kazakh border town of Uralsk.

A southern route could have its starting point in the Milan metropolitan region (the largest Italian urban agglomeration and economic centre of the country) – via Zurich and the industrially developed southern German region along the Danube valley via Vienna and Budapest to Bucharest and the port of Constanta on the Black Sea – from there, two extensions could on the one hand lead by sea via the Russian port of Novorossiysk to Volgograd and on the other hand via the Georgian port of Poti and Tbilisi to Baku on the Caspian Sea (Holzner et al. 2018).

Figure. European Silk Road

Source: Holzner et al. (2018)

Northern route of the European Silk Road would connect to the northern and central Eurasian corridor, while the southern route would link the international north-south corridor and the trans-Asian corridor. In the bottom branch of expansion, the route would also overlap with the Europe-Caucasus-Asia transport corridor (TRACECA) supported by the EU since the beginning of the 1990s. The route crossing the Caucasus has been identified as being particularly in need of expansion.

The key course of the northern route is about 3 400 km and together with the expansions 6,700 km.

High-speed railway lines (high-speed tracks are characterised by the fact that trains can run on them at a speed of more than 250 km/h) are in 30 countries of EU (data source International Union of Railways.

Infrastructure in EU countries and Slovakia:

In following table, we can see positive and negative values. Negative values that indicate investment potential in the respective infrastructure sector are marked in yellow. Slovakia with 4 yellow values has bigger potential than Switzerland (0 yellow values) Germany, Malta (1 yellow values), Belgium, Ireland, Cyprus, Latvia, Hungary, Slovenia (2 yellow values), or Czech Republic, Estonia, Spain, Luxembourg, Austria (3 yellow values). Slovakia with Bulgaria, Greece, France, Croatia, Lithuania, Netherlands, Portugal, Romania, Finland, Sweden and Norway are countries with 4 yellow values. More negative values have only Denmark and Italy (5 yellow values), Poland (6) and United Kingdom with 7 negative values.

Table. Estimated infrastructure potential in Slovakia (residual values, rounded)

High-speed rails (km)	
Electrified railway lines (km)	480
Total road sections (km)	- 280
Motorway sections (km)	- 410
Broadband (fixed connections)	- 9,980
400 KV power lines (km)	150
Net electricity generation capacity (mW)	- 560
Hospital beds (number)	2,010

Source: Holzner et al. (2018)

Based on data from The Vienna Institute for International Economic Studies, we can divide the countries of Europe into following groups:

- Periphery: Cyprus, France, Greece, Italy, Portugal, Spain
- East and Southeast Europe: Bulgaria, Romania, Czech republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia, Slovakia
- Core: Austria, Belgium, Denmark, Finland, Germany, Sweden
- Financialised: Luxembourg, the Netherlands, Malta, Ireland

In the periphery the major negative residuals appear in the areas of electrified railway lines, total road sections and hospital beds. In east and Southeast Europe are investments the most important in the infrastructure sectors of rail (high-speed), road (motorways), telecommunications and energy. In the financialised countries is potential in the field of rail infrastructure.

Infrastructural needs in Greater Europe:

The infrastructural needs growth when advancing to the east of the European continent. There are high infrastructural requirements in the range of annually 40% to 80% of the GDP in the Balkans, in the western regions of the former Soviet Union and in the Caucasus. In the Central Asian republics of the former Soviet Union the infrastructural needs are high with over 80% - 100% of the GDP. In the entire region, except for Kyrgyzstan, Belarus, Tajikistan, Albania and Turkey, the need for transport infrastructure greatly exceeds 50% of the total need.

Economic and employment growth effects of the European Silk Road:

If we take the previously calculated investments (by The Vienna Institute for International Economic Studies) in the European Silk Road and use the conservative cost assumptions, we arrive at a GDP effect of 3.5% for the average of the involved countries and an associated average employment effect of 1.8%; an increase in employment of over 2 million people ensues as a sum of the national results. These results can be understood as a short to medium-term level effect for the investment period. (If GDP-employment coefficient would be higher – 0.7, as found under favourable conditions and the previously estimated results for the low-interest periods of an investment – GDP-multiplier of approximately 3.5, then we obtain much stronger employment effects of over 7 million people).

Fort Austria, the construction projects in the baseline scenario result in an additional economic growth of 1.5% and additional 34,000 jobs. Under favourable circumstances, up to 121,000 new jobs could be generated in Austria. Again, it should be noted that this is a level effect over an investment period of one decade.

Conclusions

Effects of the core northern route of the European Silk Road on trade with Russia: The capital of Slovakia – Bratislava is 1 948 km from Moscow. Currently, without northern route, it takes From Bratislava to Moscow 22 hours at a speed 89 km/h. On the other hand, with northern route, it could take 21 hours at a speed 94 km/h. Time change is -5,5% and estimated effect on the exports to Russia is 7,4% (=160 million EUR).

Consequently, the countries along the northern route could boost their exports to Russia by more than 11%. This would be equivalent to over EUR 12.5 billion in additional exports. Austria's exports to Russia would increase by over 14%, equivalent to about EUR 330 million.

In relation to the CORCAP project – a North-South connection - the project represents a slight strengthening of the Bratislava Railway Junction in the east-west direction.

3.2.3. The Update of the Development Perspective of Public Ports 2010

Title: The Update of the Development Perspective of Public Ports (Version after incorporation of comments of Verejné prístavy [Public Ports, a joint stock company] and MDPT SR)(MDPT 2010)

Date: July 2010

Author: Deloitte (for MDPT SR – former abbreviation for Ministry of Transport and Regional Development of the Slovak Republic)

Subject: The Development Perspective of Public Ports 2010 with the focus on the following main factors of their development:

- Legislation in the area of water transport of the Slovak Republic and the EU - A valid legislation affects the possibilities of dealing with priority investment assets of public ports
- Waterway trends - unused potential in passenger water transport and relatively slow growth of water transport g; at the same time the capacities of Bratislava and Komárno ports are estimated at less than 20% and 10% respectively
- Property-law relations - land owned by the state is long-term leased (for 25-50 years) to private entities; port infrastructure is owned by private entities
- Financial resources for the development of public ports - insufficient funding for the development of water transport and public ports

Content: The Development Perspective is generally based on the application of the management of public ports in the form of so-called 'Tool Port Model' (port with majority of private ownership. The total cost of the development of public ports is estimated at EUR 483.3 million EUR in the long term (2011 to 2016).

Port Bratislava:

The long-term intention is to operate the port of Bratislava through a management model that presents ownership and management of the infrastructure and superstructure under the responsibility of the port manager (not private entities as it is at present).

From the passenger transport point of view, the Development Perspective aims to increase the number of passengers and to use parts of the Winter Harbour as a leisure place - the prerequisite for revitalization is to maintain the function of the site as a winter harbour.

Komárno Port:

Although the port of Komárno has been used for less than 10% in the long term. The Development Perspective considers its strategic position as an international port (with a winter harbour), located on the Váh section, defined as a route of international importance.

The western part of the port is located in the immediate vicinity of the urban built-up area. The development in this part is significantly limited - it is proposed to restrict activities in this part of the city.

The eastern part of the port and its development are also limited, due to the absence of a perpendicular quay, insufficient energy security and the fact that this part lies in the inundation zone. Despite these facts, the eastern part of the port should be further developed, or at least the cargo function must be maintained.

However, the concept does not exclude (in accordance with the Urban Spatial Plan of Komárno) relocation of the port to another location outside Komárno. Due to the fact that the transport ministry does not have any financial resources to change the location. Therefore, if the project is to be implemented, financial support from the city will be required.

Štúrovo Port:

The Development Perspective is focused on the revitalization of the embankment and the development of passenger water transport.

- The first development theme is focused on the lease of land with the condition of their long-term development in the form of capacity building for the passenger port
- The second development theme is focused on the development of port activities related to passenger ship handling

Since 1991, exports have prevailed over imports at the ports of Bratislava and Komárno. Exports in the port of Bratislava make up 93% (a strong pro-export character of the port). The port in Komárno is also export-oriented, but only by 56%. It can be expected that the future of the ports will to some extent be related to the economic situation in Slovakia and its GDP growth. The most important types of exported and imported commodities are:

- ▫ in Bratislava:
  - ▫ exports of petroleum products, ores, scrap metal and metal products
  - ▫ import of food, animal feed, ores, scrap metal and metal products
- in Komárno:
  - ▫ export of agricultural products, live animals, solid mineral fuels and metal products
  - ▫ imports of food, animal feed, petroleum products, ores and scrap metal

The forecast in the Development Strategy assumes an increase of 11.3% in freight transport in 2015-2020.

The vision proposal is as follows: Verejné prístavy (Public Ports Authority), as the owner of the land, infrastructure and superstructure, (1) will lease transhipment and storage capacities to individual port operators; (2) provide services at or above the level of the comparable Danube river ports; and (3) become attractive and competitive partners for transport, logistics and other services.

The estimated impact of the Development Strategy on public finances for the years 2011-2016 is 173 million EUR for Bratislava, 310 million EUR for Komárno and 0.3 million for Štúrovo EUR. As the primary source of funding, the Development Strategy recommended using of funds from the Operational Program Transport in the value of 173.3 million EUR. The impact on the budget of municipalities and self-governing regions was estimated at approx. 310 million. All estimates given are for guidance only.

Conclusions: In relation to the CORCAP project, the concept is interesting due to the specifications of the development of port capacities as well as planned transported commodities. From a territorial planning point of view, it will be necessary to align the development objectives of the ports with the development of the transport infrastructure of the respective Danube regions. The CORCAP project can provide additional new impulses for their development

3.2.4. Orient East Med – Third Work Plan of the European Coordinator

Title: Orient East Med – Third Work Plan of the European Coordinator (Grosch 2018)

Date: April 2018

Author: European Commission, Mathieu Grosch – European Coordinator

Stakeholder list for Slovakia:

- Ministry of Transport, Construction and Regional Development
- Railways of Slovak Republic
- National Motorway Company
- Slovak Road Administration
- Airport Bratislava
- Association of self-governing regions (SK8)
- METRANS

Content

The Orient / East-Mediterranean Corridor is a long north-west to south-east corridor which connects Central and South East Europe with the maritime interfaces of the North, Baltic, Black and Mediterranean seas. It runs from the German ports of Bremen, Hamburg and Rostock via the Czech Republic and Slovakia, with a branch through Austria, further via Hungary and Romania towards the Bulgarian capital of Sofia, with links to the port of Burgas and to Turkey, then to the Greek ports of Thessaloniki, Igoumenitsa, Patra and Piraeus, ending with a "Motorway of the Sea" link to Cyprus.

It comprises railways, road, airports, ports, rail-road terminals and the Elbe-Vltava waterway (IWW) system. The Orient / East-Med Core Network Corridor includes sections of former TEN-T Priority Projects (PP 7, PP 22 and PP 21, PP 23, PP 25 partly) and ERTMS Corridors (D and parts of B, E, and F).

The 9 Member States involved are (in alphabetical order): Austria, Bulgaria, Cyprus, Czech Republic, Germany, Greece, Hungary, Romania, and Slovak Republic.

Figure. The Orient / East-Mediterranean Corridor

Source: Grosch, M. (2015)

The length of the corridor infrastructure sums up to approximately 5,800 km of rail, 5,400 km of road and 1,700 km of IWW.

In June 2016, Rotterdam – the Ministers responsible for transport of Austria, Bulgaria, the Czech Republic, Germany, Greece, Hungary, Romania and Slovakia signed a joint ministerial declaration on effective improvements eliminating the bottlenecks and facilitating international traffic on the Orient/East-Med Rail Freight Corridor. The **main objective** is to significantly reduce the average border-crossing times of freight trains, with the target of maximum 2 hours waiting time – at the latest by 30 June 2018

In summary, the number of core urban nodes along the Orient/East-Med Corridor is 15, with the majority located in Germany (5) and Greece (3). One of them is located also in Bratislava, Slovakia.

Several segments of the Orient/East-Med Core Network Corridor are coinciding with others of the 9 Core Network Corridors, for example: Rhine - Danube Corridor (approx. 1000 km, in CZ between Praha and Brno, along the road/rail routes Wien - Bratislava – Budapest – Drobeta – Calafat – Vidin)

Technical infrastructure:

OEM railways network and Railroad Terminals

In summary, 87% of the OEM rail network is not compliant with the requirement for ERTMS2 deployment; when considering ETCS baseline 2 only, the value accounts to 98% of network non-compliant to ERTMS (by end of 2016).

The criterion of a line speed of at least 100 km/h is not fulfilled in parts of Slovakia and in Bulgaria amounting to 21% of the OEM rail network. Only 11% of the network is not electrified.

The analysis of the Rail-Road Terminals along the OEM Corridor shows that in 2016 only 4 of the 25 RRTs, namely Hamburg- Billwerder, Bremerhaven, Leipzig and Berlin- Großbeeren, are fully compliant with the TEN-T requirements. The new Vienna South Terminal is compliant from 2017.

The OEM inland waterway network and ports

Overall, around 1627 km of IWW are compliant with the two TEN-T requirements, representing 98% of the OEM IWW network. The non-compliant section is the uppermost river section of Elbe / Labe between Týnec nad Labem and Pardubice.

The OEM seaports and maritime infrastructure

All OEM seaports are fully compliant with the requirement to offer at least one terminal open to users in a non-discriminatory way applying transparent charges, while all ports also provide port waste reception facilities.

The OEM road infrastructure

Road infrastructure along the Corridor shows the highest level of compliance with technical requirements compared to the other modes' infrastructure. Currently, the largest part of the OEM road Corridor is either of motorway or express road class (88%), while the total length of conventional road sections is 633.8 km. OEM length (also motorways/express roads length) in Slovakia is 80,7 km (100%) and conventional roads length is 0 km (0%.

Number of alternative fuel station – there are 282 LPG stations in Slovakia and 5 of them in OEM, also there is 11 CNG stations and 2 of them in OEM. Recharging points for electrical vehicles are more than 2 in Bratislava urban node.

The OEM airports

There are 15 core airports along the OEM Corridor (Hamburg, Berlin, Bremen, Hannover, Leipzig/Halle, Praha, Wien, Bratislava, Budapest, Timisoara, Sofia, Athina, Thessaloniki, Heraklion, and Larnaka).

Out of the six major core airports, 3 (Hamburg, Praha and Budapest) still need to be connected to "heavy rail", i.e. capable to operate high-speed passenger trains. In addition, Bratislava, Timisoara, Sofia and Thessaloniki airports still miss a connection to rail.

Project list:

- 2014-2016 – 92 projects (48 OEM only) have been completed (8.9 billion EUR)
- During 2017 – 41 projects (14 OEM only) have been completed (8.7 billion EUR)
- On-going – 212 projects (57 OEM only) with 53 started in 2016
- With end date in 2016-2020 – 209 projects (69 OEM only) (50%)
- 275 projects overlap with other Corridors
- Investments between 2017-2030:

- 68 billion EUR (cost information was made available for 376 projects)
- 30 billion EUR for OEM only projects
- 74 Orient/East Med Corridor projects are related to a cross-border section.
- 28 projects were also marked as bilateral or multilateral projects.
- 59 projects refer to last-mile infrastructure between the Corridor lines and transhipment or interchange points (ports, terminals, airports, main stations)
- Urban nodes with particularly numerous last-mile projects are Hamburg (11 projects) and Bratislava (10 projects)

Rail projects:

127 rail projects and 30 Rail ERTMS projects on the list, representing 38% of the grand-total. A high number of rail projects belong to Germany (26), Greece (23), Bulgaria (21), the Czech Republic (19), Slovakia (14), while Austria has 12, Romania 8 and Hungary 4. Regarding the 30 Rail ERTMS projects, 5 belong to Austria 4 to Hungary, 4 to Czech Republic, 3 to Greece, 2 to Germany, while Slovakia and Bulgaria follow with 1 project each. 10 projects are multi-country. There are 93 rail projects and 20 Rail ERTMS projects on pre-identified CEF sections, the majority is located in Bulgaria (21 Rail and 1 Rail ERTMS). There are 11 Rail projects and 1 Rail ERTMS located in Slovakia.

Urban Nodes roles in the CNC:

Fifteen Core Urban Nodes are identified along the Orient/East Med Corridor, namely Hamburg, Bremen, Hannover, Berlin, Leipzig(-Halle) (DE), Praha (CZ), Bratislava (SK), Wien (AT), Budapest (HU), Timisoara (RO), Sofia (BG), Thessaloniki, Athina, Heraklion (EL), and Lefkosia (CY).

The construction of by-pass road arteries is either on-going or planned for Praha, Bratislava, Wien, Timisoara and Lefkosia and, once completed, an uninterrupted flow would be achieved along the Corridor by-passing congested urban/local roads of densely populated areas.

Persisting Gaps in Rail and RRTs including ERTMS:

Considering the list of on-going or planned Corridor projects to be implemented until 2030, a significant part (828 km) of the rail network in 6 of the related Member States will still be non-compliant by 2030. Regarding the remaining parameters (axle load, speed and electrification), there is one rail section in Slovakia, which is not yet addressed in national masterplans expected to remain non-compliant by 2030: Petržalka – Rajka (speed, 13 km). Non-compliant rail section by 2030 is also Entire Slovak rail network along OEM (103 km) - non-compliant parameter is train length. Non-compliant Rail/ Road terminals by 2030 in Slovakia is Bratislava terminal – non-compliant parameter is electrification and 740 m train terminal accessibility

Infrastructure implementation by 2030 and the environmental, socio-economic effects:

- INNOVATION: In the OEM Corridor, around 20% of the projects have been identified as “innovative”
- JOBS: The direct, indirect and induced job effects of TEN-T CNC projects will amount to 1,494,000 additional job-years created over the period 2016 to 2030 (It can be expected that also after 2030, further job-years will be created by the projects.)
- EMISSIONS: For the period 2015 – 2050, the emissions for Road and Rail will decrease at the same time, as for both modes, passenger and freight traffic volumes will increase in the same period. The emissions from rail will slightly rise in 2030 but would decrease in 2050. For Inland waterway transport (IWT), they will remain at current levels.

- CLIMATE CHANGE ADAPTATION: The northern part will likely become increasingly susceptible to heavy rains and flooding, while the southern part will experience more droughts in the upcoming century. The latter, in combination with increased summer temperatures, will also result in increased risk of forest fires. Sea-level increase is also expected. Climate change main risk in Slovakia is flooding.

Recommendations and Outlook by the European Coordinator:

Railway network improvements (which includes Slovakia):

The upgrade of the Brno – Břeclav railway link as a high-speed line will also increase the needed transport capacity between the Czech Republic, Austria and Slovakia. The ongoing trilateral planning cooperation between the Infra Managers is highly welcomed. An upgrade between the Czech section Lanžhot and CZ/SK border (CEF 2016), as well as studies for the adjacent Slovak section Malacky - Kúty are being prepared (CEF 2016) which is a potential candidate for CEF funding. Major CEF projects on the Slovakian portion of the OEM corridor have also been selected under CEF 2015. The modernisation of this section will remove bottlenecks and allow conventional express trains to travel faster and safer. The Austrian section between the CZ/AT border close to Břeclav and Vienna will be upgraded till 2027, resulting in an increase in line speed and capacity.

Road projects improvements (which includes Slovakia):

Several Highway PPP schemes along the OEM CNC are financially supported by EFSI, such as the Bratislava Highway Ring (D4, R7) in Slovakia, as well as the German A10/A24 motorways between Neuruppin and Berlin Pankow. Best practice for co-funding of transport infrastructure and maintenance might be used also for other parts of the OEM road transport infrastructure.

Conclusions: The identified projects will be evaluated within the next phase of the CORCAP Project by IPP.

3.2.5. Strategic Transport Development Plan of the Slovak Republic until 2030 - Phase II

Name: Strategic Transport Development Plan of the Slovak Republic until 2030 - Phase II

Year: December 2016

Author: Ministry of Transport, Construction and Regional Development of the Slovak Republic

Subject: The Strategic Transport Development Plan of the Slovak Republic until 2030 (MDVRR SR 2016b) is a long-term strategic document that aims to set an effective direction for the development of the transport sector. The vision for the development is a sustainable integrated multimodal transport system that meets the economic, social and environmental needs of society and contributes to deeper integration and full integration of the Slovak Republic within the European Economic Area.

This document followed the outputs of the so-called Phase I of the preparation part of the transport strategy and developed its outputs. The basis for the continuation was to identify the problems of the transport sector. The document will continue with the implementation plan, which will include a definition of individual projects and activities.

The identified problems of the transport sector in Slovakia were divided into the following areas: road transport, rail transport, public passenger and sustainable local and regional transport, water transport and civil aviation.

Content:

In the following summary, the information relating to rail transport is specified.

Rail transport issues

- In the field of planning
  - insufficient link between the collection and the evaluation of the transport data, unavailability of database describing the transport flows in freight rail transport
  - insufficient justification of the choice of the limit potential of lines for even more effective rationalization
- In the field of infrastructure
  - insufficient functionality of the railway junction in Bratislava
  - non-quantifiable internal debt of infrastructure maintenance
  - lack of interconnection of operational concept, infrastructure and rolling stock parameters
- In the field of rail passenger transport
  - underestimated frequency of operation
  - institutional setting of minimum service quality standards for all carriers in the public service obligation
  - insufficient intermodal coordination
  - poor public transport image
- In the field of rail freight
  - capacity problems and interoperability constraints on RFC lines

- insufficient strategy for the further development of intermodal transport and the segment of individual wagon consignments

- Other problems
  - insufficient centralization of traffic management
  - practical problems with sharing depots, stabling tracks, other maintenance equipment

In the Strategic Part general strategic global goals, horizontal specific goals and modal specific goals were defined. Regarding the rail transport, the main objectives are

- strengthening of the role of rail as the main transport mode in the public transport system, where justified
- the improvement of the quality and environmental impact of railway operation

Infrastructure measures in the area of rail transport

- Completion of the modernization of the main TEN-T lines, which are in a high stage of preparation: Púchov - Žilina, Žilina - Čadca – border SK/PL; (Bratislava-)Devínska Nová Ves - border SK/AT
- Modernization of the railway line Žilina - Košice - Čierna nad Tisou
- Modernization of the corridor border SK/CZ - Kúty - Bratislava - Štúrovo / Komárno - border SK/HU
- Modernization and improvement of the wider Bratislava junction including relevant affected lines according to the needs of the Feasibility Study of the Bratislava Railway Junction (ŽSR 2019)

Organizational measures in the field of rail transport include improving the conditions for the combined transport and for the operation of full train loads and promoting the interoperability of freight transport vehicles (organizational and infrastructure).

Operational measures in the field of rail transport include:

- Establishing the operational concept of passenger transport on railway (as part of the national public transport operational concept) and its implementation plan by 2030 with a perspective to 2050
- Completing the implementation of the 2020 target train timetable
- Determination and implementation of 2030 target train timetable - adjustment of tact and number of connections on connecting lines to corridor Žilina - Košice and border CZ/SK - Kúty - Štúrovo / Komárno border SK/HU associated with the infrastructure changes on these lines
- Centralization of traffic management
- Rationalization of traffic on other lines with regard to the operational concept of passenger transport

Finally, it may be concluded that of all the measures proposed in the area of rail transport, the most important and urgent measures are the **modernization of the corridor border CZ/SK - Kúty - Bratislava - Štúrovo / Komárno- border SK/HU** and modernization of back track Žilina - Košice - Čierna nad Tisou.

Conclusions: The Strategic Transport Development Plan identified a lack of functionality of the railway junction in Bratislava. It will be further evaluated within the next phase of the CORCAP Project by IPP.

3.2.6. Traffic modelling

3.2.6.1. Rail Passenger Traffic Survey (2015)

Title: The Assessment of the Rail Passenger Traffic Survey - Report

Date: Október 2015

Contractor: MDVaRR SR

Author: AF&partners, represented by AF-CITYPLAN

Results

Passenger data: The largest share of passengers are workers (44%) and children or students (41%), the most common age group is 26-65 (49%), followed by the 15-25 age group (43%). Representation by gender: men (50.2%) and women (49.8%)

Travel time: Travel time of passengers using the given mode of passenger transport is usually 31 to 60 minutes (25% of all journeys). 17% of all journeys were made up to 15 minutes, and 15% between 61 to 90 minutes. At subsequent intervals, the frequency of journeys decreases with the corresponding journey time.

Regularity of trips: the most frequent group are irregular trips (57%), daily trips (26%) and weekly trips (17%). Most of the regular trips were done by students (46% with travel time up to 30 minutes) and workers (35% with travel time from 31 to 60 minutes). As travel time increases, regularity decreases significantly. In terms of weekly trips, passenger rail transport is used for significantly longer distances for transport for study purposes (21% of students which travel from 181 to 240 minutes). The situation is similar for daily attendance (for 24% of workers the travel time is between 31 and 60 minutes).

Purpose of trips: based on purpose the most frequent are trips to recreation (30% of all trips), to school and work (26% of all trips). Shares of other purposes, such as business, shopping or other trips, account for less than 10% each.

Access to railway stations: The average share of pedestrian journeys to and from the railway station was 47%, the share of public transport trips was 24% and in 13% cases the passengers were transported to and from the railway station by car. However, the modal split to and from the railway station depends very much on whether the station is located in the same municipality as the starting or ending point of the entire route. In the case of inter-city journeys to and from the railway station, the dominant mode of passenger transport was car 34%, followed by 32% by bus. In the case of roads within the territory of one municipality, the prevailing share of traffic was 52% on foot, followed by 26% by public transport.

3.2.6.2. Bus Traffic Survey

Title: Bus Traffic Survey - Report

Date: September 2015

Contractor: MDVaRR SR

Author: AF&partners, zastúpená AF-CITYPLAN s.r.o

Na dvanástich vybraných autobusových staniciach bolo získaných a následne spracovaných 1587 dotazníkov. Bolo vykonané vyhodnotenie zberu dotazníkov podľa dní prieskumu, podľa dennej doby a podľa toho na ktorej autobusovej stanici boli získané. Podľa týchto údajov boli následne výsledky prieskumu pri vyhodnotení vážené.

Results:

Passenger data: The largest share of bus passengers is made up of workers (44%) and students (33%), the most frequent age group being 26-65 (44%) and 15-25 (35%). Passengers travel mostly until 7:30 am for work. In the opposite direction, people travel from work after 15:30. Meanwhile, people travel for leisure and education (until 15:00). Based on the number of trips and the number of inhabitants it was found that the average Slovak citizen generates 54 bus trips per year. Most of the passengers (80%) that use bus stations reside outside the municipality in which the station is located, i.e. the trip usually starts in bus stops of nearby villages. Students and workers (39%) travel on a daily basis. The number of passengers was highest in international connections (29 passengers on average). On the other hand, the number of passengers on regional connections was the lowest (on average 17 passengers). The lower number of passengers on regional connections was affected by connections with very low occupancy (e.g. only 4 passengers). Long-distance transport connections were occupied by an average of 20 passengers.

Trips: The largest share is made up of trips up to 40 km (80%). The average length of bus travel is 16 km. The average travel time by bus is 27 min. In cities, 34% of passengers continue to walk from the station. On multi-stage journeys, on average, 36% of passengers use public transport. Only 13% of passengers were found to change to another intercity bus or train. In 11% of cases it was a transfer from the bus line to the regional bus. The average speed of regional bus journeys is 37 km/h (routes up to 40 km). In the bus transport up to 300 km, the speed increases to 52 km/h. At a greater distance, the average bus speed is 62 km/h. The share of trips to the bus station was 72%. In county seats where public transport is available, a 34% share of pedestrian journeys to the bus station was found.

Bus stations: Bus stations in these selected cities have a very convenient location due to the proximity of the train stations. Many of them are also connected to the city's public transport system. The sources of roads found at bus stations are usually outside of the city where the bus station is located.

3.2.6.3. Air Traffic Survey

Title: Air Traffic Survey - Report

Date: September 2015

Contractor: MDVaRR SR

Author: AF&partners, zastúpená AF-CITYPLAN

In total, 633 passengers were addressed at the three most important airports who participated in the survey.

Results

Significance and characteristics of airports: The most important airport with the largest number of destinations, flights and passengers is Bratislava Airport (M. R. Štefánika). This is followed by the airport in Košice-Barca and the airport Poprad-Tatry. Neither airport provides a transfer terminal for railway transport and passengers are therefore dependent on bus or taxi. Airports are wheelchair accessible. Traveling from Bratislava Airport is carried out in large quantities (98%) directly to destinations to which passengers are heading. From Košice Airport there are number of shorter air routes to neighbouring countries. It has also been found that most passengers continue to fly from neighbouring countries (82% of Vienna, 49% of Prague). Survey at Poprad-Tatry airport included only one arrival airport - London. Most trips from Poprad-Tatry to London were headed to destinations in the United Kingdom (98%), with London being the most frequent destination.

Sources of journeys to the airport: It was found that the whole territory of the Slovak Republic is the source of trips from the Bratislava airport. Interesting is the significant share of trips from the outermost regions of eastern Slovakia and, on the contrary, low share of trips from Dunajská Streda district. Important source of trips is also Poprad, although it has own airport. A specific feature of Bratislava Airport is that part of the sources of travel to the airport lies outside the territory of the Slovak Republic Vienna 8%, Czech Republic 4%). One of the long-distance bus lines connects the airport with Vienna.

The survey identified 46 municipalities, from which passengers were transported in various ways to the airport in Košice. Compared to Bratislava, Košice Airport has more regional character.

The survey identified 22 sites from which passengers were transported in various ways to the airport Poprad-Tatry. The most frequent trips were from the Poprad district, followed by Spišská Nová Ves, Levoča and Liptovský Mikuláš.

Passenger traffic behaviour: One-segment journeys (67%) by individual car transport (75% of single-segment trips) predominate when traveling to the airport. Interesting is also the very low proportion of public transport, which is only 9% on single-segment trips. Other trips are made by taxi vehicles. The distribution of modal split of single- segment roads is more favourable only in the territory of Bratislava, where 55% of the journeys from Bratislava city to the airport are made by public transport. At the other airports/cities, individual car transport clearly dominates. The average travel time to the airport is 1 hour 23 minutes. 55% of all trips take less than one hour. The shortest travel time is by public transport (12 minutes) and TAXI (26 minutes). The longest are train journeys (2 hours 20 minutes), followed by bus trips (1 hours 48 minutes). Individual car transport trips last on average1 h 20 min. Travel time is also proportional to the number of segments. One-segment trips last about 63 minutes, two- segment last 119 minutes and three- segment 165 minutes. Leisure activities predominate in the character of the trips (62%). It is worth noting higher share of business trips from the airport Košice-Barca. The most Individual travel (42% of respondents) and family travel are very balanced in air travel.

Passenger data: Men and women are equally represented when traveling by air. These were most often people of working age. Another large group are students and people under 25 years.

Conclusions: Despite the fact that the CORCAP project is focused mainly on freight transport, the results of these projects will be one of the starting points for the processing of other parts of the CORCAP project.

3.2.7. Spatial plan of BSK Region

3.2.7.1. Spatial plan of Bratislava Self-governing Region (2013)

Title: Spatial Plan of Bratislava Self-governing Region - indicative part

Date: 2013

Contractor: Bratislava Self-governing Region (BSK)

Author: Aurex

Subject: In accordance with the provisions of the Building Act, the Spatial Plan of the Bratislava Self-governing Region was prepared (Aurex 2013).

Content: Details are given in chapters 4.2 and 4.3 of this study.

Conclusions: This document is the basic starting point for elaboration of the following CORCAP project for IPP.

3.2.7.2. Spatial plan of Bratislava Self-governing Region as amended (2017)

Title: Spatial Plan of Bratislava Self-governing Region as amended

Date: 2013

Contractor: Bratislava Self-governing Region (BSK)

Author: Aurex

Subject: In accordance with the provisions of the Building Act, the Amendments to Spatial Plan of the Bratislava Self-governing Region were prepared (Aurex 2017). This was suitable if it was not necessary to change the overall concept of the Spatial Plan, but only some of them to add partial changes.

Content: Details are given in chapters 4.2 and 4.3 of this study.

Conclusions: This document is the basic starting point for elaboration of the following CORCAP Pilot Study by IPP.

3.2.8. Program of Economic Development and Social Development of the BSK Region for 2014-2020 – The Analytical Part

Title: Program of Economic Development and Social Development (PEDSD) of the BSK Region for 2014-2020 – The Analytical Part

Date: 2015

Contractor: Bratislava Self-governing Region (BSK)

Author: Aurex

Subject

The document is prepared in accordance with the Act on Support of Regional Development. With some degree of simplification, we can say that the *Spatial Plan of Bratislava Self-governing Region* and *Program of Economic Development and Social Development of the BSK Region* are two complementary documents. The former focuses on spatial development perspective of the quality of the settlement environment. The latter (1) formulates the basis for the assignment of the Spatial Plan, and (2) develops the concept of spatial development into a set of objectives, priorities, measures and projects into implementation, including the definition of its financial and institutional framework. An important source of implementation of PEDSD is EU funds.

Content

The study brought detailed description of several modes of transport including the railway transport and logistics. It concluded that the capacity of the railway network and its facilities is sufficient in terms of current as well as expected use of railways (however this statement was based on railway study from 2010). Modernization of railways will be a prerequisite for further development of railways.

The most important project of the development of railway infrastructure in the Bratislava region is the project of international significance "Study of interconnection of the TEN-T railway corridor with the airport and railway network in Bratislava", which was prepared in 2007. The project was divided into 3 parts:

- Bratislav-Predmestie – Bratislava-filiálka – Bratislava-Petržalka (interconnection of corridors) - original project was cancelled, in April 2015 a tender for a feasibility study was proclaimed (ŽSR 2019)
- Bratislava - railway connection to M. R. Štefánik´s Airport
- Devínska Nová Ves - Marchegg, track electrification - implementation is expected after 2020

Conclusions

The project´s aim is (was) to ensure modernization and compatibility of technical parameters of railway infrastructure, enable development of railway transport based on international agreements AGC & AGTC, integrate Bratislava into the railway network by building the axis Paris - Strasbourg - Stuttgart - Vienna - Bratislava / Budapest and thus create a link between two airports, Vienna Schwechat and Bratislava M. R. Štefánik´s Airport. The corridors will be interconnected by building a direct connection of the Bratislava suburban railway station with station Bratislava-Petržalka. The proposed line will be routed through the city centre and, at the same time, fulfil the important goal of contributing to the integration of mass transport system in the territory of the Slovak capital Bratislava.

3.2.9. Regional Integrated Territorial Strategy of the Bratislava Region 2014-2020

Title: Regional Integrated Territorial Strategy of the Bratislava Region 2014-2020

Date: 2015

Author: BSK & City of Bratislava

Subject: The RITS is a medium-term planning document aimed at ensuring the conditions for efficient use of the European Structural and Investment Funds (ESIF), the state budget and other financial resources of beneficiaries during the EU Cohesion Policy programming period 2014-2020, by using the territorial dimension. From the transport perspective, RITS addresses the integrated transport systems. In the following summary, information relating mainly to the railway transport was selected.

Content

The occurrence of a railway station/stop in the territory represents a potential for increasing the utilization of the transport capacity of public passenger transport, which also means reducing the negative impact of transport on the environment. In places lack of appropriate public transport links, there is also the potential for using cycling transport at least to the closest appropriate public passenger transport point. Otherwise, residents will use cars. In locations with existing integrated transport terminal, railway stop/station it is desirable to build a cycle path allowing passengers to pass through the so-called 'last mile'. In order to increase the attractiveness and competitiveness of public passenger transport, the criterion of equipping the territory with a railway station/stop with regular passenger transport (especially within 3 km) is very important. Pursuant to the BSK Traffic Service Plan, the bus connections in the Pezinok - Bratislava program were to be replaced by rail transport.

The following text characterizes the individual lines and identifies their performance (as of October 2010):

- Kúty – Malacky – Bratislava

Performance of the local passenger rail transport is relatively high (it increases from approx. 950 daily passengers behind Kúty to approx. 3000 daily passengers before Bratislava). The track is in parallel with the primary road (distance between road and railway is about 1 - 2 km) in the section Veľké Leváre - Zohor (however, it should be noted that this ends before the Zohor railway station).

- Horná Streda (border of region) – Piešťany – Trnava – Bratislava

The performance of passenger local rail transport is gradually increasing here from relatively low to very high (in the section Horná Streda - Leopoldov about 450 - 500 daily passengers, in the section Leopoldov - Trnava about 1200 daily passengers and in section Trnava - Bratislava up to about 4000 daily passengers). The track is in parallel with the road only in the section Pezinok - Bratislava.

- Bratislava – Nové Zámky

The performance of rail passenger transport is generally high. In the section Bratislava - Šaľa there are about 1300 - 1700 daily passengers, in the next section are reduced to some 1000 - 1250 passengers. The railway line in the section Nové Zámky - Senec - Bratislava is in parallel with the primary roads 75, 62 and 61.

Conclusions: This document is the basic starting point for elaboration of the following CORCAP Pilot Study by IPP.

3.2.10. Slovak Spatial Development Perspective (KURS)

Title: Slovak Spatial Development Perspective: Based on the Slovak Spatial Development Perspective 2001, as amended by the Slovak Spatial Development Perspective 2011 – Amendment No. 1 to the Slovak Spatial Development Perspective 2001

Date: 2012 (update of the indicative part)

Contractor: Ministry of Transport, Construction and Regional Development of the Slovak Republic (MDVaRR SR)

Author: Aurex

Subject: KURS addresses the spatial development perspective of the settlement system of the Slovak Republic and its individual development sectors.

Content

National level - rail transport infrastructure: The railway infrastructure exceeds its current and forecasted capacities. Its operating condition is at a low level, generally low track speeds are reported.

The rail transport development strategy documents the same priorities occur:

- modernization of railway lines in European multimodal corridors crossing the Slovak territory (Bratislava - Žilina - Čadca – SK/PL border, SK/CZ border - Kúty - Bratislava - Štúrovo - SK/HU border, Žilina - Košice - SK/UA border, SK/PL border - Plaveč - Prešov - Košice - Kechnec - SK/HU border)
- completion of buildings under construction (Žilina - Teplička marshalling yard),
- modernization of selected railway junctions and border stations (railway junctions Bratislava, Košice and border stations Čierna nad Tisou, Kúty, Čadca)
- electrification of the line Palárikovo - Zvolen - Košice, renewal and reconstruction of railway stations Prešov, Kysak and Poprad – Tatry
- Projects of European Interest - Pan-European Corridors (implemented or planned):
  - 23 - Railway axis Gdansk - Skalité - Žilina - Bratislava - Vienna (pan-European corridors No. V branch and No. VI)
  - 17 railway axis - Paris - Vienna – Bratislava
  - IV Kúty – Bratislava
  - V Liptovský Mikuláš – Košice.

National Level - Combined Transport: The update of the Update of the Strategic Combined Transport Development Plan with a View to 2010 (MDV SR 2020d) proposes the construction of four European-level intermodal terminals in Bratislava, Žilina, Košice and Zvolen – Budeč.

Transport system of the SR: the basic communication structure of the territory is built by road network supplemented by railway lines. The hierarchically highest road and rail transport systems - forming the basic multimodal dimension of the corridor - and the concurrent settlement development axis of the 1st level, are located in the corridor Bratislava - Trenčín - Žilina - Poprad - Prešov – Košice.

Bratislava:

- ITF Multimodal Corridors (ECMT) IV. and Va.
- lies on the Danube classified as Multimodal Corridor ITF (ECMT) VII.

Southwest Slovakia

- ITF Multimodal Corridor Network (ECMT) No. IV. and Va.
- considerable deficit in service by rail transport of the settlement centre Nitra
- There is no fast railway connection between Nitra and Bratislava - as part of the European metropolitan agglomeration of Vienna – as well as with the rail system of the multimodal corridor Va.

Northwest Slovakia

- the main transport axes form multimodal ITF corridors (ECMT)Va. and VI., and the extra-corridor network TEN-T towards Central Slovakia and Moravia
- On the existing interconnection of the road I/18 to Moravia it is necessary to make corrections in order to redirect heavy freight transport from the Protected Landscape Area on the Slovak and Czech side of the border

Central Slovakia

- In the west-east direction, the TEN-T railway line Palárikovo / Nové Zámky - Zvolen - Košice (proposed part of modernized AGTC lines) creates a multimodal corridor of national importance
- The transport infrastructure of the TEN-T level of the road and rail transport network intersects in the Zvolen area, creating a transformational node that attractively covers the central Slovak transport-gravity area

East Slovakia

- Multimodal corridor no. Va interconnected in the Košice area with the TEN-T railway network Palárikovo / Nové Zámky - Zvolen - Košice
- Proposal of the road corridor, known as 'Via Carpatia': Kaunas - Bialystok - Lublin - Rzeszów - Prešov - Košice - Miskolc - Debrecen line (the intention of the realisation of the road corridor creates an intersection with the multimodal corridor Va. in the area of Košice and Prešov with the reach to the territory of Poland, Ukraine, Hungary and Romania)

Amendments No. 1 KURS 2001:

- The original proposal of KURS 2001 for the inclusion of the D1 Leopoldov - Hlohovec - Nitra - Komárno - Komárom road connection was abandoned due to the absence of an agreement with Hungary. Due to the alternative function of such a corridor in relation to overloaded D1 motorway, the section Nitra - Komárno - Komárom was reclassified as a proposal to be part of AGR network. The rest of the road connection in Leopoldov - Hlohovec - Nitra section will remain its function of nationwide importance, as the area of the Nitra agglomeration will gain advantageous access to the D1 motorway
- Amendments no. 1 KURS 2001 propose to (1) include the new and modernized conventional rail lines implemented under European Priority Project No. 17 on the territory of the city of Bratislava to TEN-T and AGC network, (2) include the combined transport line Palárikovo / Nové Zámky - Zvolen - Košice and the basic public terminals of the combined transport planned in Leopoldov and Zvolen - Budeč to the AGTC network.
- In rail transport, all lines of national importance (Palárikovo / Nové Zámky - Zvolen - Košice) are transferred to the TEN-T extra-corridor network. The aim of this step is to reduce the volumes of international source- and destination- road freight transport to the regions of Slovakia, outside their transport-gravity centres. This intention will contribute to improving the service of centres and their catchment area of central-southern Slovakia (Lučenec, Fiľakovo, Tornaľa, Rožňava). The lines Levice - Štúrovo and Nové Mesto nad Váhom - Vrbovce were omitted from the network of railways of supra-

regional importance due to the unfulfilled expectations of their importance in the transport service of the area. The broad-gauge lines Bánovce nad Ondavou - Maťovce and Haniska - Košice - Maťovce were transferred to the network of supra-regional railway lines. The assumed higher significance of the mentioned lines is related to the planned renewal of the normal gauge line at the border crossing Maťovce - Uzhhorod.

Conclusions: KURS is one of the starting points for the CORCAP project made by IPP.

3.2.11. Transport Node Bratislava - Feasibility Study

Name: ŽSR, Transport Node Bratislava - Feasibility Study

Date: 2019

Contractor: ŽSR - Železnice Slovenskej republiky (Slovak Railways)

Author: Združenie Uzol Bratislava: Reming consult, Sudop Praha Prodex, Dopravoprojekt

Subject: The extensive project addresses the further development of the Bratislava railway junction. The project also solves the sequence of individual steps of further development of the Bratislava Railway Junction.

Content

The feasibility study brought these **results**:

- most sections in the Bratislava node have enough capacity (throughput) for the current volume of regular transport
- railway segments between Bratislava Main Railway Station (hlavná stanica) - Bratislava-Lamač and (Bratislava-) Podunajské Biskupice - Bratislava-Nové Mesto show values close to the recommended maximum for the current volume of regular services
- from the heaviest sections, we can already consider the overloaded section (section with insufficient capacity) the section Bratislava-Nové Mesto - Main Railway Station (hlavná stanica)
- Bratislava Main Railway Station (hlavná stanica) has insufficient capacity of the rails not only during peak hours, but also during the workday for the current volume of regular transport
- the regional railway line Bratislava - Dunajská Streda - Komárno in the section Bratislava Main Railway Station (hlavná stanica) - Kvetoslav is overloaded (in terms of parameters from UIC 406)
- the railway line in the section Pezinok - Bratislava-Rača has exhausted free capacity due to a significant increase in the extent of suburban passenger transport
- the most loaded freight lines are Bratislava - Kúty and Bratislava - Dunajská Streda
- railway lines with the highest combined traffic volumes are Bratislava - Kúty and Bratislava – Komárno

Based on the above, the main **problems** can be defined:

- ▫ insufficient capacity of some sections and railway stations already for the current volume of transport. This is manifested by the following limitations:
  - ▫ it is not possible to increase the number of trains on some lines (this is valid for the route Bratislava - Dunajská Streda and partly for the route Bratislava - Kúty)

- it is not possible to strictly follow the periodic railway timetable in regional passenger transport, especially during peak hours
- some of the freight trains are routed directly through the hub
- waiting for free capacity, especially for freight trains during peak periods

- Average age of critical infrastructure elements is high (it applies to both technical and technological equipment). This is manifested by:
  - increased need for maintenance interventions, which affects the continuity of operations
  - the emergence of temporary speed limits
  - higher financial demands for ensuring the operability of the equipment
- Sections with low line speed and high number of local line speed limitations affecting:
  - extension of regular driving times
  - deterioration of the conditions for smooth running of trains
  - increased need for maintenance interventions, which affects the continuity of operations
  - the emergence of temporary speed and other limits
  - higher financial demands for ensuring the operability of the facilities
- Sections with low line speed and high number of local line speed limitations affecting:
  - extension of regular driving times,
  - deterioration of the conditions for free-flowing traffic of trains
- some facilities do not meet the standards (exceptions had to be made) or do not meet the requirements of operation (insufficient length of platforms or insufficient useful length of transport tracks),
- a part of the stations and stops is not equipped with platforms with an elevated approach, which affects:
  - passenger safety
  - traffic capacity of railway stations
- railway signalling devices use track circuits which do not meet the interoperability requirements (the node is impassable for some types of traction unit)

The requirements are not only to eliminate the current major problems, but to adopt solutions that will ensure that some of these problems do not occur in the future. E.g. eliminate not only current bottlenecks, but also future capacity constraints based on the transport forecasts and predicted operational concept.

In order to ensure the required railway infrastructure capacity, the study implies the need to:

- increase the capacity of the Bratislava-Nové Mesto - Bratislava Main Railway Station (hl. st.) segment by building the 2nd line track (including track modifications at the Bratislava-Nové Mesto station)
- increase the capacity of the Bratislava Main Railway Station (hl. st.) – (Bratislava-) Devínska Nová Ves segment by building the 3rd line track between the Main Railway Station and Bratislava-Lamač (including the new tunnel)

- elimination of restrictions at the Bratislava Main Railway Station by means of its modernization
- increase the capacity of the Bratislava-Nové Mesto - Podunajské Biskupice segment (build a new shunt situated at Bratislava-Ružinov)

An increase in the capacity of the Bratislava Railway Hub may subsequently trigger new requirements for the adjustment (capacity increase) of the branch lines.

Already at present (in 2019) capacity is exhausted during peak periods in the sections Trnava – Bratislava Rača and Dunajská Streda - Bratislava-Nové Mesto.

Conclusions: The feasibility study is one of the starting points for the CORCAP project made by IPP.

3.2.12. Traffic Model of the Slovak Republic

The document consists of two parts:

- Freight Transport Survey
- Final Report (Future Scenarios Prognoses)

3.2.12.1. Freight Transport Survey

Title: Freight Transport Survey – Report

Date: October 2015

Contractor: MDVaRR SR

Author: AF&partners: AF-CITYPLAN

Content

The work on the freight survey was carried out in two phases:

PHASE A: The questionnaires consisted of Questionnaire A, in which respondents added general company data, and Questionnaire B, in which respondents filled in information on consignments sent from May. Overall, the result of the questionnaire survey can be summarized as follows:

- the amount of questionnaires B obtained is very small compared to the considered length of the survey (May)
- the questionnaires are not filled evenly across the whole spectrum of respondents
- the sample is strongly influenced by the majority of responses from the department stores and chains (58% of all Questionnaires B obtained)
- particular transport modes are not covered sufficiently
- information on the weight of the cargo transported is completely missing

In view of the above facts these data do not provide a useful representative sample and are not suitable for the analysis of freight transport in Slovakia.

PHASE B: Statistical data from various subjects were provided for the needs of freight transport analysis in Slovakia. In 2014 the total transport of goods in Slovakia reached 195.5 mil. tonnes, 73% of this volume (142.6 million tonnes) was transported by road, 26% (almost 51 million tonnes) by rail, 0.9% by inland waterway freight and 0.0046% by air. Similar statistics are valid freight transport: road transport accounts

for 77% of transport performance, rail transport 21%, domestic water transport 1.7%, air transport 0.08%. Since 2000, the volume of combined transport has increased significantly from 565,000 tonnes to 4.8 million tonnes in 2014. A slight fall was recorded in 2009 (-11%), but this trend was not permanent, and the following year increased by 34%. The highest share in goods transported in 2014 was reported by the Dunajská Streda terminal, namely 63.5%. The same counted for the share in manipulated freight units for the same period (57.8%).

3.2.12.2. Final Report (Future Scenarios Prognoses)

Title: Final Report

Date: March 2016

Contractor: MDVaRR SR

Author: AF&partners: AF-CITYPLAN

Content

The work on the freight survey was carried out in two phases:

Five scenarios have been defined in two time-horizons - 2030 and 2050:

- BAU Business as usual forecast scenario
- BAU + Business as usual forecast scenario high,
- BAU- Business as usual forecast scenario low,
- IDEU TEN-T Infrastructure Development Scenario,
- ECO Environmentally friendly transport scenario.

PERSONAL TRANSPORT:

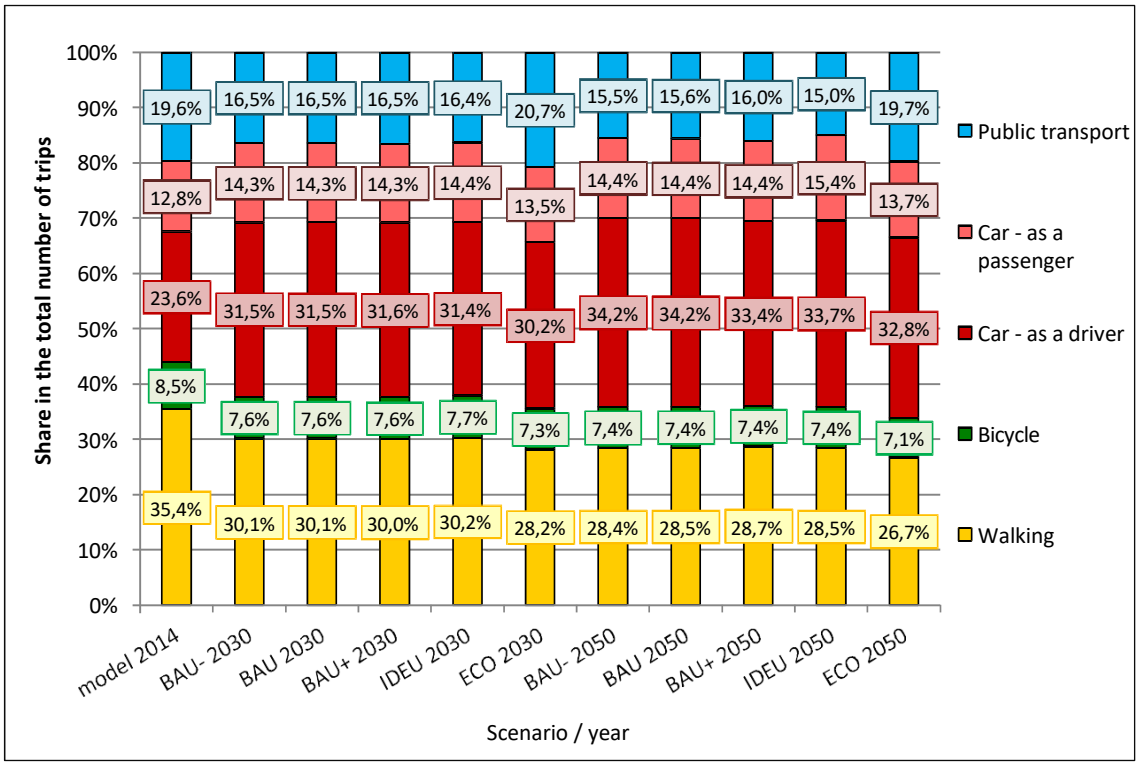
In 2030, however, a similar level of increase in traffic load can be expected in all scenarios, especially on backbone roads of national importance leading in the east-west direction, such as D1 motorway, R1 and R2 expressways and primary road I/16.

FREIGHT:

A graphical comparison of rail and road freight transport performance for all scenarios is given in the graphs.

The BAU scenario is the most probable scenario in terms of expectations of economic growth and the development of transport infrastructure. Freight transport performance will increase by 21% (about 1% per year) by 2030. The choice of transport mode between road and rail will easily increase in favour of road transport (from 67% to 71%). This is due to a lower increase in the volume of bulk materials (attractive for rail transport) and a lack of large investment in rail transport. Freight transport performance will increase by a further 33% (by 61% compared to the base year) in 2050. The share of transport modes will remain similar to that of 2030. Traffic flows on major transport corridors will increase more than the average especially on the Bratislava – Banská Bystrica - Košice and Bratislava – Trenčín – Žilina. Lower increase is expected on the Košice - Žilina corridor, where bulk materials are mainly transported. The planned transport infrastructure should be sufficient for the same or similar number of passenger trains as nowadays. The most used sections are located around Košice and Žilina on the Košice - Žilina corridor, where passenger trains are running parallelly with a relatively high number of freight trains.

Figure. Modal split per scenarios



Source: MDVaRR SR (2016c)

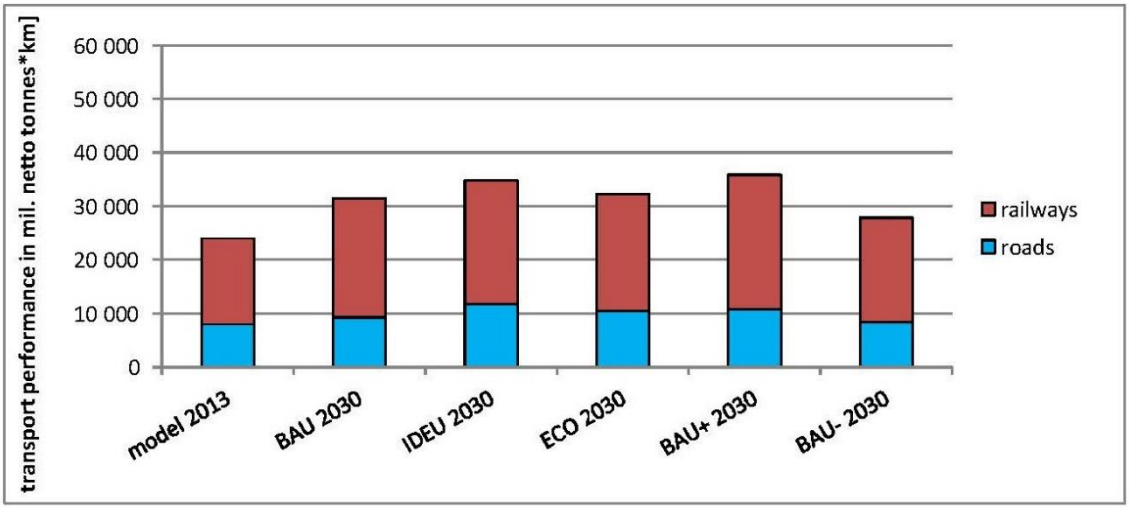
The BAU+ scenario assumes an increase of 10-20% over the most probable BAU scenario. Freight transport performance will increase by 38% (about 2% per year) by 2030. In 2050 freight transport will increase by further 49% (106% compared to the base year). Compared to the BAU scenario, capacity problems may arise on the rail network before 2050 (some sections will be fully utilized as early as 2030).

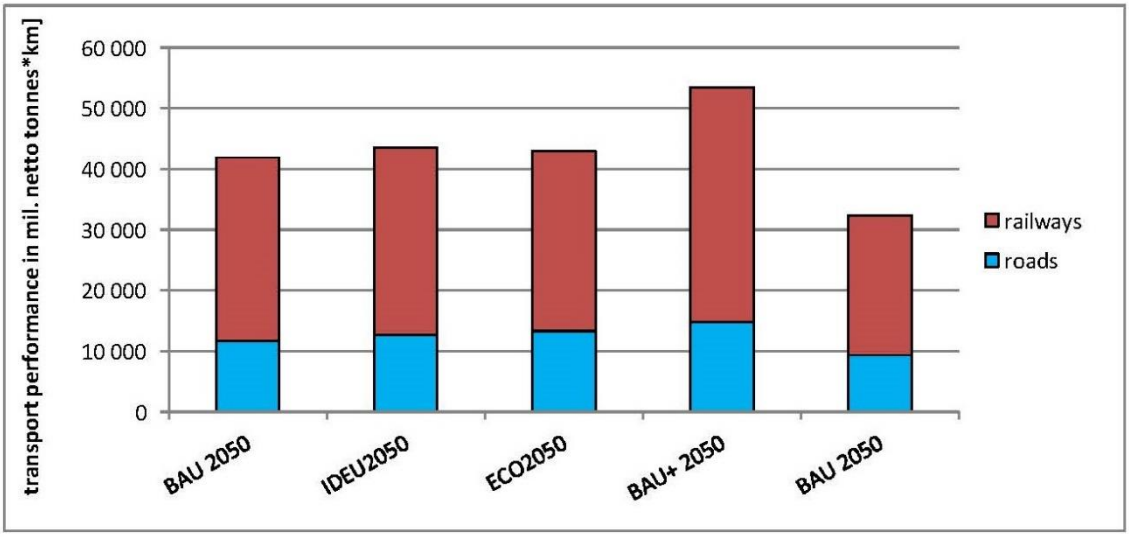
The BAU- scenario assumes a decrease of 10-20% compared to the BAU scenario. Transport capacity by 2030 will only increase by 7% (about 0.5% per year). It will increase by a further 16% in 2050 (25% compared to the base year). This scenario represents a practical stagnation in freight transport and is probably the least expected.

The IDEU scenario is based on the same socio-economic development as the BAU scenario but it differs in the expected changes in transport infrastructure. Transport capacity will increase by 34% (about 1.7% per year) by 2030. In 2050, it will increase by a further 25% (68% compared to the base year). Due to the improvement of transport infrastructure (completion of the TEN-T network), transport performance will increase by 4% on the road and 27% on the railways compared to the BAU scenario. As rail transport becomes more attractive, there will be capacity problems on the railways (especially on the Košice - Žilina corridor and the Žilina - SK/PL border section).

The ECO scenario is also based on the same socio-economic development as the BAU scenario but differs in transport policy. Transport performance by 2030 will increase by 24% (about 1.3% per year). The choice of transport mode between road and rail will remain similar, as long as the increased road charges do not shift from rail to road (as happens in other scenarios). In 2050 freight transport will increase by further 33% (65% compared to the base year). Due to the transport policy, road transport is decreasing by 3% compared to the base year and rail transport is increasing by 13%.

Figures. Transport performance and choice of transport mode in freight transport for 2030 and 2050





Source: MDVaRR SR (2016c)

Conclusions: The traffic model is one of the starting points for the CORCAP project made by IPP.

3.3. Presentation of completed and ongoing projects and actions

The initial list of projects is taken from the project Orient East Med – Third Work Plan of the European Coordinator (Grosch 2018). Due to the fact that It is a living process, further developments will be gradually added during the CORCAP project.

Tab. List of projects where Slovakia is involved

Project name	Project category	Project promoter	Member States involved	Project end date	Total cost (M €)
Regional and Transport Development in the Danube-Black Sea Region towards a Transnational Multiport Gateway Region – DBS Gateway Region	IWW	Regional Government of Lower Austria	AT, BG, DE, HR, HU, MD, RO, RS, SK, UA	06/2019	2,18
Deployment of ERTMS/ETCS onboard components	Rail ERTMS	ČD cargo, a.s.	AT, CZ, DE, HU, PL, SK	12/2020	137,50
Deployment of ERTMS/ETCS onboard components	Rail ERTMS	České dráhy, a.s.	AT, CZ, DE, HU, PL, SK	04/2020	246,89
Retrofitment of 35 locomotives with ERTMS	Rail ERTMS	MAV-START Vastui Szemelyszallito Zartkoruen Mukodo Reszventytarsasag	AT, HR, HU, RO, SI, SK	09/2019	12,72
SESAR Deployment Programme implementation 2015 – Cluster 3	Innovation	SESAR Deployment Manager (NATS (En-Route) Plc on behalf)	BG, HR, CZ, EE, HU, PL, PT, RO, SK, GR	12/2020	63,78
EAST-E	Innovation	Západoslovenská energetika, a.s.	CZ, SK, HR	12/2018	7,44
ETCS retrofit	Rail ERTMS	LEO Express, a.s.	CZ, SK, PL	07/2019	3,79
Implementation of TAF TSI by private railway operators	Rail	OLTIS Group	CZ, SK, PL	12/2019	1,10
M15: Section between M1-Rajka HU-SK border (2x1 lanes → 2x2 lanes)	Road	Ministry of National Development, National Infrastructure Development Co (NIF)	HU	10/2019	64,66

Project name	Project category	Project promoter	Member States involved	Project end date	Total cost (M €)
Motorway ITS Bratislava Node	Road	National motorway company (NDS)	SK	12/2019	24,50
Parking facilities on Motorway D2	Road	National motorway company (NDS)	SK	12/2019	17,60
Study on Motorway Junction D2 Cunovo	Road	National motorway company (NDS)	SK	unknown	1,50
Study on Increasing Capacity of Motorway D2 section Bratislava-Lamač	Road	National motorway company (NDS)	SK	Unknown	0,30
Rail Node Bratislava – Works	Rail	Slovak railways (ŽSR)	SK	12/2030	900,00
Modernisation of the railway: Devínska Nová Ves – border CZ/SK	Rail	Slovak railways (ŽSR)	SK	12/2020	273,08
Implementation of ERTMS on corridor IV: Devínska Nová Ves – border CZ/SK	Rail ERTMS	Slovak railways (ŽSR)	SK	02/2020	87,00
ŽSR Intermodal Terminal Bratislava – 1st construction phase	Multimodal	Slovak railways (ŽSR)	SK	02/2020	50,00
Rail Node Bratislava – Project Documentation	Rail	Slovak railways (ŽSR)	SK	02/2019	25,00
Construction of terminals integrated passenger transport in Bratislava - Devínska Nová Ves, implementation	Rail	Slovak railways (ŽSR)	SK	09/2020	19,66
Construction of terminals integrated passenger transport in Bratislava - Lamačská brána, implementation	Rail	Slovak railways (ŽSR)	SK	06/2021	16,35
Construction of terminals integrated passenger transport in Bratislava - Patrónka, implementation	Rail	Slovak railways (ŽSR)	SK	04/2021	9,94
Construction of terminals integrated passenger transport in Bratislava -	Rail	Slovak railways (ŽSR)	SK	01/2021	8,93

Project name	Project category	Project promoter	Member States involved	Project end date	Total cost (M €)
Trnávka, implementation					
The information system of the integrated transport system of Bratislava region	Rail	Slovak railways (ŽSR)	SK	08/2017	6,54
Construction of terminals integrated passenger transport in Bratislava – Ružinov, implementation	Rail	Slovak railways (ŽSR)	SK	07/2020	4,46
Construction of terminals integrated passenger transport in Bratislava – Mladá Garda, implementation	Rail	Slovak railways (ŽSR)	SK	11/2023	3,00
Rail Node Bratislava – Feasibility Study	Rail	Slovak railways (ŽSR)	SK	08/2017*	1,30
Terminals integrated passenger transport in Bratislava – project documentation	Rail	Slovak railways (ŽSR)	SK	03/2017	1,00
Implementation of the technical interoperability for TAP TSI sub system	Rail	Železničná spoločnosť Cargo Slovensko, a.s.	SK	12/2019	8,66
Implementation of the technical interoperability for TAP TSI sub system	Rail	Železničná spoločnosť Cargo Slovensko, a.s.	SK	12/2019	3,14
NCE - FastEvNet	Innovation	GreenWay Infrastructure s.r.o.	SK, PL	03/2019	4,80

Source: Grosch 2018. Note: * - finished in May 2019

4. SPATIAL ASPECTS OF NODES IN TRANSNATIONAL TRANSPORT

This chapter has been elaborated according to the content of the transport chapter of the Spatial Plan of Bratislava Self-governing Region (Aurex 2013, Aurex 2017) and will be gradually completed in the next part of the work on the CORCAP project.

4.1. Needs and requirements for improvement of node functions

Slovakia's position within the OEM corridor relates to its western, respectively. southwestern part. From the Slovak Spatial Development Perspective (Aurex 2012) point of view, it is the gravitational centre of the highest importance, which occupies the BSK and TTSK areas as well as the western part of the NSK and the southern part of the TSK Regions. The main centres are Bratislava, where there is an intensive suburbanization process, which in the west and south directions also crosses the borders of Slovakia to Austria and Hungary. Other centres of settlements of the highest importance are Trnava, Nitra and partly also Trenčín. Settlement structure represents a segment of radial-concentric system with centre in Bratislava from where it stretches to the other parts of Slovakia. Urbanization axes are developing towards northeast, east and southeast. In addition, the settlement structure develops across the national borders to Austria in the west and the Hungary on the south.

From the historical development point of view, Bratislava Region represents an important traffic junction - a crossroads, where the north-south axis formed one of the branches of the so-called Amber Road. The Danube was always a natural transport corridor in the east-west direction. The third historical transport route was the interconnection from northern Italy through the Považie Region along the river Váh) to the northeast of Europe. These historical ties have been strengthened again since 1989.

Based on the analysis of the documents mentioned in Chapter 3, we can conclude that the Bratislava Region is a sensitive point of the OEM corridor. Transport capacity, especially in terms of transit, is limited by the capacity of the existing transport infrastructure, especially in terms of freight rail transport, as well as the quality of the interconnection of particular road, rail, water and air transport terminals.

From the perspective of the Slovak Republic, in relation to the OEM corridor, it is also necessary to complement the transport infrastructure between Bratislava and Budapest along the left bank of the Danube in the route Bratislava - Nové Zámky – Štúrovo - Budapest, which is crucial in terms of freight rail transport.

4.2. Process of node development (analysis of the processual dimension)

Public transport infrastructure - rail transport

Rail transport has two basic objectives - to build sufficient capacity of rail corridors at the Bratislava Railway Junction and to strengthen regional rail suburban transport as part of the integrated transport system, which also includes the building of new sections of regional railway lines.

Railway lines and stations on the territory of BSK

- Trans-regional magistral railways running radially:
  - M110: Bratislava - Brno - Prague - Dresden - Berlin - Hanover, preparation for overall modernization to 140km / h

- M120: Bratislava - Žilina - Čadca - Zwardoň - Warsaw - Gdańsk, upgraded to 160km / h in the section Bratislava Rača - Border of BSK
- M130: Bratislava - Štúrovo - Budapest - Belgrade - Istanbul - (Thessaloniki), preparation for overall modernization to speed 140km / h.

- The supra-regional main railway framework is complemented by basic and supplementary lines of ŽSR also in relation to Austria (ÖBB) and Hungary (MÁV):
  - Z-100: Bratislava - Devinska Nova Ves - Marchegg - Vienna, preparation for double-track and electrification
  - Z-131: Bratislava - Dunajská Streda - Komárno, preparation for double-track and electrification
  - Z-132: Bratislava - Petržalka - Rajka - Győr,
  - Z-101: Petržalka - Kittsee - Parndorf - Vienna,
  - O-112: Zohor - Plavecký Mikuláš, the track is single track, non-electrified. The connection to Jablonica was not realized.
  - O-113: Zohor - Záhorská Ves, minimal rail traffic, passenger transport in the range of 8 pairs of trains a day.
  - O-xxx: Devínske Jazero - Stupava line (operation stopped, line dismantled, request for the resumption of personal operation)
  - Line 110 Bratislava - Kúty
  - Line 112 Zohor - Plavecký Mikuláš
  - Line 113 Zohor - Záhorská Ves
  - Line 120 Bratislava - Žilina
  - Line 130 Bratislava - Štúrovo
  - Line 131 Bratislava - Komárno
  - Line 132 Bratislava - Rusovce - Rajka

Freight rail and combined transport

The radial-circular network of existing main lines of European and national importance and basic railway routes significantly support the development of the region's territory. The space for the location of the combined transport terminals (car parks and connecting roads for the first- and second-class roads) must be reserved in contact with Malacky, ÚNS, Pezinok and Senec railway stations, and Vlčie hrdlo-Čierny les port in Bratislava.

In the organization of railway freight transport, it is necessary to increase the use of the railway line No.116 Trnava - Senica - Kúty, because of the relieving of the railway junction Bratislava, especially from transit freight transport. However, this intent requires technical adjustments to be made to improve the direction and height of the line for improving its performance.

Modernization of the railway lines to 160-200 km in flat western Slovakia and electrification of currently non-electrified lines will meet the European standard for passenger and freight transport. The Vienna-Schwechat / Bratislava Airport line will be connected to this system in the Bratislava Region, which will

indirectly link Bratislava and the magistral railways of Slovakia to the trans-European express train system in Corridor IV. and V.

A feasibility and justification study of the extension of broad-gauge line China - Russia - Ukraine - Slovakia - Austria is currently underway (BPG 2018). This project is managed by an international association of participating countries, based in Austria.

Objectives of railway transport development

The segregation of transport (passenger and freight railway transport) at the Bratislava Railway Junction is the reason for the design of the freight relief tunnel in the Lamač - Briežky corridor with continuation through the Nové Mesto – ÚNS / Predmestie – Východné (VVNS).

- Trans-regional stations are proposed in the following hierarchy:
  - Bratislava main station: with the function of an international transit railway station (upper-class), for passing express trains and fast trains from Brno, Žilina, Nové Zámky, in the scope of reconstruction and links to the main public transport system of Bratislava
  - Bratislava - Petržalka: with the function of international transit and destination transport (1st class), for passing express and fast trains from Vienna and Győr, Žilina and Zvolen, within the scope of a new customs station - under construction, in relation to public transport 56 passenger trains
  - Bratislava - Nové Mesto: with the function of the international crossing and ending station (2nd class) for fast trains from all directions entering the region, with the possibility of using the current capacity of the railway yard
  - Bratislava – Bratislava Airport (M. R. Štefánika): with the function of an international stop of express and fast trains especially for connecting airports and all the main directions via the Nové Mesto station, underground stop connected to the direct airport service system and the Bratislava public transport system. Connection of this line to the railway line is also envisaged
  - Bratislava - Filiálka is a renewed station on the line BA-Predmestie - BA – Petržalka, with the planned connection with the station BA-Petržalka through the tunnel under the Danube, as the interconnection of corridor lines and with an increased share of urban and suburban passenger transport. Also, in the construction phase without interconnection under the Danube, the railway station Bratislava - filiálka will serve as an important terminal of suburban rail passenger transport
- The technical facilities of the trans-regional stations will be:
  - The Žabí majer station for passenger traffic, daily volumes: 65 pairs of maintenance trains
  - Central freight station (UNS) for freight operations, number of passenger trains 48, freight trains 48 days / day, loading volumes: 96 v / day, unloading 110 v / day and container docking station 28 + 17 v / day
  - Station Východné for freight traffic and network train formation, handling and conversion trains
  - stations Kittsee / Petržalka and Devínska Nová Ves as freight customs - transit stations of national importance

The capacity of the existing railway premises and their transport potential provide sufficient reserves for the further development of the area.

It is proposed the modernization and improvement of following railway lines:

- Modernization of railway infrastructure IV. of the multimodal corridor in the section SR / CR - Kúty - Bratislava - Galanta - Štúrovo – SK/HUborder
- Interconnection of railway corridors in the city of Bratislava, project TENT-T no. 17, including the connection of Bratislava Airport´s (M.R. Štefánika) railway infrastructure
- Electrification and doubling of the railway line Devínska Nová Ves - Marchegg
- Electrification and doubling of the railway line Petržalka - Kittsee
- Electrification and doubling of railway line BA-Nové mesto - Podunajské Biskupice, Nové Košariská
- Location of intermodal transport terminal in Bratislava – Pálenisko (port)

Revitalization of selected railway stations at the Bratislava node

Prepared objects and installations must be located at a distance beyond the maximum permissible noise level from the railway traffic. There is a need for the development of railway infrastructure and of the project "Bratislava, railway interconnection of the EU corridors with direct connection of the airport to the railway network" from 2008. The project “Interconnection of the TEN-T railway corridor with the airport and railway network in Bratislava” from 2010 also fulfils the intentions of the development of railway transport and thus increasing the share of railway transport in the transport market according to the EC White Paper of 2001 on European Transport Policy till 2010. The project consists of three parts:

- Railway interconnection of stations Bratislava-Predmestie – Bratislava-Petržalka
- A new railway terminal at the M. R. Štefánik´s Airport
- Electrification of the line Marchegg - Devínska Nová Ves

4.3. Networking activities

Potential routes of railway infrastructure development at the Bratislava node

Route 1 / Vienna - Marchegg - Devínska Nová Ves - Bratislava Main Station – Bratislava Airport

It is the northern branch of the Vienna-Bratislava connection. Due to its technical parameters, the track has the character of a regional track.

The track is a single-track in the whole section on the Austrian side and is not electrified up to Devínska Nová Ves. The line speed of this line is up to V = 80 km / h. In both nodes, the line is suitably connected to the technological and technical facilities. In passenger transport, the line is important for the regional connection from the Gänserdorf, Marchegg to the industrial zone in Devínská Nová Ves and also to Bratislava.

The capacity increase of this route can be achieved by doubling the track in the Stadlau - Marchegg - Devínska Nová Ves section and electrifying this section in its full length. The Bratislava Main Station - Devínska Nová Ves section is the most loaded section on the Slovak Railways network, and when increasing performance, it is necessary to look for a solution, either by double-tracking or by diverting freight to other lines. On the Bratislava Main Station - Bratislava Nové Mesto section, the line is monorail and is at the limit of operational performance. In the next period it is necessary to double-track this line section, as well as to build a stop for connecting the line to the integrated system of public transport. The track runs on the section of Bratislava through the built-up residential area to the airport / to Podunajské Biskupice station. The line section Bratislava Nové Mesto - Podunajské Biskupice station is monorail, non-electrified and up to the level of the turn to the airport it is in parallel with the double-track, electrified

line in the direction of the central freight station (ÚNS) and port, continuing to Bratislava Petržalka station. The railway connection from the station Bratislava-Nové Mesto – Bratislava Airport by a single track in parallel with the track to Podunajské Biskupice passes through the built-up area of Bratislava and with built stops on the route it has its importance for the integrated transport. The connection to the airport crosses the D1 motorway and the track in the direction to Podunajské Biskupice and Dunajská Streda, which plays an important role in regional transport.

Route 2 / Kittsee – Bratislava-Petržalka - Bratislava-filiálka - Airport

Most of this route represents the original former fast connection of the Bratislava and Vienna centres. The railway line provides both suburban and regional transport in passenger transport, mainly on the Austrian side, as the route passes through the margins of important settlements in the suburbs of Vienna. In the section on the Slovak side from the Bratislava-Petržalka station, the line passes the edge of the city centre and also fulfils the function of urban transport linked to regional transport. The route provides a fast connection between Bratislava and Vienna and in the future also a fast connection of the airports of these two cities. Technical parameters of the track outside the nodes are designed to speed V = 160 km / h, in nodes it is speed V = 80 km / h.

The track on the territory of Bratislava follows the old railway connection, which in the past played an important role in suburban and urban transport, including stops on this route. Railway station Bratislava-filiáka is an important transport hub for all kinds of public transport, such as buses, trolleybuses and trams to all directions of the city. The section of the track to the Bratislava-Predmestie station also passes through a densely populated district. Bratislava-Predmestie station is an important branching station for four lines and a connecting station for industrial buildings in this area. The station is located in close proximity to the Bratislava-Východné marshalling yard, which is the largest within the ŽSR network.

Route 3 / Kittsee – Bratislava-Petržalka – Prístavný most (bridge) - Airport

This line in the section Bratislava-Petržalka - Bratislava Central Freight Station (ÚNS) was established as a substitute line after the cancellation of the railway through the city. For the most part, the line passes after crossing a double-track railway-road bridge over a low-occupied part of Bratislava. Furthermore, the Bratislava-Nové Mesto station does not fulfil the function of the city railway. From the station Bratislava - ÚNS there is a connection by a branch line to the company Slovnaft and for the port of Bratislava, where several companies provide logistics. The line in the section Bratislava-ÚNS – Bratislava-Nové Mesto is double-track, electrified with a direct turn to the airport, above the railway line to Podunajské Biskupice. This rail link is the basis for the future guidance of high-speed lines across the territory of Bratislava, continuing beyond its borders in the direction of Central Slovakia. The line passes through the less populated part of Bratislava and therefore has less environmental impacts on the surroundings.

The track is convenient for both passenger and freight transit traffic. The route can serve as a quick connection to Bratislava and Vienna airports. The track parameters are up to V = 100 km / h.

Route 4 / Kittsee – Bratislava-Petržalka - tunnel - Bratislava Main Station - Airport

The route is a combination of the projected railway connection with the planned public transport system (metro). The track can serve mainly as a city railway with the possibility of transfer to suburban, regional and long-distance transport. The route is guided in part by the historical densely populated part of the city. The connection of the route to the Bratislava main station is very technically demanding and it is possible to connect to the Devínska Nová Ves direction. There are several public transport stops on the route, which ensures the integration of transport and interconnection of urban and suburban public transport, including the transfer to long-distance transport at the Bratislava Main Station, which at the Bratislava node serves as a transit station in west-south directions. The route to the airport from the main station is led by a single track to the station Bratislava-Nové Mesto, which is at the limit of its operational

performance. In the section Bratislava-Nové Mesto – Bratislava Airport the line is in parallel with the single track to Podunajské Biskupice

Route 5 / Kittsee – Bratislava-Petržalka - tunnel - Bratislava-filiálka - Airport (projected)

It is an interconnection of corridors in the city territory with a significant function of the combination of suburban, regional and urban transport. The track within the city fulfils the function of public transport, in integration with other types of transport and leads directly, without changes to regional and long-distance railway transport. The track is designed for parameters for track speed V = 80 km / h. On the territory of city districts, it provides transport services. Individual stops and stations are in important transport junctions where individual types of supplementary urban public transport cross.

In the next stage of construction, the connection of the terminating railway line at the airport is expected to connect to the railway line no. 130 Bratislava - Štúrovo.

Extension of regional lines:

In order to increase the attractiveness of the rail segment of integrated suburban transport, it is proposed to strengthen and interconnect existing lines within the BSK, bringing together two regional lines to achieve a complete transport interconnection of the railway circuit around the Small Carpathians massif. Regional lines will be operated exclusively by light vehicles for the purpose of passenger transport, allowing these lines to be brought closer to the centres of settlements. These are light rail lines with a possible town-forming function. A territorial reserve for the construction of these lines must be established, but the specific route must be directly linked to the urban structure of the affected areas.

- ŽSR 120-116 - construction of a new regional line from Pezinok to Smolenice. The new line will serve the foothill villages and will create a circuit by connecting the lines 110 - 120 - 116 - 112. The maximum design speed is 80 km / h. The new section will enable the interconnection of Bratislava and Trnava also in case of failure on line 120
- ŽSR 112 - new route 112 from Lozorno through the cadastre of Stupava, use of the existing route Stupava - Devínske jazero and connection to line 110. Within this line there is Stupava headend station, which will be located on the outskirts of Stupava urban area. Zohor Station remain unchanged
- ŽSR 112– Plavecký Mikuláš - new extension of line 112 to Jablonica. Maximum design speed 80 km / h
- Construction of a new regional railway line from Vajnory to Pezinok with service of Chorvátsky Grob - Slovenský Grob - Grinava. Creation will require a new route and interchange with existing and proposed roads. Design speed is up to 80km / h. The routing of this regional railway line and its stops will be specified according to the state of development of the whole area, in particular to the extent and type of development in the area concerned. The location of this line will also be affected by future noise conditions from rail traffic.

Rail and combined transport:

The radial-circular network of existing main lines of European and national importance and basic railway routes significantly supports the development of the region's territory.

Modernization of tracks at speeds of 160-200 km/h in the flat territory of western Slovakia and their electrification will provide the European standard for passenger and freight transport. The Vienna - Schwechat and Bratislava airports will be connected to this system in the Bratislava region, which will indirectly link Bratislava and the Slovak Arterial Roads to the trans - European express train system in Corridor IV. and V.

The proposal includes terminals for combined transport in connection with railway facilities in Malacky, Pezinok, BA - ÚNS and Senec.

In the port BA - Pálenisko, a trimodal freight terminal is being created in connection with the water transport on the Danube.

Long-term development of ITS (Integrated Transport System)

BID presented the BSK service plan, which was oriented to the operating conditions of tariff zones and tariff conditions.

On the basis of analyses carried out within the "Territorial Master Plan of BSK Transport", a request was made to extend suburban integrated transport to the territory of the neighbouring Trnava Self-governing Region. However, it is already possible to observe significant transport relations, especially from Šamorín, Dunajská Streda, which may have a significant impact on the development of fast regional rail or other transport. The proposed lines, which should be included as a matter of priority in the integrated transport system, would be operated by light passenger vehicles so as to be sufficiently fast, capacity and comfortable. On these lines it is necessary to consider stops of TIOP type.

- ŽSR 120-116 - construction of a new regional line from Pezinok to Smolenice. The new line will serve the foothill villages and will create a circuit by connecting the lines 110 - 120 - 116 - 112
- ŽSR 112 - Zohor - new opening of line 112 from the direction of Lozorno to Stupava, terminating with a return station and connecting to line 110 in Devínský jazero along the route of the original railway line
- ŽSR 112 - Plavecký Mikuláš - new extension of line 112 to Senica via Jablonica
- Construction of a new regional line Vajnory - Pezinok

The proposed investments will create a circle of future rapid regional rail transport, which will allow the transport of passengers by public rail transport from the more remote BSK areas and beyond the BSK area. The development of rail transport will result in a gradual reduction of road transport requirements (car and bus) in connection with increasing the quality and capacity of rail transport in the respective transport directions.

5. PRESENTATION OF NECESSARY ADDITIONAL DEVELOPMENTS

5.1. Identification of regional challenges and regional needs

Region Bratislava including Bratislava as its centre of gravity is undergoing a process of suburbanization, which in turn leads to the need to rebuild its transport system. Commuting to work and services from the suburbs, together with an increase in transit passenger and freight traffic, causes congestion. This necessitates the rebuilding of the superior road transport network. Gradually, a network of motorways and expressways is forming, not only on accesses to Bratislava, but also in touch with the centre, but the speed of rebuilding is slow compared to the increase in requirements. One solution is to strengthen public transport not only in the built-up area of Bratislava, but also in the suburbs. There is a need for an Integrated Transport System, where rail transport plays a major role.

Another important factor is the gradual rebuilding of the economic base of Bratislava, where industrial enterprises in the central parts of the Bratislava region are being phased out at the expense of tertiary and quaternary activities. In the suburbs and peripheral parts of the Bratislava region, warehousing and logistics centres are formed, connected mainly to the road network through which truck transport is realized. This creates an additional burden on the road network and consequently the need to transfer part of this burden to the railway again.

The turbulent urbanization and suburbanisation processes have led to the airport and port approaching the central parts of the city, with air freight as well as port traffic increasing in recent years. The same applies to rail infrastructure. On the one hand, this raises the need to move part of the transport to other locations, outside the central locations of the Bratislava region, as well as to significantly modernize individual transport terminals and especially their effective interconnection.

If we look at the conditions of the development of the OEM corridor in this context, we can conclude that the key question is the correct estimation of the development of transport demands, especially transit freight transport, where the location potential of the Bratislava region is expected to increase significantly.

5.2. Maps with possible improvements

Three overview maps of possible improvements in road and railway network, incl. projected ideas are part of the last Chapter in the Annexes.

5.3. High speed lines for freight trains

The formation of high-speed railways with a design speed of 200 km/h and more is in the stage of intent and partly also of project preparation. For the time being, such a speed is considered on routes from Bratislava to Brno and towards Budapest via Štúrovo. It can be assumed that crossing the Carpathian Massif in the area of Bratislava will require the construction of a new tunnel.

The use of railway infrastructure on the route to Austria and Hungary via Petržalka is possible, but the elimination of potential negative impacts on the quality of the residential environment requires its reconstruction and modernization. New possibilities are being created in connection with the project plan to extend the broad-gauge line through the south of Slovakia to Austria, where a new railway connection across the Danube would need to be built (most probably)south of the Slovnaft area, thus avoiding Petržalka at least as far as freight rail transport is concerned.

5.4. Presentation of future capacity utilization and modal shift

The answer to this topic will be the subject of further work on the project. For now, it can be stated that from the position of the OEM corridor as a whole it would be necessary to obtain estimates of the development of traffic growth in the long term at least until 2030, preferably by 2050.

5.5. Business model of new lines / developments

This topic will be the subject of further work on the project.

5.6. Improvement of regional and cross-border accessibility (opportunities provided by the rail sector)

As already mentioned in the previous chapters, considering the location of the Bratislava region, cross-border accessibility is one of the key development factors in the Slovak capital, Bratislava, in contact with Austria and Hungary. After 1989, the railway connection through Petržalka to Austria was re-established, a new railway station was built and regular passenger transport between Bratislava and Vienna operates. As part of the Transhusk Plus project - implemented under OP CBC Slovakia-Hungary - the GYSEV Feasibility study was developed for the development of mainly passenger rail transport on the Bratislava Main Station - Mosonmagyaróvár line and subsequently regular rail transport was launched.

Further development of this transport will be subject to further work on the project.

5.7. Possible chronology of developments

The documents in Chapter 3 describe possible scenarios for the development of the Bratislava Railway Junction, as well as in the Bratislava, Trnava and Nitra Regions. In the course of further work on the task, developments in this area will be followed, and then it will be possible to shape and develop the chronology of the intentions of individual projects. However, it has to be stated that due to the dynamic development of the Bratislava region, investments are now focused on the construction of the Bratislava ring road and intensification of the Bratislava Integrated Transport System.

5.8. Possible pilot projects

Based on the analysis and from the point of view of the implementation of individual parts of the transport infrastructure system, the following projects have to be mentioned:

- Road transport
  - Bratislava ring road
  - logistics centres and car parks
- Rail transport
  - IDS BSK (Integrated Transport System of Bratislava Region)
  - Investments to improve and increase the capacity of the railway interconnection within the Bratislava Railway Junction
  - Potential extension of the broad-gauge line across the south of Slovakia to Austria
- Water transport
  - further development of Bratislava port and its interconnection with other transport terminals
- Air transport
  - the development of the capacity of Bratislava Airport with a particular focus on the development of air freight

Each transport sector, each project, addresses the issues of further development in different time horizons. Currently, the finalization of the processing of sustainable mobility projects is endeavouring to look at the development of the transport systems of Bratislava, Trnava and Nitra Regions in a comprehensive way. In the subsequent work on the CORCAP project the respond to developments in the field will be done.

6. STAKEHOLDER ANALYSIS AND STAKEHOLDER INVOLVEMENT

6.1. Identification of relevant stakeholders

6.1.1. For the implementation of pilot actions

This could be a preliminary proposal following the previous chapter.

6.1.2. For the elaboration of the Corridor Capitalization Plans

Capitalization, or an evaluation of the existence and further development of the OEM corridor, is in fact an evaluation of the potential for the development of existing infrastructure, especially transport and logistics. It is a qualified estimate of the possible added value due to the functioning of the corridor. If we look at it from the point of view of improving the quality of the settlement environment, we can not only evaluate the economic benefit, but the overall benefit of improving the settlement conditions. Speaking specifically about the benefits of freight transport, especially rail freight, where a significant increase in transit traffic is expected, we face some contradiction. This is due to the fact that the quality of the settlement environment and the increase in transit of freight traffic are not in accord.

The benefits of the existence of the OEM corridor can be anticipated more in the economic sphere, which may subsequently bring about positive social effects as a result of an increase in the standard of living of the population. On the contrary, negative impacts can be expected in the natural factors of the settlement environment, especially in terms of noise level increase. It is also known that the development of freight transport can lead to an increase in some socially pathological phenomena. In any case, the development of the OEM corridor will require massive investment in transport infrastructure. Current use of existing facilities, routes and terminals have already weaknesses that need to be removed.

As already mentioned, work is currently under way and long-term and medium-term transport development scenarios are under development.

The relevant public administration institutions at national and regional level play a key role in spatial planning, regional policy and transport as well as individual modes of transport. In addition, the managers of individual transport infrastructure, whether publicly or privately owned, are important partners. Important partners are also municipalities, especially Bratislava and its districts, relevant regional cities, as well as other municipalities in whose territory important elements of transport infrastructure are located.

6.2. Description of the approach towards stakeholder participation during the elaboration of regional analysis of challenges and needs

During the analysis the above-mentioned realities were consulted. This will continue in the further CORCAP works by IPP.

7. ANNEXES

7.1. Bibliography

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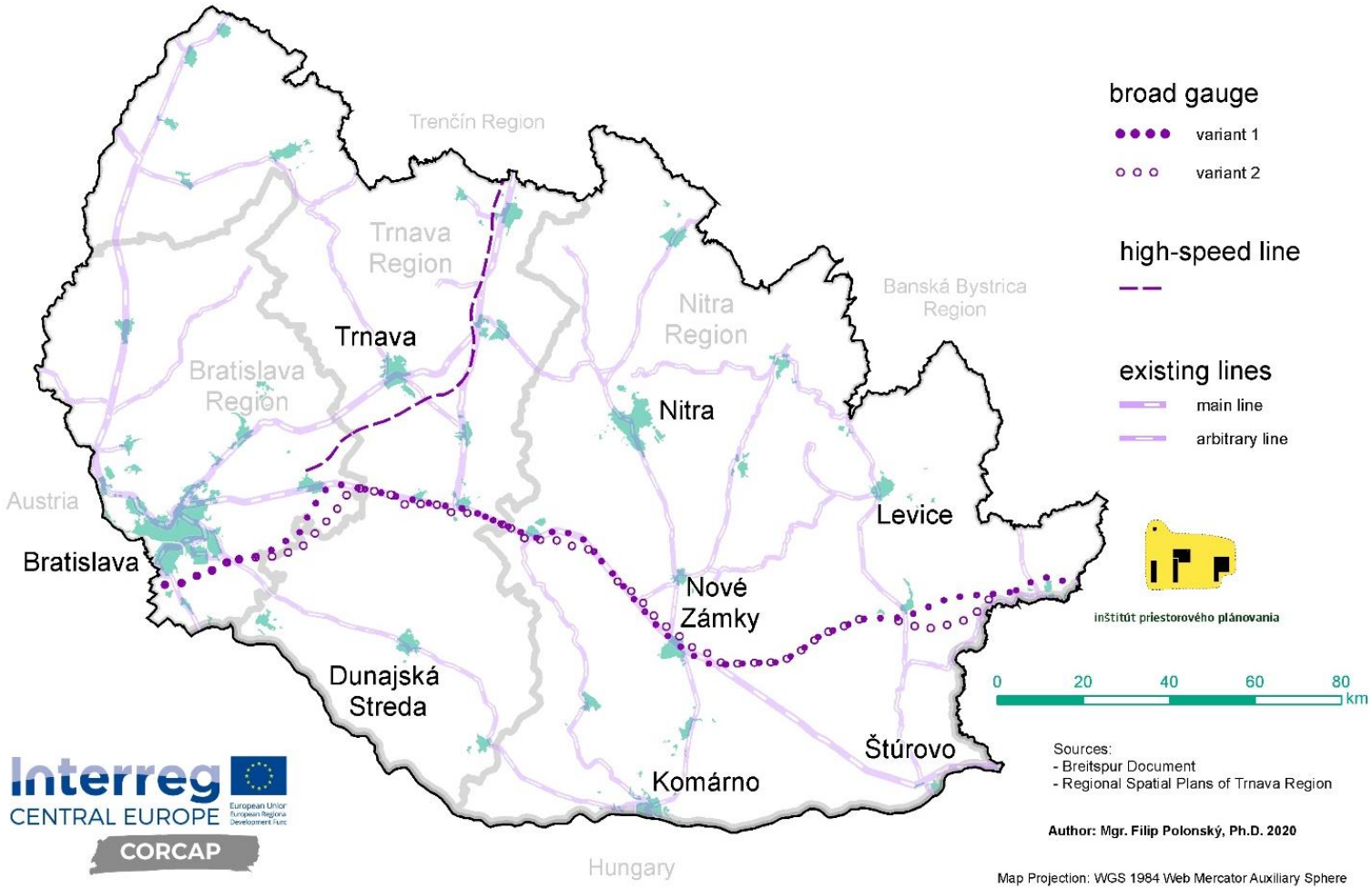
7.2. Abbreviations

- AT – Austria (Österreich)
- BA – Bratislava
- B+R – Bike and Ride
- BID – Bratislava´s Integrated transport (Bratislavská integrovaná doprava, a.s.) - joint stock company - responsible for the transport services in the Bratislava region
- BSK – Bratislava Self-governing Region
- CENTROPE - Region in Central Europe
- CZ – Czech Republic
- D – Germany (Deutschland)
- DPB – Dopravný podnik Brtaislava, a.s.
- EC – EuroCity
- ECMT - European Conference of Ministers of Transport
- EIA – Environmental Impact Assessment
- EN – EuroNight
- EV (EV6, EV 13) – EuroVelo
- Ex – Expres
- GR – Greece (Ελλάδα)
- H – Hungary (Magyarország)
- HW – hardware
- IAD – individuálna automobilová doprava
- IC – InterCity
- ICAO – International Civil Aviation Organization
- IDS BK – Integrated Transport System in Bratislava Region
- IPP – Spatial Planning Institute (Inštitút priestorového plánovania, o.z.)
- IT – information technologies
- ITF - International Transport Forum
- ITU - Intermodal Transport Unit (Containers, swap bodies and semi-trailers suitable for intermodal transport)
- K+R – Kiss and Ride
- MDV SR – Ministry of Transport and Construction of the Slovak republic
- MDVaRR SR – Ministry of Transport, Construction and Regional Development of the Slovak republic
- MHD – urban city transport
- MZVaEZ SR – Ministry of foreign Affairs of the Slovak republic

- NSK – Nitra Region
- Os – passenger train
- P+R – Park and Ride
- PL – Poland (Polska)
- R – express train
- REx – regional express train
- rj – railjet
- RJ – RegioJet
- rjx – railjet express
- SR – Slovak republic (Slovakia)
- SUMP – Sustainable Urban Mobility Plan
- SW – software
- ŠÚ SR – Statistics Office of the Slovak republic
- TEN-T – Trans-European Transport Networks
- TI – technical infrastructure
- TIOP – Terminal of Integrated Passenger Transport
- TTSK – Trnava Region
- UA – Ukraine (Україна)
- ÚPNR-BSK v znení ZaD č. 1 – Regional Spatial Plan of the Bratislava Self-Governing Region v znení zmien a doplnkov č. 1 z roku
- ZSSK – Slovak Railway Company (Železničná spoločnosť Slovensko, a.s.) - joint stock company – national railway carrier of passenger transport
- ŽSR – Slovak Railways (Železnice Slovenskej republiky)
- ŽST – railways station
- ŽZ – railways stop

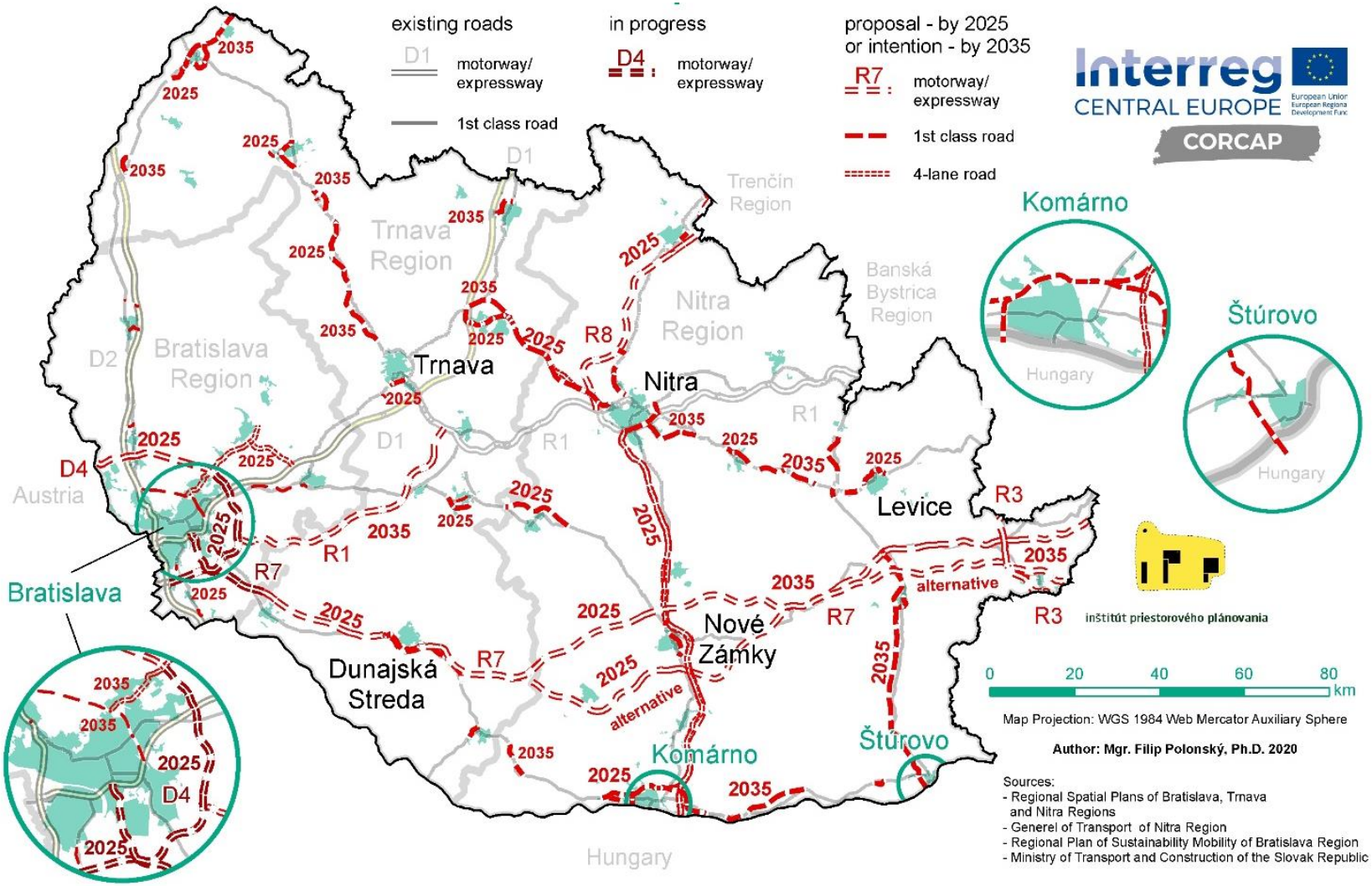
7.3. Maps

Figure. Rail Transport Development in Southwest Slovakia



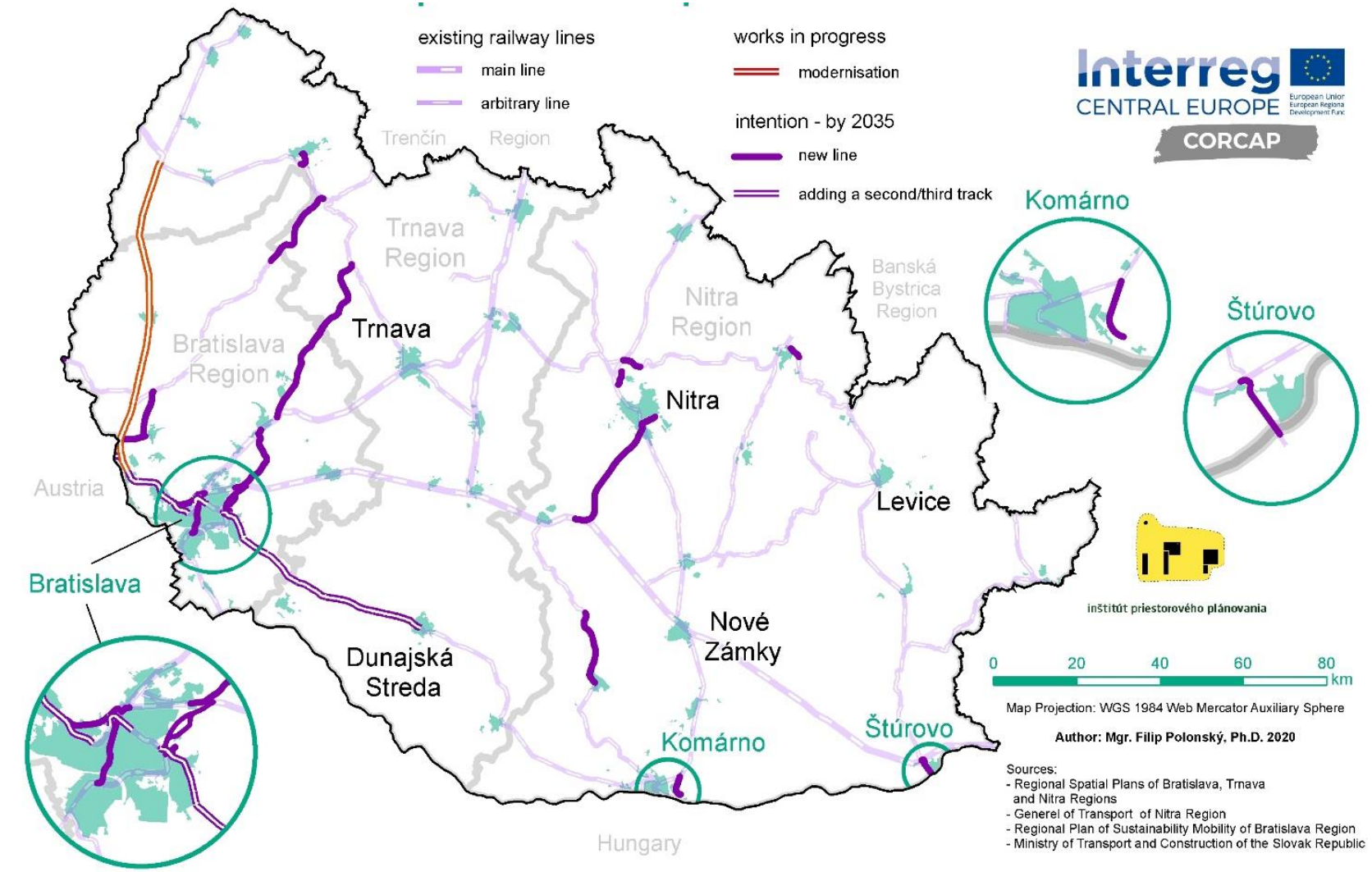
Source: IPP, BPG (2018), Aurex (2013), Aurex (2017), TTSK (2019), NSK (2017), NSK (2020), https://ipp-oz.sk/corcap

Figure. Road Network Development in Southwest Slovakia



Source: IPP, Aurex (2013), Aurex (2017), TTSK (2019), NSK (2017), NSK (2020), https://ipp-oz.sk/corcap

Figure. Rail Transport Development in Southwest Slovakia



Source: IPP, Aurex (2013), Aurex (2017), TTSK (2019), NSK (2017), NSK (2020), https://ipp-oz.sk/corcap