Study on Strategic Evaluation on Transport Investment Priorities under Structural and Cohesion funds for the Programming Period 2007-2013

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Country Report Slovak Republic

Final

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1 Introduction

1.1 Background

The recent enlargement of the EU to 25 Member States creates a new challenge for its Cohesion Policy. Disparity levels within the EU increased substantially, and will further increase with the accession of Bulgaria and Romania in 2007. This is an explicit point of attention, as the Treaty states that, in order to strengthen its economic and social cohesion, the Community shall aim at reducing the disparities between the levels of development of various regions and the backwardness of the least favoured regions or islands, including rural areas. This aim lies at the core of the Commission’s regional policy.

One of the key elements of the cohesion policy is the contribution of the development of new transport infrastructure to regional economic development. Extensive spending has been taking place in this domain under ERDF, Cohesion Fund and ISPA.

One of the prominent initiatives in the European Union in this respect is the development of the Trans-European transport networks (TEN-T). In 2003 the Commission has identified the 30 priority projects of the TEN-T up to 2020.¹ The priority projects include: “the most important infrastructures for international traffic, bearing in mind the general objectives of the cohesion of the continent of Europe, modal balance, interoperability and the reduction of bottlenecks”.

For the new programming period 2007-2013 the Commission seeks to strengthen the strategic dimension of cohesion policy to ensure that Community priorities are better integrated into national and regional development programmes. In accordance with the draft Council Regulation (article 23), the Council establishes Community Strategic Guidelines for cohesion policy to “give effect to the priorities of the Community with a view to promote balanced, harmonious and sustainable development”².

To assess the impact of programmes in relation to Community and national priorities, the Commission has indicated that evaluations on a strategic level should be undertaken. The present evaluation can be seen as one of these specific strategic evaluations. The strategic evaluation feeds in the process of determining transport investment priorities and the preparation of the national strategic reference frameworks and operational programmes.

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¹ Decision 884/2004/EC of 29 April 2004. The total investment of the 30 priority projects amounts to € 225 billion at the 2020 horizon.
² COM(2004)492
As such, it should serve to enhance the quality, effectiveness and consistency of Fund assistance.

1.2 The Strategic Evaluation

The strategic evaluation is directed to the transport sector. Three specific objectives have been formulated for this strategic evaluation:

- To provide an analysis of the **situation** in selected fields relevant to transport, using structural indicators across Member States, plus Romania and Bulgaria;
- To assess the **contribution** of Structural and Cohesion funds relative to the current and previous programming periods and draw lessons of relevance for the purpose of the study in terms of identification of potential shortcomings in the development of transport priority projects that might have hampered the utilization of those funds or their expected benefits;
- To identify and evaluate **needs** in the selected fields and identify potential investment priorities of structural and cohesion funds for the programming period 2007-2013.

1.3 The Country Report

The strategic evaluation results in specific country reports for all 15 countries and a synthesis report. The current report is the Country Report for the Slovak Republic. Its main aim is to give a more detailed indication of the strengths and weaknesses of the transport system in the country and to address areas for future intervention. Where relevant this accompanied by recommendations with respect to the overall transport policy of Slovak Republic.

The country reports feed into the joint programming effort with the Member States for the next period, as will be detailed in the National Strategic Reference Frameworks and the subsequent Operational Programmes.

1.4 Structure of the report

The report is structured around three building blocks:

- First a needs assessment is presented based on an analysis of the current transport systems and a modelling analysis which reveals the current (relative) level of accessibility per region. This leads to first conclusions strengths and weaknesses of the current transport system and related transport investment needs (Part A).
- Next an overview is presented of the transport investment priorities in the past period (Part B).
- Finally, future areas for priority transport investments are identified. This builds on the needs assessment in the first part but also addresses other factors such as the contribution to EU and national policy objectives, the availability of other sources of funding and the administrative capacity of the country (Part C).
Part A: Needs assessment current situation
2 Transport Sector: current situation

2.1 Introduction

This chapter describes the current transport situation and policy in the Slovak Republic. After a brief introduction on the geographical and economic characteristics of the country, it first describes the situation per mode of transport. The analysis of the current situation is summarized in a SWOT table on the main strengths and weaknesses. The assessment of the transport system is followed by an analysis of the key transport policy issues in the Slovak Republic.

2.2 Slovak Republic

Basic data

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Population</td>
<td>5.4 million</td>
</tr>
<tr>
<td>Total area</td>
<td>49,035 km²</td>
</tr>
<tr>
<td>Population density</td>
<td>109 inh/km²</td>
</tr>
<tr>
<td>Main cities</td>
<td>Bratislava (capital; 428,000 inh), Kosice (250,000 inh)</td>
</tr>
</tbody>
</table>

Source: The Slovak Republic Government Office
### Economic data

<p>| | |</p>
<table>
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<tr>
<td>GDP (2004)</td>
<td>33.9 bn€</td>
</tr>
<tr>
<td>Government debt as % of GDP (2004)</td>
<td>41.6%</td>
</tr>
<tr>
<td>Government deficit as % of GDP (2004)</td>
<td>-3.2%</td>
</tr>
<tr>
<td>GDP per capita, Slovakia (2004)</td>
<td>6,300€</td>
</tr>
<tr>
<td>GDP per capita, EU15 (2004)</td>
<td>25,800€</td>
</tr>
<tr>
<td>GDP per capita, EU25 (2004)</td>
<td>22,700€</td>
</tr>
</tbody>
</table>

Source: Eurostat

### 2.3 Situation per mode of transport

#### 2.3.1 Roads and road transport

**Infrastructure**

The motorway infrastructure is one of the key factors significantly influencing economic development and the spatial arrangement of the state territory. The geographic position of Slovakia in Europe clearly confirms the current importance of the road network of Slovakia in the Europe-wide transport infrastructure.

The largest concentration of heavy traffic flows in road transport in Slovakia is found in the road network with the largest range of transport conditions. Heavy transport flows in road transport in Slovakia occur in the main urbanised axes west-east and north-south. The most heavily used are motorways, international network roads and intra-state roads connecting centres of the SR territory.

In the period from the beginning of the construction of the first section of motorway in Slovakia in April 1969 to the founding of an independent Slovak Republic in 1993 198 km of motorways were put into use.

In the period from 1993 to 1995 the construction of motorways in Slovakia almost stagnated. The total length of sections under construction as of the end of this period was only 17 km. The main reason for the stagnation in construction was the transfer of its financing from federal sources to the Republic’s sources. This period was however important from the aspect of preparing study documents, in which there was for the first time defined the motorway network in the length of 660 km and presented the ability of financing the construction on the basis of a cost-revenue analysis. The total length of motorways according to the criteria of economic efficiency was in stage I up to 2005 calculated at 75 km and in later stages to 2015 at 295 km. The rate of motorway construction should be approx. 18 km/year.
Figure 2.1  Motorway and Road network Slovak Republic
A significant impulse for the development of motorways was the approval of the Comprehensive Project for the Preparation and Construction of Motorways by the government in February 1996. This project set the completion of motorway construction up to 2005 at the rate of approx. 45 km/year. The schedule adopted did not respect the recommendations of pre-investment studies. The effect on employment and the need for a recovery of the activity of the large construction industry were prioritised. The non-respecting of criteria of capacity for financing led to the necessity to re-evaluate the Comprehensive Project with the aim of adjusting the rate of construction.

The SR Government in March 1999 approved the Conceptual Plan of Motorway Infrastructure Development and with it also the schedule of the progress of works for the years 1999 – 2002. Through this there were created the conditions for continuing the construction of the motorway network with the necessary limitations against the previous objectives.

In accordance with the government regulation of December 1998 the SR Government through resolution no. 162/2001 approved the New Motorway and High-Speed Road Construction Project. In the New Project the Conceptual Territorial Development Plan of Slovakia – II draft approved by SR Government resolution no. 903/1997, the conclusions of the Europe-wide conference on Transport in Helsinki in June 1997 and the project TINA (Transport Infrastructure Needs Assessment) are now taken account of. The New Project defines the new motorway network of Slovakia with the numerical designation D1, D2, D3, D4.

In the New Project the network of high-speed roads is defined, with the numerical designation R1 to R6, which is situated in the first row in road routes with international transport (“E” roads) and in routes of the additional TINA network. This network includes the road links with the heaviest traffic. The total planned length of the high-speed road network is 874 km.

Programmes of the development of the road network have since 1989 been drawn up with an emphasis on the preference of motorway and high-speed road construction. The material extent of road development planned in the Conceptual Plan for Economic Development to 2000 with a view to 2010 (hereinafter simply the 1989 Conceptual Plan) was financially fulfilled up to 2000 only to approximately 50%. This situation in the development and modernisation of the road network is caused by the significant decline in the volume of funds provided for their development in particular since 1992. Financial resources were mainly used for the reconstruction of bridges that were in a very poor or even critical state and for resolving defective points on roads. Reconstruction and new construction of roads has been carried out only to a very small extent. In the years 1997 – 2000 they represented newly-built lengths of only 9—10 km a year.

Maintenance and repairs of road and motorways
From an evaluation of the actual state it results that 4169.9 km of the road network in Slovakia is in a state requiring immediate repair or related maintenance. Of these 552.4 km of roads are in a critical state from the aspect of construction. These roads show inappropriate bearing capacities, or deterioration of the surface and construction. Their introduction into an operable state requires the complete reconstruction of roads. On the
basis of measuring the bearing capacity of roads it was ascertained that 8 – 10% of grade I and II roads require strengthening. On grade III roads, which are built primarily as light roads, these roads require strengthening especially in the Eastern part of the Slovak Republic, where with regard to the higher share in a critical state it will be necessary to classify selected sections of roads for complete reconstruction. This concerns in particular roads built with penetration by surface treatment. These have not been repaired since the completion of their construction up until the present. Long-term insufficient financing has the consequence of insufficient maintenance of roads. In the Slovak Republic there were as of 31.12.2001 registered 7 541 road bridge objects, of which 443 bridge objects were in construction status V (poor) i.e. 5.95% and 182 bridge objects were in construction status VI (very poor) i.e. 2.44 %. Bridge objects in construction status VII (critical – 15 objects) are at present under repair. At the current level of financing there are on average 45 repairs of bridge objects on grade I, II and III roads are performed.

At the end of 2004 there were 316 km motorways in operation. The real life use of asphalt layers covering roads with regard to traffic volume is 8-9 years. The life use of 9 years is exceeded by almost 240 km of motorway driving lanes, i.e. 40%. Approximately 80 km of driving lanes are in an unsuitable state from the aspect of the occurrence of accidents, i.e. 14%. On the basis of results from inspections and diagnostics research of 215 motorway bridges 7 bridge objects are in construction state V (poor) , i.e. 3.26 % and 4 bridge objects, i.e. 1.86% are in construction state VI (very poor) . At present financial resources assigned enable the annual repair of 2 to 3 bridge objects.

**Road network**

Slovakia has a core road network of 316 km of motorways and 3341 km of class I roads (end 2004). Roads of class II (3729 km in total) cater for transport between larger cities and roads of class III (10,393 km) serve to interconnect villages and connect them to higher roads. Both class II and class III roads are nowadays operated by regional offices.

<table>
<thead>
<tr>
<th>Table 2.1</th>
<th>Length of road network in Slovakia (1995-2004) in kms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1995</td>
</tr>
<tr>
<td>Motorways</td>
<td>198</td>
</tr>
<tr>
<td>Expressways</td>
<td>-</td>
</tr>
<tr>
<td>I class roads</td>
<td>78</td>
</tr>
<tr>
<td>II Class roads</td>
<td>3,878</td>
</tr>
<tr>
<td>III Class roads</td>
<td>10,718</td>
</tr>
<tr>
<td>Roads and motorways</td>
<td>17,869</td>
</tr>
<tr>
<td>Local roads</td>
<td>24,572</td>
</tr>
</tbody>
</table>

Source: Transport Research Institute

Despite its expansion in the past decade, the motorway network in the Slovak Republic is still underdeveloped when compared to the EU average. The density of 6 km/1000km² is comparable to that of the Czech Republic and Hungary.
Table 2.2  Motorway density in Slovakia

<table>
<thead>
<tr>
<th></th>
<th>Length motorway/1000 km²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slovakia (2004)</td>
<td>6</td>
</tr>
<tr>
<td>EU25</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Eurostat

Demand
Car ownership is with 221 cars/ 1000 inhabitants one of the lowest in the EU-25. The degree of motorisation is relatively low in comparison to other new member states.

Table 2.3  Car ownership Slovakia

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cars/1000 inh</td>
<td>221</td>
<td>491</td>
<td>459</td>
</tr>
</tbody>
</table>

Source: Eurostat

The number of registered cars increased slightly in the past decade (20%). The number of freight vehicles showed a strong development in the same period with 37%.

Table 2.4  Number of vehicles 1994-2004 (in 1000 vehicles)

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>2004</th>
<th>Percentage change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>994</td>
<td>1197</td>
<td>20%</td>
</tr>
<tr>
<td>Trucks</td>
<td>102</td>
<td>140</td>
<td>37%</td>
</tr>
</tbody>
</table>

Source: Eurostat

Road charging
The Slovak motorways are charged for all vehicles at all stretches of the motorways that are marked by the relevant road sign and allow the speed of 130 km per hour. Exclusions to the charge are marked by the sign “Free of Charge”. The stretches are often very short, and they are usually located at the entrances of large cities. The motorway-charges in Slovakia are implemented in form of a vignette, i.e. users of the Slovak motorways must buy a vignette. There are vignettes with a validity of 24 hours, one week, two weeks, or one year available. A change of motorway-charging is proposed: instead of vignettes there will be electronic motorway-charging that will correspond to the length of the trip. The new charging method will be introduced in 2008 at the earliest.

Road accidents
The number of road fatalities in Slovakia has increased since the beginning of the 1990s, mostly due to the increase of motorisation. Accidents and fatal injuries reached a peak in 1998, and since then stayed at a more or less constant level. In 2004 there were 61,000 road accidents registered and 603 people were killed on Slovak roads. Road-congestion and an increasing number of cars on Slovak roads are directly related to road accidents. Slovakia has one of the highest accident rates in the EU (49 fatalities per billion km set against the EU-average of 13). The accident fatality rate per million inhabitants (112) is only slightly higher than the EU-25 average of 110 and lower than the average of the new member states at 134. This is mainly due to relatively low traffic volumes.
In the Slovak Republic there is no central national institution that deals with reducing the road accidents and fatalities.

<table>
<thead>
<tr>
<th>Table 2.5 Road deaths per mln inhabitants Slovak Republic and EU25</th>
</tr>
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<tbody>
<tr>
<td><strong>Slovak Republic</strong></td>
</tr>
<tr>
<td>121</td>
</tr>
</tbody>
</table>

Source: Eurostat

2.3.2 Railways

*Infrastructure*

Slovakia has 3,657 km of railway lines of which 1,558 km (43%) are electrified. Railway density is significantly higher than the EU25 average. Although the density of the network is high from a European perspective, there is a need for renewal and maintenance of the Slovak rail infrastructure.

<table>
<thead>
<tr>
<th>Table 2.6 Railway density</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
</tr>
<tr>
<td>Slovakia</td>
</tr>
<tr>
<td>EU-25</td>
</tr>
</tbody>
</table>

Source: Eurostat

The geographic position of Slovakia in Europe confirms the current importance of the position of railway lines of Slovakia in the Europe-wide transport infrastructure. The main international railway links have a direct connection to the railway routes of Slovakia.

High speed standards and other technical parameters should be introduced and maintained in Europe on international routes in accordance with interoperability rules and ERTMS standards. The current state of the railway network clearly suffers from a lack of investment in the past decades and does not yet meet these standards.
Figure 2.2 Rail network Slovak Republic
The backbone railway network of Slovakia is a triangle, the frame of which comprises the lines: Košice – Žilina, Žilina – Bratislava and Bratislava – Zvolen – Košice. Other lines are additional or connecting basic corridors, local lines and regional lines. According to the international agreements the following lines in Slovakia are included in the network of European railway lines: C – E40, C - E52, C - E61 and C - E63 with a total length of 837 km. Together these lines represent 22.8% of the total length of railway lines, but reflect approx 75% of journey kilometres.

In 1996 the SR Government established a Comprehensive Programme of the Transformation of Railway Lines, which was updated and discussed by the government in 1998. Main aim of the programme was the transformation of regional lines. In 1999 fifteen selected model transformation projects were discussed at the regional level, for the purpose of harmonising regional transport with the form of founding associations, or joint-stock companies operating regional transport. Due to lagging legislation and unclear financial coverage, until now no progress has been made in the implementation of the projects.

A fundamental decision with respect to the regional lines occurred when the SR Government decided to cancel passenger transport on the 25 most loss-making lines. In the absence of conditions for the privatisation and operation of these services by non-state transport companies (for example under the administration of Territorial self-administration), this step has negatively affected the passenger transport service provision of these areas.

**Means**

The owner of the Slovak railways is the state. The two state-owned companies ZSR (The Railway of the Republic of Slovakia) and ZS (The Railway Company) are responsible for the administration of the railway-infrastructure and the operation of passenger-transport respectively.

**Demand**

The modal share of rail freight transport is 30% (in tonne kilometres), which is far above the EU25 average of 16%. Rail freight transport accounts for 85% of international freight. Notwithstanding its relatively high share, demand for rail freight transport has been clearly under pressure and decreased with 30% in the period 1995-2004.

Rail passenger transport is of importance in the Slovak Republic, but shows a decreasing trend, from nearly 90 million passengers in 1995 to 50 million passengers in 2004. The rail transport demand decreased to 2,228 million passenger kilometres in 2004 (representing a decrease of 53% in the period 1995-2004). Most rail transport demand is domestic (90%).
2.3.3 Urban transport

The share of public transport in total passenger movements has decreased considerably since 1995, from 19 to 11 billion passenger kilometres. This trend is even more prominent in urban (city) transport, where public transport decreased from 3.7 to 1.3 billion passenger kilometres over the same period. The decreasing trend can be seen in almost all modes of city transport, with the exception of trolley buses in the four large cities (Bratislava, Zilina, Kosice, Presov).

Public passenger transport, from the point of view of society, is a public service that ensures meeting the transportation needs of the population. The amount of financial resources invested in public passenger transport expresses the level of state, local administration and municipality interest in its preservation and development due to the necessity of sustainable development, as an alternative to constantly growing individual car transport. Public service obligations should adequately reflect the requirements on public transport services executed upon order from the respective administration body (state, local administration, municipality). Efficient utilization of public resources and the introduction of more attractive services need to be ensured by enabling competition between transport service providers and performance volume optimisation in the public interest.

Recently, public service obligations on bus lines up to 100 kilometres have been financed by regional administrations. The amount of allocated finance to cover public service obligations is approved by regional administrations that conclude public service contracts with the operators. In urban public transport, the public service obligations are ordered and financed by the respective towns.

In railway transport, a contract is concluded annually on public service obligations between the state (represented by Ministry of Transport, Post and Telecommunications of SR) and ŽSR (national and regional railways), and between Ministry of Transport, Post and Telecommunications of SR and Railway Company Slovakia (transport services), where the scope of public service obligations as well as loss reimbursement are quantified for a given year.

Public transport services are expressed by public service obligations to operators in space and time oriented distinction in order to meet the basic transport needs of the population, such as commuting for work, education, and healthcare, and visiting offices and public institutions. Public transport services are not defined as one of the basic civil rights in SR, but it supports other such rights regarding mobility (right to work, education, healthcare, etc.), thus considerably influencing the quality of life of the population, mainly in regions.

The scope of public service obligations should be included in a public transport service plan that is fundamental for drawing up a public service contract. The basic distinctive features of the public transport service plan shall include the transport infrastructure network in the given area and directions of population mobility with commuting attraction centres in the region defined upon the results of transport–sociological surveys. The plan defines the way of ensuring transport services, and a framework scope of
transport services standards (number of pair lines), financing of which would be
bindingly granted by the administrative body.

2.3.4 Inland waterway transport

Inland waterway transport plays a role in the freight shipment of different goods (liquid
and dry bulk, general cargo). Its share in total freight transport is relatively small (2.8%).
The navigable waterways in the Slovak Republic consist of 172 km of navigable inland
waterways on the Danube and of 78 km of the Vah waterway. All of the inland waterway
transportation is border crossing, international transportation. Inland waterway
transportation has shown a constant freight volume of about 1.5 million tonnes. The ports
of Bratislava, Komarno, Sturovo (all public ports) and the port of Safa are the access for
inland waterway transport and form the inland waterway network.

Intra-state water transport at present is performed on the monitored waterways of the
rivers: the Danube, Váh, Morava, Bodrog, the length of which is 256 km. Management of
the waterways – their building and maintenance on the basis of the Jurisdiction Act no.
575/2001 of the Digest of Laws on the organisation of activities of the Government and
central public administration bodies falls within the jurisdiction of the Ministry of
Agriculture SR.

The Danube forms transport corridor no. VII with designation E80 according to the
European Agreement on Main Internal Waterways of International Importance (AGN). It
flows through three regions – Bratislava, Trnava and Nitra and three public ports are built
on it: Bratislava (Bratislava region), Komárno a Štúrovo (Nitra region). Services,
transhipment, storage and also partially cartage services are performed at these ports. At
the Bratislava port the joint-stock company Slovak Shipping and Ports also ensures
refuelling and the collection of solid and liquid wastes from vessels. On other waterways
non-public ports, or transhipment centres are available.

The development of water transport depends also on the modernisation, development and
additional construction completion of public ports on the Danube. On the Váh waterway
and in Eastern Slovakia it is necessary to gradually build up a transport and port
infrastructure in accordance with the Conceptual Plan for the Development of Water
Transport of the Slovak Republic, which was approved by the SR Government through
resolution number 469/2000.

2.3.5 Airports

Infrastructure

The governmental Slovak Airport Administration manages the international airports
Bratislava, Košice, Poprad, Sliač and Piešťany. The airports Sliač and Piešťany are
operated on the basis of an agreement on joint operation with the Armed Forces SR. The
international airport network includes also Žilina airport and Nitra – Janíkovce airport.
These airports are not operated by the Slovak Airport Administration.
Slovakia’s air passenger transportation is growing rapidly, from 2000 to 2004 the numbers grew by 170%, which is the fastest of all new member states. The growth is concentrated on international flights only, domestic flights stagnated; it has a share of only 7%. Due to the small size of Slovakia, growth potential for domestic flights is limited. In 2004 more than 1.1 million of passengers used Slovakian airports, of which 40% were transit passengers. Bratislava airport handles approximately 0.9 million passengers in 2004 and almost doubled its figures since 2003.

The rapid growth is explained by the accession to the EU on the one hand offering new possibilities for Slovakia and on the other hand by low cost airlines that are serving Bratislava airport.

**Figure 2.3 Airport network Slovak Republic**

**Table 2.7 Passengers at Slovakian airports of Bratislava, Kosice, Poprad, Sliac and Piestany**

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<td></td>
<td></td>
<td></td>
<td></td>
<td>1,169,640</td>
</tr>
</tbody>
</table>

Source: National data

*M.R. Štefánika Bratislava Airport* is the main airport in the Slovak Republic. The airport has a well-built runway and security systems, allowing the operation of all types of aircraft. Through the addition of a terminal for passengers its capacity has increased to 1.8 million passengers a year.

*Košice Airport* is the second most important airport in the Slovak Republic. Following reconstruction the airport has a modern runway system suitable even for Boeing 767
aerospace. To date 160 million SKK has been invested in the construction. The construction of a terminal has been slowed down.

*Poprad-Tatry Airport* is situated in the area of the High and Low Tatras – attractive for tourism. The airport can cope with aircraft of up to 200 passengers or 30 tonnes load. Reconstruction of the runway system and terminal at this airport is necessary with a date for commencement of 2005 – 2006.

*Sliač Airport* is a military airport, at which there is also a civil operation. From the technical aspect this airport is able to handle medium-capacity aircraft. The terminal and its other facilities correspond to the requirements of smaller regional airports.

*Piešťany Airport* is a military airport, at which there is also a civil operation. The terminal and the other facilities of this airport correspond to the requirements of a smaller regional airport able to receive medium-capacity aircraft.

*Žilina Airport* – at this airport there is predicted primarily the development of general aviation.

*Nitra – Janíkovce Airport* is an international public airport for non-regular air transport with possibilities for development. The further development is conditional upon the construction of a steel-mesh runway, its lighting and the modernisation of existing objects of the airport.

*The Conceptual Plan for the Development of Transport of the Slovak Republic* was approved by the SR Government through resolution no. 649/2001.

In 2005 the government set further steps in the privatisation of the airports of Bratislava and Kosice. In both cases 66% of the shares were made available to private parties in an international tender. The privatisation process was finalised in February when a contract was signed with an Austrian-Slovak consortium. Part of the ownership of the four airports in Zilina, Popriad, Piestany and Sliač was transferred to regional governments.

### 2.3.6 Trends and indicators

**Modal split**

The comparison of the modal split in passenger travel demand reveals the (until now) low car ownership in the Slovak Republic. Bus transport can be recognized as a strong mode of public transport and railway transport takes a relatively average position. However, the role of private cars is clearly increasing, at the expense of public and rail transport. Especially in urban areas this is leading to increasing congestion problems.

<table>
<thead>
<tr>
<th></th>
<th>Passenger cars</th>
<th>Buses</th>
<th>Railways</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slovakia (2004)</td>
<td>67.2</td>
<td>19.7</td>
<td>5.9</td>
<td>3.5</td>
</tr>
<tr>
<td>EU15 (2002)</td>
<td>83.5</td>
<td>8.8</td>
<td>6.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: Eurostat, national data
For freight transport a strong position of rail can be noticed (although its share decreased over the years). With a share of 30% in terms of ton kilometres the position of rail cargo transport is relatively strong. The share of inland waterways is modest.

Table 2.9  Modal split freight transport (share in ton kilometres)

<table>
<thead>
<tr>
<th></th>
<th>Road</th>
<th>Rail</th>
<th>Inland Waterways</th>
<th>Pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slovakia (2004)</td>
<td>66.3</td>
<td>31.3</td>
<td>2.4</td>
<td>-</td>
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<tr>
<td>EU15 (2002)</td>
<td>75.5</td>
<td>12.9</td>
<td>6.9</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Source: Eurostat, national data

Summary trends
A number of key trends can be observed:
- Since 2000, total freight demand develops in line with GDP;
- Road transport, in both freight and passenger markets, is growing;
- Car ownership is low but steadily increasing;
- Both rail freight and passenger demand show a gradual decline;
- Rail passenger demand per capita is relatively low given the high rail network density in comparison to the road network densities;
- Transport intensity is high: road freight per GDP equals 6 times the EU average; rail freight per GDP equals 12 times the EU average;
- The rail freight modal share, though declining, is still well above EU average.

2.4 Current Transport policy

2.4.1 Strategic objectives at sub-sector level

Main national strategic objectives for the upcoming programming period are set by the new Transport Policy of the Slovak Republic until 2015, proposed by the Ministry of Transport, Posts and Telecommunications, approved by the government of the Slovak Republic No. 445 from 8. June 2005.

The main principle of transport policy is sustainable development arising from the support of sectoral balance, transport user orientation, support of equality of opportunity, effective use of land and resources, open approach and gradual transition of cost reimbursement onto its originators.

The global objective is to secure sustainable mobility. Reduction of the negative impact of transport on the environment is crucial for achieving sustainable mobility, reflecting the objectives of EU documents, as well as national objectives. By the ratification of the Kyoto Protocol – an international agreement stipulating reduction of gas emission causing climatic changes to pre-1990 levels – the Slovak Republic agreed to lower emissions by 8%. This obligation must be fulfilled in all sectors as well in transport that contributes by about 10% to the total CO2 production in the national economy.

Roads

Road transport in SR is considerably liberalized and it represents approximately 70% of the total transport market performance. The more flexible adaptability of road transport to the changing economic conditions is assumed to result in an increasing tendency of growing transport volume and performance.

The full access to the common EU market is limited for Slovak hauliers in cabotage – performing of internal freight transport by a haulier who is not registered in the given state – due to the transition period; the length of the transition period depends on the evaluation of the impact on the given country’s internal market. This limitation can be reduced or not applied at all, based on a bilateral agreement between the respective states.

The issue of market opening in internal passenger transport performing public services has not recently been regulated, even by EU legislation. EU legislation states that an operator has the right to cross the border in order to provide certain international services and non-regular services. Operators willing to provide regular services abroad have to get
a registration in the respective member state and participate in a tender conducted in accordance with national law, if such policy exists.

**The main objectives in the road sector are:**

- Ensure proportional development of motorways and expressways with respect to considered international road routes.
- Ensure accelerated completion of motorway network included in TEN-T on routes Bratislava–Žilina–Košice–Vyšné Nemecké–SR/Ukraine state border (corridor Va; motorway section D1) with the priority part being Bratislava–Košice as the main transport and inter-city route in SR.
- Ensure accelerated completion of expressway R1 between Trnava–Banská Bystrica.
- Ensure completion of motorway network included in TEN-T on routes Poland/SR state border–Skalité–Žilina (corridor VI; motorway section D3).
- Ensure completion of missing sections of motorway network included in TEN-T: Czech Republic/SR state border–Kúty–Bratislava–Rusovce–SR/Hungary (corridor IV; motorway section D2).
- In satisfying the needs of internal and international transport, ensure proper conditions for all users and provide adequate quality of transport routes, provided services and price for use, depending on users’ requirements.
- Ensure the necessary standard of maintenance, repair and systematic renewal of motorways, expressways and 1st class road network.
- Ensure high quality solutions to transit transport on 1st class road networks in towns and villages via bypasses.
- Ensure development and necessary standard of maintenance, repair and systematic renewal of motorways, expressways and 1st and 2nd class road networks.
- Improve technical parameters of regional roads (2nd and 3rd class roads).
- In sections with cyclist transport paths, create conditions for separation of cyclist transport from motorized transport (cyclist lanes, belts).
- Ensure the development and necessary standard of maintenance, repair and systematic renewal of local communications.
- Improve technical parameters of local communications.
- Create conditions for preferring public transport by modernization and development of road infrastructure of towns and villages to satisfy the needs of regional and urban transport.

**Railways**

In order to gradually revitalize Slovak railway transport, open the market and create non-discriminatory conditions, the Railways of the Slovak Republic (state-owned company) has been transformed into two independent bodies: Railways of the Slovak Republic (ŽSR) – the rail infrastructure manager, and the Railway Company – rail operator. Thus, the transport infrastructure has been separated from transport operations.
The process of transformation of the Railway Company continued by the creation of two independent bodies on January 1, 2005: Railway Company Slovakia – rail passenger operator; and Railway Company Cargo Slovakia – rail freight operator. The main reason for the division was the fact that there were different entrepreneur philosophies as well as mutual relationships towards the government.

Passenger transport is generally focused on providing public services, whereas freight transport is business-oriented. The aforementioned division will enable the railways to maintain their position in the transport market and achieve positive economic results, also conditioned by the privatization of the Railway Company operating in freight transport.

An essential condition for liberalization and provision of a competitive environment in the transport market would be the establishment of a regulatory office that would be legally, financially and administratively independent of the railway companies. This regulatory office would be responsible for issuing licenses, safety certificates, and it would be the appellate body for solving claims on infrastructure assignment.

The basis for establishing a common European railway transport market is securing interoperability of the trans-European railway system under the technical specifications for interoperability on the tracks of Railways of the Slovak Republic (ŽSR) in a way that would enable the train sets to move within EU without technological barriers.

The level of achieving the target – at least keep the existing railway transport share in SR in the total transport performance under the liberalized transport market conditions – would be determined mainly by solving the problem of high prices for railroad use that prevents the operators from succeeding in the transport market.

**The main objectives in the rail sector:**

- Perform gradual modernization and development on line sections included in TEN-T:
  - Bratislava–Žilina–Čierna nad Tisou–state border SR/Ukraine, with priority to modernize Žilina–Nové Mesto nad Váhom line section (corridor V),
  - Poland/SR state border–Skalité–Čadca–Žilina (corridor VI),
  - Austria (Vienna)/state border of SR–Bratislava – cross-border section,
  - Czech Republic/SR state border Kúty–Bratislava–Štúrovo–SR/Hungary state border (corridor IV),
- Support implementation of electric traction mainly in urban-suburb railway transport to and from regional centres.
- Connect Bratislava Airport and Košice Airport to TEN-T rail network.

**Rail track modernization must secure:**

- Achievement of standards defined in international agreements,
- Interoperability of modernized, prepared and constructed new line sections of TEN-T network.
- Increase the line speed on conventional railway lines to 160 km/h (with option for tilting trains to operate at speeds up to 200 km/h) and with selected freight trains to 120 km/h with electric traction.
• Execute construction of platforms and semi-platforms for access of disabled passengers.
• Sufficient platform length.
• Increase operation safety.

**Aviation**

In fulfilling the strategic intentions of SR in air transport it is necessary to have a regulatory body reflecting the concord with defined conditions for service providers in the context of European transport policy and EU legal environment. Sustainable development of air transport services must be achieved on a regional level, as prescribed by EU.

With regard to the transformation of Slovak Airport Administration and airport privatization it is necessary to preserve the public character of airport infrastructure and to enable transparent access of air carriers to the air transport market with efficient use of airspace by securing safety, operation and protection of civil aviation.

**The main objectives in aviation:**

• Preserve public character of aviation infrastructure with the possibility of strategic investor involvement;
• Ensure permanent improvement of quality and safety of airport and line equipment within aviation operation control and provision of flight control services;
• Modernize international airports in Bratislava, Košice and Poprad-Tatry;
• Modernize other airports with potential of regional and local use (Piešťany, Sliač and Žilina);
• Provide more modern and efficient access for the public to Bratislava Airport and Košice Airport;
• Adhere to Single European Sky initiative.

**Inland waterways**

In the area of liberalization of access to the inland waterway transport market the key issues present mutual acceptance of certificates, licenses and technical requirements on vessels.

**The main objectives in inland waterway transport:**

• Create conditions for modernization of existing waterways (Danube to achieve required transport criteria, and according to EU approach create conditions for completion of construction of projects included in TEN-T (waterway Rhine – Danube, part Vienna – Bratislava and cross-border section Sap – Moháč);
• Create conditions for ensuring optimal development of existing waterways and public ports utilization;
• Analyze economic efficiency of continuation of the Váh waterway construction after 2015.

**Combined intermodal transport**

Existing intermodal transport infrastructure (11 transhipment centres) is sufficient to cover recent as well as projected transportation performance. However, its major
The drawback is insufficient technical and technological standards (except for intermodal transport terminal Dobrá).

The priority in intermodal transport infrastructure development is the completion of construction of the selected basic intermodal transport infrastructure defined in AGTC agreement, its technical equipment and creation of conditions for development of logistic centres, their interconnection for provision of logistic services based on a non-discriminatory approach.

Support of intermodal transport infrastructure and technology development can be performed directly via subsidies to intermodal transport infrastructure, as well as indirectly via financial and tax incentives for manipulation and transport technology purchase.

Intermodal transport infrastructure development can be performed from the public resources of the state or local administration bodies, or with use of private resources. Basic intermodal transport infrastructure must ensure non-discriminatory access to terminal services, therefore effective state control must be provided. The SR Government through resolution no. 37/2001 approved the *Conceptual Plan for the Development of Combined Transport and a Proposal for its financial provision with a view to 2010*.

**The main objectives on intermodality:**
- Complete construction and modernization of infrastructure of selected basic intermodal transport terminal networks according to AGTC agreement;
- Build logistic centres near to selected transhipment centres;
- Connect (technologically and informational) intermodal transport terminals with freight transport logistic centres for efficient provision of logistic transportation chains.

**2.4.2 Policy issues**

*Infrastructure pricing (in roads, railways)*

In the road transport sector, the road infrastructure fee charging for heavy goods vehicles (over 12t) is solved by means of user fees (respecting the time-period), toll (distance travelled) and annual vehicle tax (so called “Eurovignette” directive). The directive defines maximum fee per year, considering the number of axles and how “environmentally friendly” the vehicle is. The level of toll depends on construction and operation costs of the roads, as well as on infrastructure development cost. Vehicle tax is defined as minimum, and depends on vehicle maximum load, number of axles and type of a suspension system. Electronic fee collection is in the process of preparation.

The current charging system in the Slovak Republic in the rail sector is based on total costs reduced by the level of state subsidy awarded to the infrastructure manager. This leads to relatively high fees and makes railway transport unattractive.

In air transport, the existing system of fee harmonization and differentiation is relatively well elaborated and the recent tariff mechanisms reflect real infrastructure cost. This system does not require any immediate regulation.
Individual regions and towns in SR have different financial conditions as well as differentiated urbanization structures, different levels of industrialization and equipment of area, which leads to different transportation needs of their populations. It is therefore necessary to gradually implement so-called differentiated models of transport services for each area, which enable improvements in meeting the population’s transportation needs via proper combination of transport serviceability by individual types of transport.

The main transport policy objectives in this area:

- Apply systematic solutions to finance public service obligations and create conditions for preserving the achieved level of public transport services in regions.
- Create legislative conditions for execution of public service obligations via regulated competition in accordance with EU approach, respecting the national specifics.
- Harmonize economic conditions for enterprise in accordance with efficient enforcement of public interest.
- By legislative tools create transparent financial relationships regarding the executed public service obligations.
- Elaborate a public transport service plan based on subsidiarity.
- Ensure economic efficiency of public passenger transport by transparent public procurement of these services via regulated competition, and stimulate development of integrated transport systems by terms of competition.
- Conclude public service contracts for sufficiently long periods in order to ensure returns on operator’s investment utilizing the exclusive right, with the option of annual specification in certain cases.
- Take into account all future liabilities of the relevant administrative body (state, regional administration, municipality) by contracts on public interest, and minimize or eliminate additional specific subsidies from public resources.
- Use public service contracts in order to achieve concordance between social, regional and transport policy based on defining priorities of public interest.
- Create conditions for implementation of targeted granted discounts.
- Take into consideration the need for financial resources to cover public service obligations in public budgets.

Road traffic safety in the Slovak Republic, expressed in the number and consequences of accidents, is relatively poor. Slovak government has responded by developing a strategy to improve road traffic safety. Such strategy appears the content of “National Road Safety Plan for the 2nd half-year 2005, with outlook until 2010 in Slovak Republic” that was developed by Council of Government for Road Safety.

This document proceeds from detailed statistics of traffic accidents that is consequently taking into account in SWOT analysis referring to possibly areas of improvement. Realization of measures that could help psychological and physical losses caused by traffic accidents is within competence of Ministry of Transport, Posts and Telecommunications of SR. Ministry for this purpose established initiative, advisory and coordination government body (Council of Government for Road Safety). The Council is
composed of wide spectrum of experts on road safety problems who informs the society about their sessions through official web page of MTPT SR. Main aim that policy makers try to achieve is a 50% reduction of the number of fatal accidents.

Service accident is monitoring in term of internal regulations into four categories (A – D) in the field of railway transport. Accidents are quantifying into these categories according to incident type and value of damage to property, respectively according to fact, if came to danger of persons and detriment to health or not. Conditions for safety of railway transport in SR regulate Act No. 109/2005 Codes of law that specifies safety on railway by means of safety plans and report processing, regulation and standards making, certificating of organizations that construct the track vehicles as well as supervision exercising and accident investigation. Railway operators and carriers are yearly obligatory present the report about safety for last year to “Office for Regulation of railway transport”. The report has to contain achieved goals in the field of railway safety, results of Safety Plan and audit of internal safety. The Office is state administration body and is also compulsory for report publishing concerning its activity in railway safety.

**Road transport main objectives:**
- Harmonize road signs and traffic signs, especially in sections with multiple traffic accidents.
- Harmonize regulations for checking and fining in international transport for speeding and drunk driving.
- Ensure improved safety standards for carriage of dangerous goods which is managed by international agreements (especially ADR agreement), improve control and measures for management of accidents on transport routes including a more efficient coordination with the rescue system.
- Perform regular checks of observance of regulations relating to traffic with freight vehicles (lorries) over 7.5 tones at weekends and on holidays.
- Implement information and monitoring systems in the trans-European network, as well as in towns and urban agglomerations.
- Improve the standard of education of new drivers in driving schools.
- Provide traffic education to children and young people during school education.
- Ensure regular checks of working hours of professional drivers.
- Perform road repair of expressways and motorways in order to secure their good operational condition.
- Ensure efficient activity of Governmental Council for road traffic safety.
- Ensure renewal of road signs in order to improve comprehensibility and visibility (alternating road signs and horizontal road signs).
- Improve the construction and layout of crossroads.
- Perform measurements of road surface technical conditions (roughness, faults and pits).

**Railway transport main objectives:**
- Gradually implement safety rules according to EU legislation and standards.
- Provide interoperability and coordination among railway systems, mainly by harmonization of safety and operational directives.
- Implement more modern signalling and interlocking devices.
• Establish an independent investigative body for investigation of railway transport accidents.
• Ensure a higher safety standard for carriage of dangerous substances, which is managed by international agreements (RID), mainly regarding new operators entering the railway network of SR.

**Interoperability**

The European railway system is, according to interoperability, divided into subsystems that are defined by technical specifications for interoperability (TSI), which present a tool for achieving harmonization of technological means and procedures of subsystems for control and management of railway operations. Every subsystem and its components that are newly introduced in operation, market or are substantially modernized must meet the requirements and parameters stated in European legislation and in TSI. In existing subsystems, full conformity must be achieved with European legislation and TSI within a period defined by the national implementation plan.

By January 1, 2005, TSI were approved for the following subsystems: (1) signalling devices, (2) rolling stock for freight transport, (3) telematic applications for freight transport, and (4) noise. TSI for other subsystems of conventional railway systems are being processed. Gradual provision of conformity of technological equipment and processes at infrastructure manager and railway operators in the Slovak Republic is a priority for preserving their enterprise activities in railway transport.

Road transport technical harmonization in road transport is controlled by the 1958 Agreement on acceptance of technical regulations and directives for vehicles, equipment and parts, that can be mounted on or used with road vehicles, and on conditions for mutual acceptance of assigned homologisations based on these regulations, as well as Council Directive 70/156/EHS of February 6, 1970 on approximation of legal regulations of member states regarding typological approval of motor vehicles and their towed vehicles, valid as amended.

**The main objectives:**

• Establish a notified body in order to approve individual TSI subsystems in compliance with EU legislation;
• Create such an environment, in which the activity of notified bodies is perceived as a supporting element for manufacturers in placing their products and services onto the market;
• Ensure larger control of the market, control of meeting the technical requirements in operation, by more frequent monitoring of supervisory bodies in cooperation with accredited laboratories;
• Elaborate a national implementation plan to reach conformity of technical means and processes in the railway sector with European legislation and TSI;
• Verify technical competency/capacity of vehicles in concordance with EU legislation.
2.5 Summary

Roads
- The Government of the Slovak Republic puts emphasis on the development of a Motorway and express roads network, which was stagnating since the 1990s. While passenger car ownership and road transport demand are steadily growing, the need for network extension is increasingly felt. Both pertaining to TEN-T priority axis and (other) domestic corridors.
- The highways need to be rehabilitated, upgraded and adapted to EU bearing capacity.
- The decentralisation of lower capacity roads to regions is in progress.
- The institutional setting of the road construction sector has been reformed.
- New financing schemes, incl. PPP, are considered.
- Electronic charging of road use is being developed.

Railways
- Demand steadily decreasing due to ongoing changes in market conditions during transition: altering economic structures and subsequent commodity mix (from bulk to general cargo); domestic distances rather short for rail freight transport.
- Railway restructuring, well advanced, should also consider planning for further decline.
- Priority needs are not only concerning track rehabilitation and modernisation, but also and increasingly rolling stock renewal.

Aviation
- Traditionally, the capital’s airport capacity extension and modernisation are high on the political agenda.

Water transport
- The Danube offers potential for increased use of inland waterways, for which the fairway shall be improved and bottlenecks removed within international programmes.

Intermodal
- Intermodal transport has a high priority within the Ministry of Transport, including the development of Logistic Centres (at modal junctions, including Danube ports).

Urban Public Transport
- In view of ongoing motorisation, further increase of UPT’s deficits cannot be avoided (this also pertains to rail passenger transport). Clear definition and policy formulation of Public Service Obligation (PSO) and market conditions constitute a high priority.

Safety
- In view of the country's record in (road) traffic safety, the issue has high political attention

Alignment with EU policies
- Generally compliance is confirmed, accomplished, or well advanced.
- Main issue of different interpretation is the modal shift from road to rail objective. While the principle of aiming to increase the rail share is endorsed, and measures are
developed and applied to the end, the actual market movements are opposite. It might take a number of years before the effects of transition are bottoming out, and railways find there “natural” position in the transport market. In the meantime, the ambitions of a modal shift policy should be realistically formulated.
### Conclusions: SWOT analysis transport system

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>• Strategic geographic position of SR in transport links of West – East, North – South,</td>
<td>• Transport infrastructure within the TEN-T network is not constructed completely,</td>
</tr>
<tr>
<td>• Transport infrastructure of SR as part of trans-European transport networks (TEN-T),</td>
<td>• Lack of financial resources to develop the infrastructure,</td>
</tr>
<tr>
<td>• Density of existing transport infrastructure,</td>
<td>• Low standard of information and communication technologies in transport,</td>
</tr>
<tr>
<td>• Relatively large share of transport is performed by railway transport, when compared to EU 15 countries,</td>
<td>• Insufficient technical condition of railway infrastructure and high fees for its use,</td>
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<tr>
<td>• National concern to lower the rate of traffic accidents and their consequences,</td>
<td>• Difficult access of the regions to the TEN-T network,</td>
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<tr>
<td>• Progressive modernization of railway corridors,</td>
<td>• Failing technical and qualitative condition of remaining transport infrastructure (national, regional and municipal level),</td>
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<tr>
<td>• Governmental efforts to accelerate motorway and expressway construction,</td>
<td>• Exceeded capacity of roads (mainly 1st class roads) and lack of road by-passes around settlements,</td>
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<tr>
<td>• Preparedness to implement road fee charging for infrastructure use base on distance travelled,</td>
<td>• Insufficient technical-technologic condition of terminals for intermodal (rail/road) transport (except for the terminal in Dobrá),</td>
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<tr>
<td>• Direct access to European transport Corridor VII (Danube – Mohan – Rhine),</td>
<td>• Insufficient use of waterway transport potential</td>
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<td></td>
<td>• Liberalization of railway freight transport services underdeveloped,</td>
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<td></td>
<td>• Low quality of transport services (public transport, integrated transport systems).</td>
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<td></td>
<td>• Low standard of transport vehicles renewal, and limited possibilities for supporting the renewal of public passenger transport fleet.</td>
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<tr>
<th>Opportunities</th>
<th>Threats</th>
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<tr>
<td>• Provision of sustainable mobility via supporting ecologic means of transport.</td>
<td>• Decreased transport accessibility and thus reduced attractiveness of SR and its regions to investors.</td>
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<tr>
<td>• Improvement of transport quality, safety and reliability, based on intelligent transport systems.</td>
<td>• Financial basis for decentralisation of roads to the regions weak.</td>
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<tr>
<td>• Demand management via introducing fees for using the infrastructure,</td>
<td>• Growth of negative impact of transport on the environment.</td>
</tr>
<tr>
<td>• Proportional development of individual types of transport infrastructure.</td>
<td>• Deterioration in quality of transport infrastructure, caused by a lack of financial means for its development, maintenance and operation.</td>
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<tr>
<td>• Improve the accessibility of SR and regions to TEN-T networks and to supra-ordinate transport infrastructure.</td>
<td>• Increasing trends to move freight transport from railway to road and rapid growth of private car-ownership.</td>
</tr>
<tr>
<td>• Reduce externalities by development of multimodal transport systems.</td>
<td>• Congestion causing increased energy, time</td>
</tr>
<tr>
<td>Infrastructure via multiple-resource financing of the transport infrastructure (introduce charging system for infrastructure use based on distance travelled, projects with public – private partnership (PPP) and EU funds, • Decrease the rate of casualties and consequences of road accidents. • Increase utilization of water transport potential. • Achieve more efficient and attractive services via regulated competition in public passenger transport.</td>
<td>and economic loss which reduces the competitiveness of the Slovak economy. • Increase of transport’s negative impact on the environment caused by a lack of financial means for renewal of public passenger transport fleet.</td>
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3 Accessibility analysis

3.1 Introduction

This chapter presents a more quantitative transport needs assessment at a regional level. It clearly complements chapter 2 in which the current situation of the transport system is described where potential deficiencies are addressed. The analysis on the current situation together with the analysis of transport needs from a cohesion perspective forms a basis for identifying possible investment priorities.

In this chapter, first a description of the needs assessment methodology is presented. Especially the determination of the “composite accessibility problem indicator” which forms a central role in the approach is explained. The higher the value of the index, the higher the need for intervention. This approach has been labelled the “red flag” analysis.

This composite accessibility problem indicator is a combined measure, which addresses transport network quality, population density and regional disparity (a more elaborate explanation is provided in Annex C). As such the accessibility analysis is much more linked to cohesion policy than a more traditional accessibility analysis. Next, results of the application for the specific country are illustrated and analysed. This analysis identifies main areas for intervention in rail and road transport for the current situation (2006).

3.2 Methodology: Accessibility Problem Indicator

To determine the need for transport investments, the SASI model has been used to assess the present situation of the road and rail systems in each country without the national transport projects to be examined later. For this the accessibility provided by the road and rail systems in each country was evaluated from both a national and a European perspective in order to identify regions with serious accessibility deficits that should be addressed by European transport policy taking account of the stated EU goals competitiveness and territorial cohesion. In the SASI model accessibility, which is directly influenced by transport policy and investments, is judged to play a crucial role in promoting the realisation of the cohesion objectives.

To determine the appropriate assessment of transport investment need from the cohesion policy perspective an agreement on the indicator of accessibility to be used is required. Traditional accessibility indicators are not useful for this. They measure the total effect of both geographical location (periphery v. core) and quality of transport provided by the transport system. As a result they always show a steep gradation in accessibility from the
core to the periphery. However, public policy cannot change the fact that some regions are central and some are peripheral, i.e. provide the same level of accessibility to all regions. Public policy can only alleviate disadvantages through unequal transport provision.

This distinction is relevant for European transport policy. To invest only in transport in the most peripheral regions with the lowest accessibility according to such an indicator would benefit only the relatively few people living there and would ignore the needs of the densely populated central regions to combat traffic congestion and so endanger the competitiveness goal of the Lisbon Strategy of the European Union. On the other hand, to invest only in transport in the most densely populated central regions with the greatest congestion problems would not only lead to ever more traffic but also widen the existing gap in accessibility between the central and peripheral regions and would so run counter to the territorial cohesion goal of the European Union.

To avoid this dilemma, a new composite accessibility indicator was defined which distinguishes between geographical location and quality of transport. This indicator assumes that people in the peripheral regions cannot expect to enjoy the same level of accessibility (measured in traditional terms) as the central regions but that they can demand to be able to reach relevant destinations with the same travel speed ("as the crow flies") as the people in the central regions. In addition the indicator recognises the utilitarian principle of the happiness of the greatest number, i.e. that the transport needs of densely populated regions should be given more weight than those of regions with only few inhabitants. And finally, the indicator recognises that economically lagging regions with severe deficits in accessibility may offer greater potential for stimulating economic effects by transport investments than regions which enjoy already high accessibility.

These three principles avoid the pitfalls of both an extreme egalitarian view, which postulates that all regions in Europe enjoy the same level of accessibility and a purely efficiency-oriented view which postulates that accessibility in the already highly accessibly central metropolitan areas should be further strengthened because they bring the largest economic benefits. In other words, the three principles aim at a rational trade-off between the stated EU goals of competitiveness and territorial cohesion. Annex C gives a more elaborate description of the Composite Accessibility Problem Indicator.

### 3.3 Transport needs

The composite accessibility problem indicator takes account of the transport system quality (travel speed), population density and regional disparity. Figure 3.1 and 3.2 depict the population density and the regional distribution of income between the different regions in Slovakia. Because of its large region the capital Bratislava has a lower population density than other capital cities, such as Vienna or Budapest (Figure 3.1). However, Bratislava is clearly the dominant economic centre of Slovakia in terms of income per capita (Figure 3.2).
Figure 3.1  Population density (population/sq km) Slovakia 2006

Figure 3.2  GDP/capita (Euro of 2005), Slovakia 2006
The results of the analysis of regions with accessibility deficits that could be addressed by European transport policy are presented in Figures 3.3 to 3.6. These figures show the spatial distribution of the Accessibility Problem Index in Slovakia, first for road, and then for rail from a national and a European perspective for the current situation (2006). The colour scale of the maps resembles that of a traffic light: green shades indicate average regional travel speeds above the national or European average, yellow values indicate speeds slightly above the national or European average and red shades indicate speeds significantly lower than the national or European average.

**Overall accessibility**

From a European perspective, Slovakia benefits from its neighbourhood with Austria so that average interregional travel speeds by road are near the European average (Figure 3.4). However, the rail system is very substandard like those of the neighbouring new member states Czech Republic, Poland and Hungary (Figure 3.6).

**Regional imbalances**

There are significant differences in interregional road speeds in Slovakia, with a clear decline from west to east (Figure 3.3). There are even larger differences in rail accessibility. Here, too, is a west-to-east decline in rail speeds. The Banská Bystrica region is particularly disadvantaged due to poor rail connections to Hungary (Figure 3.5). Overall, the rail accessibility in Slovakia is far below the European average (Figure 3.6).
Figure 3.4  Accessibility Problem Index Road (European), Slovakia, 2006
Part B: Past transport investment priorities
4 Previous support programmes

4.1 National public funding for transport infrastructure

In 2004 the total national budget for transport was about 353.78 mln €. Table 4.1 gives an overview of the budgetary expenditure on transport infrastructure.

<table>
<thead>
<tr>
<th>Year</th>
<th>Road (mln €)</th>
<th>Rail (mln €)</th>
<th>Air (mln €)</th>
<th>Water (mln €)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>220.02</td>
<td>52.96</td>
<td>3.45</td>
<td>1.11</td>
</tr>
<tr>
<td>2001</td>
<td>203.88</td>
<td>172.26</td>
<td>4.07</td>
<td>0.72</td>
</tr>
<tr>
<td>2002</td>
<td>220.29</td>
<td>246.13</td>
<td>3.14</td>
<td>0.70</td>
</tr>
<tr>
<td>2003</td>
<td>224.80</td>
<td>88.53</td>
<td>5.59</td>
<td>0.66</td>
</tr>
<tr>
<td>2004</td>
<td>247.73</td>
<td>93.21</td>
<td>11.73</td>
<td>1.11</td>
</tr>
<tr>
<td>Total 2000-2004</td>
<td>1116.72</td>
<td>653.09</td>
<td>55.23</td>
<td>5.41</td>
</tr>
<tr>
<td>Share</td>
<td>61.0%</td>
<td>35.7%</td>
<td>3.0%</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

The budget allocation by modes clearly shows the high level of spending on motorway development in the past period and the more limited spending on rail. Waterborne transport only receives very limited government expenditure, and air transport receives also some budget from the government.

4.2 EU funding

Overall, in the period 1998 – 2004, the Slovak Republic has received 392 million € for the development of transport infrastructure.

Overall Phare funding for the transport sector has been limited (EU contribution of 14.0 m€) and this has been allocated mainly to road transport. In 2004 0.25 million € were allocated to a multimodal project.

The Slovak Republic received from ISPA funding for the transport sector an EU contribution of 171 m€ in the period 2000-2002. The ISPA projects concern 3 rail projects, including the modernisation of railway line Bratislava – Trnava in 2000 (38 m€), the modernisation of railway line at the section of Senkvice-Cifer and railway stations at the section of Raca-Trnava in 2001 (58 m€), and a rail project of 46 m€. In addition 1 road project was financed in 2001 (Motorway D61: Vienna Road – Pristavny bridge at 27 m€).
The Slovak Republic received from Cohesion Fund for the transport sector an EU contribution of 207 m€ of which 140 m€ were allocated to road projects and 66 m€ for rail projects.

Overall, cumulative EU contributions were primarily allocated to the rail transport sector (EU contribution of 210 €), followed by the road sector (EU contribution of 181 m€). The Structural Funds include an Operational Programme for basic infrastructure including road, rail and air transport.

### 4.3 Other sources of financing

This section gives an overview of other sources of financing for transport infrastructure.

**EBRD**

EBRD has committed one loan in 1993 for the upgrade of national motorway (15 m€). The focus of the project was on road charge studies and maintenance techniques. After that no direct EBRD involvement in transport has taken place in Slovakia.

**EIB**

In the period of 2002-2006 the European Investment Bank (EIB) has been involved in 3 projects in Slovakia for in total 600 million EUR. Two projects have a focus on motorway construction and road investment. In the period 2002-2006 the total cumulative lending for motorway construction and road investment amounted to some 200 million EUR. In 2006, EIB is involved in ‘Presov Regional Infrastructure’ project focuses on the improvement of the regional road infrastructure (26.5 million EUR and in the construction of a part of the D1, the Trans European Corridor (180 million EUR) implemented by the Slovak National Motorway Company. The other loan was supplied in 2002 to the railway sector with a proposed EIB finance of 400 million EUR. This project ‘Slovakian Railways Modernisation II’ includes the modernisation of infrastructure, in particular the upgrading of Pan-European Transport Corridors, as well as the purchase of rolling stock.

**PPP financing**

For the next motorway constructions a change in the financing scheme is planned, but not enacted yet. Interest of private capital will be possible, but this change in the financing scheme is connected with the question of the private interest in motorway construction and administration, and it is also connected with the planed new electronic motorway charging in the Slovak Republic. Currently this financing scheme is only in preparation; the selection of the consultant, whose task will be to define the process of entrance of private finance to the motorway construction, is ongoing.
Part C: Future transport investment priorities
5 National Transport Strategy

5.1 Introduction

This is the first section of Part C which aims to determine transport investment priorities at a strategic level. This chapter deals with the current national transport policy and resulting investment priorities. In the next chapter these investment priorities are confronted with an analysis of possible sources of financing, and other factors such as their contribution to EU policy objectives, the administrative capacity of the country, the socio-economic impacts in relation to the costs of the projects, and the extent to which the projects contribute to the needs identified in Part A of this report. Finally the overall impact of the proposed investment priorities is assessed.

5.2 Long term National Transport Strategy and Planning

The main priorities have been recorded in the recent “TRANSPORT POLICY OF THE SLOVAK REPUBLIC UNTIL THE YEAR 2015” (Approved by the Government in June 2005). The transport policy consists of “Core Principles and Objectives”, which are related with transport/political, economic, environmental and social principles. Each of the “specific objectives” of transport policy is elaborated into a number of “priorities” and for the sub-sectors (modes of transport) involved “measures” are defined.

**Global objective**

The global objective of the transport policy is to ensure the sustainable development of mobility, perceived as the long-term satisfaction of growing traffic requirements of the society (goods and passenger transport) in the required time and quality, while reducing the negative environmental effects of transport. The ensuring of sustainable mobility requires a proportional development of all transport modes in the framework of the transport system of SR, based on the principles of the EU common transport policy, with the view to effectively meet the traffic requirements of the society.

**Specific objectives**

The global objective will be achieved through the following specific objectives:

- To create transparent and harmonised conditions for competition on the transport market;
- To ensure the modernisation and development of the transport infrastructure;
- To ensure adequate financing in the transportation sector;
- To decrease the negative environmental effects of transport;
- To increase the quality and the development of transport services;
- To enhance traffic safety and protection;
To support research and development in transport;
To manage the effects of transport globalisation.

5.3 Operational programme 2004-2006

The sectoral Transport Operational Programme (SOPT) for the coming programming period are yet unpublished. The indication of the Slovak Republic priorities for the period 2004-2006 is provided by the Operational Programme Basic Infrastructure, published by the Ministry of Construction and Regional Development in December 2003.

The global objective of OP Basic Infrastructure is to support the balanced regional development via increasing competitiveness of the regions.

One of the specific objectives is the modernisation and development of transport infrastructure. This objective focused on the improvement of transport accessibility and serving of backward regions of the SR. The following transport infrastructure priorities in OP are important.

Modernisation and development of the railway transport infrastructure

The railway transport infrastructure is one of the key factors influencing significantly the development of the economy, as well as the spatial arrangement of the state. The current technical level of railway infrastructure does not provide sufficient foundations for providing quality services and for joining the international transport market. Therefore, the development of the SR Railways network is based on a forecast of the future development of transport in Europe and the principles of European transport policy, placing emphasis on the higher use of environmentally friendly types of transport, in particular rail transport.

It is assumed that the activities scheduled in the programme period 2004-2006 enable an increase in the competitiveness of railway transport in comparison to road transport and the transit of individuals and goods.
Removing the unsatisfactory technical state of platforms requires the performance of essential reconstruction work.

At present, due to several aspects it is necessary to establish operational, organisational, technical and technological bases in particular for the fields of compact electrical traction and strong-current equipment, control systems and control centre management technology, components for the power supply of security systems, as well as other railway technology equipment. Concurrently, it is necessary to utilise the advantages of the geographical location of our territory in terms of the inclusion of its railway lines into the international corridors of Europe.

Among the most important factors of modernisation trends in the conditions of Slovak Railways infrastructure is the complex programme of railway route electrification. Its undoubted economic, operating and not least environmental benefits are confirmed and proven through the long-term experience not only of advanced railway companies abroad, but also through practical experience of the SR Railways company.

Through the measures, the aim is to increase technical level of railway equipment, safety and a culture of passenger transport on the railways.

The objective of the measure is to ensure development of railway transport infrastructure in individual regions. Implementation of this measure provides for the more effective use of capacity of railway infrastructure, acceleration of transfer of individuals and goods, increasing safety and reliability, and through this an overall improvement in the quality of railway transport. Increasing the quality of the railway network contributes also to a reduction of the negative impacts of transport on the environment.

**Modernisation and development of road infrastructure**

The road infrastructure is one of the key factors influencing significantly the manner of the economy’s development as well as the spatial arrangement of the state. An increase in the standard of living brings with it high growth in road automobile transport, in particular individual automobiles, calling for the necessary modernisation and expansion of the road network capacity. The overloaded capacity of roads on main transport routes with international transport results in a worsening transportation situation. If no investment is made in road development by the year 2005, the sections with overloaded capacity may reach more than 500 km on roads with international transportation. The principal solution aims at removing inadequate capacity, taking into account current as well as forecast traffic growth. In this connection ERDF resources will, in particular expressways.

The measure is aimed in particular at realisation of the expressways construction programme approved though SR Government Regulation 523/2003, the construction and modernisation of roads with exceeded transport performance (mainly class 1st roads), reconstructing existing unsuitable crossroads, improving the environment in building road bypasses around human settlements on expressways with an exceeded admissible traffic intensity.
The objective of the measure is to ensure quality road connections between individual regions, regional centres themselves, and the capital of Bratislava. Within this, the construction of new road sections, crossroads and bypasses around towns and villages, as well as the reconstruction of roads is being considered, which should significantly improve the transport situation at exposed sections. Implementation of this measure will eliminate negative impacts of road transport, enabling a reduction of energy and time losses, decreasing rate of accidents, and not least also a reduction in costs for the repair and maintenance of communications.

Modernisation and development of air transport infrastructure

The Measure is aimed at increasing airport security through installation of a comprehensive security system with the aim of protecting operating areas, buildings and equipment at airports.

The objective of this measure is to ensure an increase in airport security through building up a comprehensive security system at airports aimed at protection of property, individuals and protection of civil airlines against illegal action. Under consideration are the construction of a monitoring technological system, control system and access control system inside the external areas of airports, the aim of which is to safeguard access control of individuals and vehicles between the surface, land side and the air side. The building of an integrated violation alarm system (VAS) is aimed at integrating existing independent systems reporting violations inside protected premises of the terminal with a centrally controlled security system.

5.3.1 Preparing priorities for the new programming period 2007-2013

Modernisation and development of road infrastructure concerns improvement and construction of main transport network to eliminate regional disparities in less-developed regions of SR and interconnection within neighbouring countries. Next steps will be aimed on modernization and maintenance of existing road infrastructure of lower level.
Specific objectives for the preparing priorities of the programming period 2007-2013 are:

- Development of prior road infrastructure (TEN-T),
- Development of speedways,
- Modernization and development of I. class roads,
- Modernization and development of II. and III. class roads.

**Modernisation and development of the railway transport infrastructure** will be focused on quality improvement by modernization of infrastructure on main corridors and safety and quality of operation improvement.

Specific objectives for the preparing priorities of the programming period 2007-2013 are:

- Modernization and development of routes under TEN-T network,
- Modernization and development of other routes,
- Safety improvement.

**Modernisation and development of the intermodal transport infrastructure** will be focused on modernization of terminals according to AGTC Agreement.

Specific objectives for the preparing priorities of the programming period 2007-2013 are:

-基本网络的公共多式联运终端的发展,
-技术和信息的终端与物流中心的互联.

**Development of public passenger transport** will be focused on development and integration of suburban transport and vehicles renewal with aim to reduce energy demand in public passenger transport.

Specific objectives for the preparing priorities of the programming period 2007-2013 are:

- to reach the share of buses newer than 7 years at minimum 50% of total number in public bus transport by 2013,
- to ensure regional passenger railway transport by minimum 18 new compact train sets by 2013,
- to ensure inter-regional passenger railway transport by 25 modern motive power units by 2013,
- to realize the systems of integrated transport in at least two regional agglomerations by 2010.

### 5.4 Priorities in OP by sector

As per Declaration “Strategic Targets of Development of MTPT – 2020”, the following priorities have been stated, by mode of transport and target year.

**Priorities for railway transport**

- Modernization of corridors:
  - Corridor No. IV: continuing of realization on the section Kúty - Štúrovo,
  - Corridor No. Va.: finalization of the section Bratislava - Žilina,
  - Corridor No. VI: finalization of the section Žilina - Čadca - Skalité.
- Finalization of ZSR transformation,
- Improvement of traveling culture and extension of provided services assortment by means of:
- construction completion and modernization of decisive railway junctions and stations,
- modernization of technical base of lines, which have been not included into selected lines - corridors, however, are necessary from the view of national transport,
- construction preparation of high-speed lines across our territory,
- preparation and realization of integrated systems of passenger short-distance traffic in selected regions.

- Modernization of corridors:
  - Corridor No. IV: finalization,
- Improvement of traveling culture and extension of assortment of services provided
  - finalization of decisive railway junctions and stations
  - modernization of technical base of lines and stations not included into selected lines and corridors which are necessary from the aspect of national transport.

Priorities for combined transport:
Stabilize international co-operation of intermodal operators by means of participation in international companies, support next development and reconstruction of infrastructure, mobile transport and handling engineering. To follow development of new technical and technological trends and solve the way of their application in the SR transport market, Finalize construction of international terminal of combined transport in the SR territory, including transport services provision at level of the European standard. Improvement of the engineering/technical level of the railway infrastructure within the program of reconstruction. Form technical and technological conditions for introduction of new transport systems in line with European standard.

Priorities for road infrastructure
The strategic target is to finalize the whole SR motorway network construction to connect it with the European motorway network and so join motorways to main European multi-modal corridors. In the construction procedure is followed the priority target, i.e. finalization of TEM motorway (north - south route) in multimodal corridors No. Va (Bratislava - Žilina - Košice - Ukrajina) and No. VI (Gdańsk - Katowice - Žilina). In this time horizon some motorway sections will be constructed in half profile.

Finalize the construction of motorway network in full profile with first-rate connection to both road network and express roads, complex equipment of motorways corresponding with requirements for traffic safety.

Priorities for waterway transport
- Realize navigability of the Vah river on the whole section Komárno - Žilina.
- Navigation of rivers Bodrog, Latorica a Laborec with waterway parameters in accordance with classification group IV.
- Develop inland waterway transport on all newly-established waterways of the Slovak Republic and its both active exploitation and connection to the system of combined transport.

Priorities for aviation- By 2010
Main objectives are the full incorporation of civil aviation to EU and providing for the full liberalization of air transport market.
Priorities for EU funding

- Development of missing links motorways and expressways with respect to considered international road routes and cross border connections
- Completion of motorway network included in TEN-T with the priority part being Bratislava–Košice as the main transport and inter-city route in the Slovak Republic
- Development of TEN-T priority railway axis IV and VI
- Upgrading high-speed railway on the corridors
- Network of public intermodal terminals development
- Navigability Danube waterway and Vah river
- Definition and policy formulation of Public Service Obligation (PSO)
- Renewal urban transport fleet
6  Prioritisation of Transport Investments (2007-2013)

6.1  Introduction

This chapter intends to identify the main areas for transport investments that would merit EU funding in the period 2007-2013. It should be emphasized that this is based on an analysis that has been carried out at strategic level. Although the areas identified are expected to result in high potential projects they should still be subjected to the regular cost-benefit analysis at a project level before being finally selected.

**Community Strategic Guidelines**

The context for identifying strategic investment priorities is set by the Community Strategic guidelines. In accordance with the draft Council Regulation (article 23), the Council establishes Community Strategic Guidelines for cohesion policy to “give effect to the priorities of the Community with a view to promote balanced, harmonious and sustainable development”\(^3\).

These Strategic Guidelines form the basis for identifying investment priorities, which are then be elaborated in National Strategic Reference Frameworks at the Member State level, which are subsequently further detailed in Operational Programmes (OPs) for thematic areas. A Commission proposal on these Strategic Guidelines was published in July 2005\(^4\). In parallel, Member States have already started preparations for their National Strategic Reference Frameworks and OPs.

**Additional factors influencing investment priorities**

As indicated the Strategic Guidelines form the context in which investment priorities for Community financing should be identified. In addition to these strategic guidelines a number of other factor shape the eventual establishment of transport investment priorities. These other factors include:

- Cost-effectiveness of projects;
- Availability of other sources of funding;
- Appropriateness of transport policy;
- Administrative capacity to adequately absorb and manage funds.

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\(^3\) COM(2004)492

In the next section the Strategic Guidelines and the other factors are elaborated in more detail leading to a proposed prioritisation of areas for funding from Cohesion and Structural Funds.

6.2 Community Strategic Guidelines

The (draft) Community Strategic Guidelines set the scene for any future transport investment financed as part of the Commission’s cohesion policy. According to the communication of the Commission (COM(2005)299) the guidelines with respect to the expansion and improvement of transport infrastructures for the period 2007-2013 determine clear guidelines for action (see text box 6.1)

Box 6.1 Community Strategic Guidelines: Guidelines for action

The Community Strategic Guidelines distinguish the following guidelines for action:

- Member States should give priority to the 30 projects of European interest, located in Member States and regions eligible under the Convergence objective. Other TEN projects should be supported where this is a strong case in terms of their contribution to growth and competitiveness. Within this group of projects, cross-border links and those overseen by the specially designated European co-ordinators in the Member States merit special attention. Member States should make use of the co-ordinators as a means of shortening the time that elapses between designation of the planning of the network and the physical construction.

- Complementary investment in secondary connections will also be important in the context of an integrated regional transport and communications strategy covering urban and rural areas, in order to ensure that the regions benefit from the opportunities created by the major networks.

- Support for rail infrastructure should seek to ensure greater access. Track fees should facilitate access for independent operators. They should also enhance the creation of an EU-wide interoperable network. Compliance and applications of the interoperability and the fitting of ERTMS on board and on track should be part of all projects financed.

- Promoting environmentally sustainable transport networks. This includes public transport facilities (including park-and-ride infrastructures), mobility plans, ring roads, increasing safety at road junctions, soft traffic (cycle lanes, pedestrian tracks). It also includes actions providing for accessibility to common public transport services for certain target groups (the elderly, disabled persons) and providing distribution networks for alternative vehicle fuels.

- In order to guarantee the optimum efficiency of transport infrastructures for promoting regional development, attention should be paid to improving the connectivity of landlocked territories to the Trans-European network (TEN-T) (...). In this respect, the development of secondary links, with a focus on inter-modality and sustainable transport, should be promoted. In particular, harbours and airports should be connected to their hinterland.

- More attention should be paid to developing the “motorways of the sea” and to short-sea shipping as a viable alternative to long-distance road and rail transport.

In addition the Guidelines give specific instructions with respect to the territorial dimension of Cohesion policy in stressing that Member States should pay particular attention to prevent uneven regional development and improve territorial integration and cooperation between and within regions.

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6.3 Additional factors for the prioritisation of transport investments

As indicated in the introduction a number of other factors determine the eventual prioritization of transport investment priorities under the Commission’s cohesion policy instruments. These will be subsequently elaborated.

Cost-effectiveness
Cost-effectiveness or value for money stands at the core of any sound investment programme. It is also fully embedded in the procedures and structure of the cohesion policy of the Commission in which cost-benefit assessments of proposed projects are standard procedure. Also EIB applies CBA as standard assessment methodology before granting new loans.

The cost-effectiveness criterion is especially important if budget resources are limited. In this case cost-benefit analyses can be used to phase foreseen transport investment in time or to seek alternatives with a similar functionality that offer a higher value for money.

Availability of other sources of financing
A can be observed from the previous investment programmes other sources of finance should not be overlooked with respect to future transport investments Apart from public financing by the country itself important potential sources are:

The Commission recently reached an agreement with the EP on future TEN-T financing. Total budget available is 7 bn€ for the coming programming period. Financing can be up to 20%. It should be noted however that this financing is only a fraction of total cohesion financing (e.g. Cohesion Fund financing for transport approximates 45 m€), while TEN-T funds are valid for all EU members. It is expected that TEN-T funds will be focused on cross-border TEN-T projects.

EIB financing is another source of financing available for transport investment. EIB is active in the Slovak Republic in supplying loans for road projects in 2006 and railway investment in 2002. Further involvement of EIB is expected in the Slovak Republic. An important criterion is the level of public debt which should be below 60% of GDP. In the Slovak Republic this currently stands around 42%.

In addition to EIB, EBRD can become active in the Slovak Republic. Until now EBRD involvement has been limited. EBRD can become more actively involved in development of roads and railways in backward regions.

PPPs are explicitly mentioned in the Community Strategic Guidelines as a possible appropriate method of financing investment when there is significant scope for involving the private sector. Apart from the financial leverage positive impacts are expected on implementation and management of projects.

Experience with private involvement in transport infrastructure in the form of PPPs has been limited until now. However, based on the experience in other countries logical sector for a more intense private sector involvement are: airports, inland ports and multimodal logistics centres. Also motorways sometimes figure as typical PPP models.
The Slovak government has recognized that implementation of improvements in the transport system creates a need for financing from multiple sources. Apart from public national sources and EU funds, bank loans and private resources through concession are actively sought for. In this respect the following opportunities are indicated:

The combined terminals financing will be, according to present presumptions, carried out from the state resources with the using of EU funds support. In case of construction logistics centres it is possible to contemplate different ways of financing like PPP.

Regarding to the sector of road transportation, the state has taken action in 2005 to prepare the legislation and real conditions for the invitation to tenders for PPP projects in motorways and expressways. The PPP project of motorway section D1 is in the state of preparation. This section, part of the TEN network, is 30 km long and parts of this section consist of a tunnel and bridges. So private resources obtained by the partnership of private and public capital can be one of the multi-source financing methods for the Slovak Republic in future for transport infrastructure, but PPP is still not in practice.

The current business climate in the Slovak Republic is expected to be sufficiently open not to hamper PPPs.

Both EBRD and EIB can also get involved if PPP constructions are considered through direct equity participations.

In summary, other financing sources are expected to relevant for the following areas:

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEN-T</td>
<td>TEN projects, especially cross border sections</td>
</tr>
<tr>
<td>EIB</td>
<td>Motorways, railways and rolling stock</td>
</tr>
<tr>
<td>EBRD</td>
<td>Possibly roads (road rehabilitation) and rail</td>
</tr>
<tr>
<td>PPP &amp; private capital</td>
<td>Income generating transport investments: airports, inland ports, multimodal logistic centres, toll roads</td>
</tr>
</tbody>
</table>

**Appropriateness of the transport policy**

The recent policy document ‘Transport Policy of the Slovak Republic until the year 2015’ gives the objectives and measures of the priorities concerning national transport policy. Transport policy as sectoral policy is the prerequisite for the development of the Slovak Republic and form a framework with cross-sectional development policies for sustainable development.

One of the objectives is to ensure adequate financing in the transport sector in future. Therefore, implementation will utilize multi-source financing of transport infrastructure that includes measures to:

- Use multi-source financing for the acceleration of the modernization and development of the transport infrastructure, so as to minimize the demand for public finance;
• Take legislative measures allowing the partnership of the private and public sectors in financing of the development of the transport infrastructure
• Prepare and adopt the programming documents for drawing from the SF and the CF for the years 2007-2013 for the areas of transport, and their subsequent implementation
• Launch an electronic system in 2007 for toll collection on motorways, express ways and selected 1st class roads, whereby the amount of the toll will be based on the analysis of costs of operation, maintenance and modernization of the motorway road network.

Administrative capacity
The Ministry of Finance has been appointed as the only paying authority in charge of Structural Funds. As of 1st July 2002, a separate department of the paying authority for Structural Funds has been created within the Ministry of Finance. The paying authority delegates some of its powers to intermediary authorities under paying authority. The extent of these powers has been established in the Concept of Structural Funds financial management system and in the agreement on delegation of powers.

The Ministry of Transport, Post and Telecommunications is one of the intermediate authorities that provide for transfer of EC funds and co-financing resources from the state budget to the financial beneficiaries. The beneficiaries are the Railways of the Slovak Republic (ZSR), Slovak Road Administration and the National Motorway Company that was established by state on February 2005.

The strategy of ZSR is directed at the ongoing transformation of the organization, human resources development, implementation of EU legislation and the mission to be an effective market and customer oriented company. For the stimulation of the capacity of railway transport and interconnection with EU states, ZSR has a department for programmes of foreign aid of EU funded railway projects.

Main responsibilities of the National Motorway Company (NMC) are preparation, implementation of maintenance of motorways and speedways based on the Plan of Development of Motorways and Roads approved by the Government. Also future motorway and road funded EU projects can be organized by NMC.

For the planned investment in inland waterway projects and intermodal transport capacity building and is necessary to manage and implement the expected increase in available funding.

To stimulate the competition and optimalisation of public transport, Government, Regions, Municipalities and the public administration bodies should apply a legal framework to support public transport, create conditions for legislation and maintenance of services and organize the requirements for transparent financial resources and relations.

Overall administrative capacity in the transport sector should be strengthened through an adequate clarification of tasks and proper coordination between the various ministries involved in the legislative process.
Based on the previously stated argument a risk assessment has been prepared with respect to the administrative capacity in the Slovak Republic. This assessment has been summarized in table 6.2. Moderate to high levels indicate that additional attention should be paid to this aspect in the implementation of the programme.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Risk level</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>moderate</td>
<td>TEN projects, especially cross border sections</td>
</tr>
<tr>
<td>Roads</td>
<td>moderate</td>
<td>Motorways (via NMC) low-moderate risk; state roads moderate risk due to limited experience.</td>
</tr>
<tr>
<td>Rail</td>
<td>Moderate-high</td>
<td>Limited investment experience with large scale investments. ZSR has department for foreign aid. ZSR is in state of reorganization.</td>
</tr>
<tr>
<td>Inland waterways</td>
<td>high</td>
<td>Limited experience with large scale investments.</td>
</tr>
<tr>
<td>Urban transport</td>
<td>moderate/high</td>
<td>Depending on size of project. More cooperation between authorities needed. Limited experience with large scale projects.</td>
</tr>
</tbody>
</table>
7 Assessment of Impacts

7.1 Introduction

This chapter assesses the impacts of the identified priorities with respect to three different (EU) policy objectives:

- Economic competitiveness
- Territorial cohesion
- Environmental sustainability

First the methodological approach is described, including the SASI model that has been used to assess the impacts, followed by a presentation of the impacts.

7.2 Methodology

The SASI model

The impacts are assessed with the support of the SASI model. The SASI model is a recursive-dynamic simulation model of socio-economic development of 1,330 regions in Europe. The model was developed to assess socio-economic and spatial impacts of transport infrastructure investment and transport system improvements. It has been applied and validated in several large EU projects including the IASON and ESPON projects.

The SASI model differs from other forecasting models of regional development by modelling not only production (the demand side of labour markets) but also population (the supply side of labour markets). Regional production by industry is forecast by regional production functions containing production factors capital, labour, regional endowment and accessibility. Regional population is forecast by a demographic model including fertility, mortality and migration.

The SASI model is specifically relevant for projects that serve a function at a European level (e.g. the TEN projects). Such projects cannot be adequately evaluated using traditional cost-benefit analysis at a national scale, since they are less able to capture the international effect and the indirect effects occurring in non-transport sectors. See e.g. Rothengatter, The relevance of Transeuropean Transport Networks for Integration and Growth in the Extended European Union.
The reference network

To assess the impacts of new transport investments, a reference scenario has been prepared. This mainly implies an adjustment of the transport network in the SASI model. The dynamic network database of SASI is based on highly detailed pan-European transport networks with respect to:

- Roads (including short-sea shipping)
- Rail (including ferries)
- Air (including regional airports).

Network calculations are based on travel times or generalised costs, including border waiting times and (political, economic cultural and language) barriers.

The reference network has been updated, based on the most recent information from the countries on implementation schedules and alignment with respect to TEN and national transport projects (also information on toll is included). The reference network includes all projects that are already under construction and will be operational until 2007.

In addition, the reference scenario assumes the further development of the European integration with the accession of Bulgaria and Romania in 2007. Further European integration results in reductions in waiting times and lower barriers between countries.

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7 Which relies on the trans-European transport network database developed by IRPUD (2003) and now maintained and further developed by RRG (2005)
7.3 Scenarios

Impacts have been assessed for different scenarios, to be able to compare the outcomes and draw conclusions on the different impacts. Although the study aims at identifying strategic areas for investment priorities, these areas need to be “translated” into projects to enable the SASI model to assess impacts. As a result, assumptions have been made on projects in the scenarios. These projects are not listed separately, as this would distract the discussion from strategic priorities to projects. Where possible, these projects are based on existing planned projects and related cost estimates. Where no existing data is available, estimates are based on unit parameters in EU-wide infrastructure needs assessments. In all scenarios no further transport projects are implemented after 2016. However, it is assumed that European integration proceeds as in the Reference Scenario (resulting in higher transport speeds due to less time consuming border procedures).

In addition to the Reference scenario, two major scenarios are distinguished:

- The **Maximum** Scenario, which comprises a listing of possible projects that have been identified in Slovakia;
- The **Balanced** Scenario, which applies a budget restriction (with in parallel an assessment of additional financing opportunities). Projects are prioritised on the basis of their benefit-cost ratio and their contribution to specific objectives and needs (sustainability, regional disparity, and contribution to accessibility).

On the basis of the maximum scenario, two sub-sets are determined: the **Maximum Road Scenario** and the **Maximum Rail Scenario** which illustrates the differential impact of rail versus road projects.

**The Maximum Scenario**

The Maximum Scenario is based on an extensive listing of possible investment projects that have been identified by the national project partners. Where relevant, these project lists have been extended with projects that have been identified on the basis of existing network analyses and studies, projects identified on the basis of interviews that have been carried out in the countries, or projects that can be additionally identified on the basis of the needs assessment in Part A of this report (including the “red flag” analysis).

This result in a scenario of all TEN priority projects and additional national projects that are planned to be constructed (or start with construction) in the period 2007-2013 and which are operational by 2016. An important notion with respect to the maximum scenario is that no budget restriction is applied.

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8. This can be national studies or information, information on TEN priority projects 2005 (EU 2005), or recent studies on the Pan-European corridors (VTT 2006).
9. E.g. TINA, TEN-Invest, TEN-STAC.
10. The impact assessment in SASI has only been done on a selected set of road and rail projects. This is done because these sub-sectors in general will receive the majority of funding and an assessment of their impacts can be done without having to go into too much project detail. It is assessed that this approach gives sufficient feedback on the potential impacts.
11. Are projects solving “missing links” in the network?
12. For example the recent study carried out by VTT on the Pan-European corridors (VTT 2006).
Within the Maximum Scenario two specific sub-sector scenarios are distinguished:

- The **Maximum Road Scenario** assumes the implementation of all proposed road projects including cross-border transport corridors.
- The **Maximum Rail Scenario** assumes the implementation of all proposed rail projects including cross-border transport corridors.

**The Balanced Scenario**

The Balanced Scenario starts from the Maximum Scenario. First, an assessment is made of the available EU funding in comparison to the total budget requirements of the projects. If a budget restriction applies, projects are selected and prioritised on the basis of a number of criteria:

- **Cost -benefit ratio.** Are projects in this field expected to deliver value for money (socio-economic rate of return)\(^\text{13}\)?
- **Accessibility.** Are they contributing to a clear improvement in accessibility, both on a European and a national scale (missing links in networks, main transport corridors, and secondary connections to backbone network)?
- **Sustainability.** Do interventions facilitate modal shift to more environmentally friendly transport modes?
- **Territorial cohesion.** Is there a contribution to improving the accessibility of more backward regions?
- **Safety.** Do measures contribute to improved transport safety?

The assessment in this respect draws strongly on the finding in Part A of the report (SWOT-analysis of the transport system and “red flag” analysis).

In addition to the Balanced Scenario two variants of the Balanced Scenario are distinguished, in order to examine the impact of the north-south road connections versus those of the east-west road connections:

- The **Balanced N-S Scenario** assumes the implementation of the north-south road connections D3/R3 and R4, but not of the east-west road connections D1/R1 and D2/R2.
- The **Balanced E-W Scenario** assumes the implementation of the east-west road connections D1/R1 and D2/R2, but not of the north-south road connections D3/R3 and R4.

Finally, an assessment is made to which extent other financing sources could play a role. In this respect especially the potential of an involvement of the European Investment Bank and public private partnerships is included (see also Chapter 6):

- **Other sources of finance.** Are projects able or likely to attract other sources of finance? In those cases application for EU financing might not be necessary.

In addition, the possible impact of limitations in the administrative capacity and changes in the pricing policy (if large distortions exist in this respect) are taken into account.

\(^{13}\) Based on TEN-STAC
Table 7.1 gives an overview of the criteria that have been applied for the sub-sectors road and rail.

Table 7.1 Assessment of selected areas for road and rail investment

<table>
<thead>
<tr>
<th>Sub sector</th>
<th>Cost-effectiveness</th>
<th>Accessibility</th>
<th>Sustainability</th>
<th>Territorial Cohesion</th>
<th>Safety</th>
<th>Other sources of finance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Railways</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Bratislava – Vienna</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>- TEN-T priority axis Katowice – Zilina - Nove Mesto</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>- high speed on the IV, V and VI corridor</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td><strong>Roads:</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>- TEN-T priority axis Zilina - Katowice (VI)</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>- completion missing sections motorway network</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>cross border connections (corridor IV and V)</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>- upgrade R1 and R2 to motorway</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>- reconstruction / maintenance national roads</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Legend: + positive score; 0 neutral score; - negative score on criterion

**Railways**

- The railway network in Slovakia is one of the densest in Europe, but one of the oldest as well. The infrastructure needs upgrading and maintenance and the possible speed has to be increased on the corridor parts. Focus should be on the national railway lines that represent parts of trans-European corridors, the TEN-T priority axes 17 and 23 that connect Slovakia with neighbouring countries (Corridors IV, V and VI). Upgrading of the Vienna-Bratislava railway line and the railway section between the Czech and Hungarian borders via Kuty, Bratislava and Sturovo (Corridor IV) is essential to maintain the position of railway passenger and freight transport. Upgrading of the railway Katowice-Zilina-Nove Mesto is important for improvement of the accessibility of the eastern part of Slovakia.

- To maintain and strengthen the position of rail freight and passenger transport, increase of the line speed on conventional railway lines to 160 km/h and with selected freight trains to 120 km/h with electric traction is necessary. Priorities are the modernisation and speed increasing of the TEN-T corridors.

**Roads**

- The main priority is to develop, modernise and increase the network of motorways in Slovakia. The construction of the motorway Bratislava-Kosice (D1) is the core connection between the western and eastern part of Slovakia and part of the corridor V. The TEN-T project Zilina-Katowice is important to improve the accessibility of the eastern regions in Slovakia and improve the border motorway connections with Poland (Corridor VI).

- The need to construct new motorways is urgent and necessary to expand the motorway network. The motorway network construction enlarges the capacity,
relieves the existing (congested) road network and meets the expected growth of traffic passenger and freight demand. Also the new motorway network contributes to the development of regions and connections with neighbouring countries. Some missing links on the motorway corridors IV and V are planned to be constructed as toll roads, like D1, and could be financed through loans by the European Investment Bank or with public private partnerships. Co-ordination with neighbouring countries on cross border connections is important.

- To improve the accessibility and development of the eastern regions along the Hungarian and Polish border (Banska Bystrica, Presov and Kosice), further upgrade of the class I roads R1 (Trnava-Zvolen) and R2 (Zvolen-Kosice) to motorways is needed.

- The upgrading of the sections that connect the regions with road accessibility problems with the motorway network could be aided by financing from ERDF/CF. Insufficient maintenance of the road network and poor conditions of cross border infrastructure are important aspects that should be improved. ERBD funds may be used to establish improved links from border and eastern regions to the existing motorway networks. Also the Slovak government should pay attention to financing of regular maintenance of the state road network.

Table 7.2 gives an overview of the assessment which areas for the road and rail projects can be (potentially) financed by other sources.

<table>
<thead>
<tr>
<th>Sub sector</th>
<th>CF/ERDF</th>
<th>EIB</th>
<th>EBRD</th>
<th>PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Railways:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Bratislava – Vienna</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Katowice – Zílina - Nove Mesto</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- high speed on the IV, V and VI corridor</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Zilina - Katowice (VI)</td>
<td>√</td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>- completion missing sections motorway network</td>
<td>√</td>
<td>√</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>- cross border connections (corridor IV and V)</td>
<td>√</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- upgrade R1 and R2 to motorway</td>
<td>√</td>
<td></td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>- reconstruction / maintenance national roads</td>
<td>√</td>
<td></td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>

Location of projects
Figures 7.2 and 7.3 show the location of the expected projects under the Maximum (Road and Rail) and Balanced Scenarios that have been included in the impact analysis.
Figure 7.2  Road network in the Reference, Maximum Road and Balanced Scenarios, Slovakia

**TEN priority road projects**
- Hričovské Podhradie - Lietavská Lúčka
- Vlčňové - Dubná Skala - Turany - Hubová - Ivachnová
- Važec - Mengusovce
- Jánoce - Studenec - Studenec - Behárovec
- Budimír - Bidovce
- Mengusovce - Jánoce
- Svinia - Prešov west
- Poprad - Kežmarok
- Bratislava, Mierová ul. - Bratislava, Senecká cesta
- Bratislava, Lamačská cesta - Bratislava, Staré Grunty
- Skalité - SR/PR Border
- Svidnik - Žilina - Kysucké Nové Mesto - Čadca
- Čadca Bukov - Svrčinovce - Skalité
- Horná Štubňa bypass
- Košice, Prešovská - Košice, Sėčovská
- Košice - Milhost bypass
- Prešov Sever (north) bypass
- Šarišský Štvrtok - Valkovce
- Ladomirová - Hunkovce

**National road projects**
- Trnava - Nitra
- Žarnovica - Šašovské Podhradie
- Selenec - Beladice - Tekovské Nemce
- Nitra feeder
- Lovčica - region border
- Zvolen - Pstruša
- Pstruša - Kriváň
- Ožďany - Zacharovce - Báňka
- Žiar nad Hronom - Dolný Kubín - Oravský Podzámok
- Horná Lehota - Trstená
- Oravský Podzámok bypass
- Trstená bypass
- Dunajská Streda - Trstic - Vľčany
- Trnava-Zvolen - Kosice
Figure 7.3  Rail network in the Reference, Maximum and Balanced Scenarios, Slovakia

**TEN priority rail projects**
- Vienna - Bratislava
- Katowice - Žilina - Nove Misto
- Nové Mesto nad Váhom - Púchov
- Zvolen - Žilina
- Žilina - Krasno nad Kysucou - Čadca
- Bratislava - Bratislava Airport
- Bratislava Filialka - Pass. Station
- Piešťany - Nové Mesto nad Váhom
- Púchov - Žilina - Krasno nad Kysucou - Čadca

**National rail projects**
- Devínska Nová Ves - Marchegg

### 7.4 Impact assessment

The impacts of the balanced transport scenario are measured as differences between the balanced scenario and reference scenario. These impacts are evaluated with respect to the strategic objectives:

- Economic competitiveness
- Territorial cohesion, and
- Environmental sustainability

The following objectives have been identified to describe the impact on the different policy objectives:
Table 7.3 Strategic objectives and related indicators

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic competitiveness</td>
<td>Average speed of interregional road trips (kph)</td>
<td>National, regional average</td>
</tr>
<tr>
<td></td>
<td>Average speed of interregional rail trips (kph)</td>
<td>National, regional average</td>
</tr>
<tr>
<td></td>
<td>GDP per capita (Euro)</td>
<td>National, regional average</td>
</tr>
<tr>
<td>Territorial cohesion</td>
<td>Primacy rate population (%)</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td>Primacy rate GDP (%)</td>
<td>National</td>
</tr>
<tr>
<td></td>
<td>Gini coefficient(^{14}) of GDP per capita (0-1)</td>
<td>National</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Share of interregional rail trips (%)</td>
<td>National, regional average</td>
</tr>
</tbody>
</table>

It should be realised that these spatial impacts are long term effects, as:
- Location decision of firms result in changes in economic activity and employment only after some time;
- Secondary effects of economic activity (i.e. attraction of other firms) take even longer.

This is accounted for in the SASI model by time delays of one to five years. In order to take due account of the long-term spatial impact of transport infrastructure investments in the period 2007-2013, the target year for the model simulations is set at 2031.

**Overall Impacts**

Table 7.4 presents the impacts of the proposed priority transport investments.

\(^{14}\) A Gini coefficient is a measure which represent the deviation from a fully egalitarian distribution of income between NUTS 3 regions (i.e. equal regional GDP/capita)
Table 7.4 Strategic objectives and related indicators (2031 impacts)

<table>
<thead>
<tr>
<th>Objective</th>
<th>Indicator</th>
<th>Scenario Reference 2006</th>
<th>Maximum Road 2031</th>
<th>Maximum Rail 2031</th>
<th>Maximum Balanced 2031</th>
<th>Balanced N-S 2031</th>
<th>Balanced E-W 2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic competitiveness</td>
<td>Average speed of inter-regional road trips (kph)</td>
<td>38.8</td>
<td>40.6</td>
<td>42.4</td>
<td>40.6</td>
<td>42.4</td>
<td>42.8</td>
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<tr>
<td></td>
<td>Average speed of inter-regional rail trips (kph)</td>
<td>24.2</td>
<td>24.2</td>
<td>24.9</td>
<td>24.9</td>
<td>24.9</td>
<td>24.9</td>
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</tr>
<tr>
<td></td>
<td>GDP per capita (Euro)</td>
<td>4,909</td>
<td>11,952</td>
<td>11,970</td>
<td>11,978</td>
<td>11,981</td>
<td>11,964</td>
</tr>
<tr>
<td>Territorial cohesion</td>
<td>Primacy rate (%) population</td>
<td>11.2</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
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<tr>
<td></td>
<td>Primacy rate (%) GDP</td>
<td>27.3</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
<td>25.1</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gini coefficient of accessibility (0-100)</td>
<td>4.85</td>
<td>4.57</td>
<td>4.30</td>
<td>4.65</td>
<td>4.38</td>
<td>4.35</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Share of interregional rail trips (%)</td>
<td>24.3</td>
<td>22.7</td>
<td>21.3</td>
<td>24.2</td>
<td>22.8</td>
<td>22.3</td>
</tr>
</tbody>
</table>
Table 7.4 indicates that the overall impact of the scenarios on Slovakia is relatively modest. In absolute terms, the effects are negligible: the transport infrastructure improvements of the policy scenarios increase the average income in Slovakia by less than 30 Euro per capita per year (i.e. 0.1-0.3%). The main explanation for the modesty of the increase appears to be the already relatively high level of road accessibility in Slovakia. Another explanation is that completion of the network (road and rail) does not only favour national, but also international traffic, which is not captured in the Slovakian growth figures. From Figure 7.4 and 7.5 it can be concluded that this EU impact is clearly present. Especially the regions near the Slovakian border in Poland profit from the improvement of the international connections.

The comparison between the scenarios shows that the effects of the scenarios on rail speed are smaller than those on road speed. The effects of the extensive road construction programme manifested in the Maximum and Balanced Scenarios overshadow those of the only two new rail connections between Vienna and Bratislava and Katowice and Nove Mesto and the electrification projects – which with one exception (the Zvolen-Filakova link in the Banska Bistrica region) all occur in the west of the country near the Austrian border.

The environmental effects in terms of increased rail share are significant if only rail projects were implemented as in the Maximum Rail Scenario. However, if also the planned road projects are implemented as in the Maximum Scenario, this effect is almost cancelled out. In the Balanced Scenario, the net effect on rail use is slightly negative.

The impact with respect to the cohesion indicators, which reflect the impact of the transport policy scenarios on the spatial structure of the country, is negligible. The dominant role of Bratislava in terms of population increases in all scenarios. In terms of economic activity, it decreases in all scenarios; however, no significant differences between the scenarios can be detected, not even between the Reference Scenario and the transport policy scenarios. This suggests other factors than accessibility are more important for the process of spatial polarisation.

A comparison of the two alternative Balanced Scenarios, the Balanced N-S and the Balanced E-W Scenario, indicates that in economic terms the east-west road connections are more effective than the north-south road connections. The east-west road connections increase average interregional road speeds three times as much as the north-south road connections, and their economic impacts, though small, are twice as large. The east-west road corridors contribute to convergence in accessibility between the east and west of the country, whereas the north-south road connections increase the gap in accessibility between east and west. However, the more efficient east-west road connections result in less rail use, whereas rail use increases if the north-south road connections are implemented.

**Regional impacts**

Figures 7.3 to 7.6 show the spatial distribution of GDP per capita in the NUTS-3 regions of Slovakia in the target year 2031 in comparison to the Reference Scenario. The impact
Figure 7.3 shows gross domestic product (GDP) per capita of the NUTS-3 regions in Slovakia in the Reference Scenario in the year 2031. Compared with the current distribution of GDP per capita (see Chapter 3), the capital city region around Bratislava is still dominant, however, the wider hinterland of the city with the fast growing industrial centre Trnava participates in the economic growth of the wider capital region. Figures 7.4 to 7.7 show the effects of the Maximum Scenario and the three Balanced Scenarios on GDP per capita. It can be seen that the economic effects of the transport investments are rather evenly distributed across the country in the Maximum Balanced and Balanced E-W Scenarios. In the Balanced N-S Scenario the western parts of the country, in which the major north-south road corridor lies, gains more. In the other three scenarios the other regions benefit more than the capital region of Bratislava. However, this is in relative terms; in absolute terms the Bratislava region benefits more because it is already more advanced and economically more successful (see Figure 7.3).
Figure 7.4  Impact on GDP per capita in the Maximum Scenario, Slovakia, 2031

Figure 7.5  Impact on GDP per capita in the Balanced Scenario, Slovakia, 2031
Figure 7.6  Impact on GDP per capita in the Balanced N-S Scenario, Slovakia, 2031

Figure 7.7  Impact on GDP per capita in the Balanced E-W Scenario, Slovakia, 2031
Figures 7.8 to 7.10 show the impact of the Maximum and Balanced Scenarios on sustainability (as expressed in the share of interregional passenger rail trips).

Figure 7.8 shows the average share of interregional rail trips originating in the NUTS-3 regions of Slovakia (excluding air) in the Reference Scenario in the year 2031. The spatial distribution of rail usage closely resembles that of average rail speed, showing the west-east decline already noted in Figure 3.5. Figures 7.9 and 7.10 show the combined effects of the road and rail projects in the policy scenarios on the share of interregional rail trips. Here, too the reversed traffic light colour scale is used: Green indicates a higher share of rail trips than in the Reference Scenario, and red indicates a lower share of rail trips. It is clearly apparent that the share of rail trips only grows where the new rail projects are: in the west of the country and in the Banska Bistrica region. In the east of the country, however, where there are no rail projects, the road projects dominate with the effect that rail use declines significantly. This decline is even more pronounced in the Balanced Scenario, which contains more road projects than the Maximum Scenario.
Figure 7.9 Impact on sustainability of transport (share of interregional rail trips) in the Maximum Scenario, Slovakia, 2031

Figure 7.10 Impact on sustainability of transport (share of interregional rail trips) in the Balanced Scenario, Slovakia, 2031
Finally results are shown as impacts on the composite Accessibility Problem Index (see Chapter 3). It is examined in how far the policy scenarios contribute to solving the accessibility problems identified in the red-flag analysis. As was noted in Chapter 3, road accessibility in Slovakia is close to the European average and rail accessibility far below the European average, with a decline in accessibility from west to east.

Figures 7.11 and 7.12 show the indices in the year 2031 in the Reference Scenario from a European perspective. It should be remembered that in the Reference Scenario no new road/rail projects are started after 2006. The maps show that despite of this accessibility by both road and rail has improved in most regions due to the ongoing European integration leading to shorter border waiting times and reduced trade barriers. Slovakia benefits from its neighbourhood to the new member states Czech Republic, Poland and Hungary and indirectly to accession country Romania which is assumed to become an EU member state in 2007.

Figures 7.13 to 7.16 show the impacts of the Maximum and Balanced Scenarios on the European Accessibility Problem Index in Slovakia. The spatial distribution of the index is nearly identical in both scenarios. Compared to the Reference Scenario accessibility has further improved in most regions. However, in particular the rail system of Slovakia remains severely substandard compared to the European average, as the few rail projects, with the exception of the Zvolen - Filakovo link, are in the west of the country and mainly serve the capital region of Bratislava.
Figure 7.11 Accessibility Problem Index Road (European perspective) in the Reference Scenario, Slovakia, 2031

Figure 7.12 Accessibility Problem Index Rail (European perspective) in the Reference Scenario, Slovakia, 2031
Figure 7.13  Accessibility Problem Index Road (European perspective) in the Maximum Scenario, Slovakia, 2031

Figure 7.14  Accessibility Problem Index Rail (European perspective) in the Maximum Scenario, Slovakia, 2031
Figure 7.15 Accessibility Problem Index Road (European perspective) in the Balanced Scenario, Slovakia, 2031

Figure 7.16 Accessibility Problem Index Rail (European perspective) in the Balanced Scenario, Slovakia, 2031
Table 7.5 summarises the effects of the scenarios on the Accessibility Problem Index: index values above one indicate accessibility problems, whereas index values below one indicate above-average performance.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Level</th>
<th>Scenario</th>
<th>Reference</th>
<th>Maximum Road</th>
<th>Maximum Rail</th>
<th>Balanced</th>
<th>Balanced N-S</th>
<th>Balanced E-W</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2006</td>
<td>2031</td>
<td>2031</td>
<td>2031</td>
<td>2031</td>
<td>2031</td>
</tr>
<tr>
<td>Road</td>
<td>National</td>
<td>1.000</td>
<td>0.908</td>
<td>0.873</td>
<td>0.908</td>
<td>0.874</td>
<td>0.859</td>
<td>0.903</td>
</tr>
<tr>
<td></td>
<td>European</td>
<td>1.213</td>
<td>1.101</td>
<td>1.059</td>
<td>1.102</td>
<td>1.060</td>
<td>1.041</td>
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<td>Rail</td>
<td>National</td>
<td>1.000</td>
<td>0.939</td>
<td>0.936</td>
<td>0.899</td>
<td>0.897</td>
<td>0.895</td>
<td>0.899</td>
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<tr>
<td></td>
<td>European</td>
<td>1.498</td>
<td>1.406</td>
<td>1.402</td>
<td>1.346</td>
<td>1.343</td>
<td>1.341</td>
<td>1.346</td>
</tr>
</tbody>
</table>

The table reflects the results of the evaluation. There are significant improvements to the road network in Slovakia if all envisaged motorway projects are implemented as in the Maximum Scenario – the values below one indicate that the Slovakian road network is already well developed. The improvement in road accessibility is strongest in the Balanced Scenario because it contains more road projects than the Maximum Scenario. The Balanced E-W Scenario is nearly as effective in improving average road accessibility in the country as the full Balanced Scenario.

The Slovakian rail network is substandard compared to the European average (index values above one); the small projected improvements in the scenario’s do not change that significantly. As there are no differences in rail investment in the Maximum and Balanced Scenarios, the differences in the Accessibility problem Index between the two scenarios are small.

7.5 European effects

The effects of transport infrastructure improvements are not confined to the country in which the construction work actually occurs, but reach across borders into neighbouring countries. The SASI model forecasts these effects.

To demonstrate this on the following two pages three-dimensional images of the spatial distribution of the impacts of the transport infrastructure investments in Slovakia are shown (Figures 7.17 to 7.20).

The four indicator surfaces show the difference between the Balanced Scenario and the Reference Scenario in 2031 for four of the evaluation criteria of Table 7.4: average speed of interregional road trips (Figure 7.17), average speed of interregional rail trips (Figure 7.18), GDP per capita (Figure 7.19) and share of interregional rail trips (Figure 7.20).
can be seen that although the main impacts occur in Slovakia itself, significant effects spread beyond national borders. Even the changes in GDP per capita induced by the infrastructure investments, though minimal, spread almost across all of Europe.

The west-east decline within Slovakia can also be seen. Whereas rail investments in the scenario’s are concentrated in the west of Slovakia near the capital city of Bratislava, new road construction takes place also in the eastern parts of the country and, accordingly spread further out to the north and south. For the same reason the share of interregional rail trips develops quite differently in the west and east of the country: whereas the rail projects in the Bratislava area attract more rail passengers, there are large losses of rail passengers predicted in the eastern part of Slovakia.
Figure 7.17  Average speed of interregional road trips: European impacts in the Balanced Scenario, Slovakia, 2031
Figure 7.18  Average speed of interregional rail trips: European impacts in the Balanced Scenario, Slovakia, 2031
Figure 7.19  GDP per capita: European impacts in the Balanced Scenario, Slovakia, 2031
Figure 7.20 Share of interregional rail trips: European impacts in the Balanced Scenario, Slovakia, 2031
8 Conclusions on investment priorities

8.1 Introduction

Based on the previous analysis main areas for transport investments that would merit EU funding in the period 2007-2013 have been identified. It should be emphasized that this is based on an analysis that has been carried out at the strategic level. Although the areas identified are expected to result in high potential projects, they should still be subjected to the regular cost-benefit analysis at a project level before being finally selected.

8.2 Transport investment priorities 2007-2013

The identified priority areas are described per sub-sector. These sub sectors are assessed on a number of criteria:

Table 8.1 Assessment of priority areas

<table>
<thead>
<tr>
<th>Sub sector</th>
<th>Cost-effectiveness</th>
<th>Accessibility</th>
<th>Sustainability</th>
<th>Territorial Cohesion</th>
<th>Safety</th>
<th>Other sources of finance</th>
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<tbody>
<tr>
<td>Railways</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Bratislava – Vienna</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>- TEN-T priority axis Katowice – Zilina - Nove Mesto</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>- high speed on the IV, V and VI corridor</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Roads:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- TEN-T priority axis Zilina - Katowice (VI)</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>- completion missing sections motorway network</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>0</td>
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</tr>
<tr>
<td>cross border connections (corridor IV and V)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- upgrade R1 and R2 to motorway</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>0</td>
<td>+</td>
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<tr>
<td>- reconstruction / maintenance national roads</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
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</tr>
<tr>
<td>Urban Transport</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>- reconstruction fleet urban transport</td>
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<td>0</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>- Public Service Obligations</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>Inland waterway transport</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>- improving navigability of inland waterways</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
</tr>
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<td>Multimodal transport</td>
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<tr>
<td>- intermodal terminals Danube Ports</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>- modernisation infrastructure intermodal terminals</td>
<td>+</td>
<td>0</td>
<td>+</td>
<td>0</td>
<td>0</td>
<td>+</td>
</tr>
</tbody>
</table>

Legend: + positive score; 0 neutral score; - negative score on criterion
Roads
Road accessibility in Slovakia is presently below the European average, with decreasing accessibility from west to east. With a view to improving national and international cohesion, priority could be given to the missing links in the international motorway network (corridors IV and V). For these projects financing may be derived from EIB loans. Such projects are also to include the completion of missing border sections. The impact of such investments on Slovakia itself may be relatively limited, but they are of substantial importance from a European perspective (an impact can be noticed on neighbouring countries). At the same time it will make projects in neighbouring countries more beneficial for Slovakia.

The improvement of the accessibility and development of the eastern regions of the Slovak Republic by new and upgraded road connections (like R1 and R2) will have significant impact on the Slovakian economy itself. Although the highest impact is derived from their implementation according to motorway standards, it is not expected that traffic volume fully merit these investments in the coming programming period. This should be revealed by cost-benefit analyses. This investment compares more favourable in terms of both cohesion and economic growth than investments in the north-south corridors, although it should be kept in mind that such an assessment is than purely made from the national point of view.

Rail
A focus on road transport in the country clearly endangers the position of rail transport in the country and hence the sustainability of the transport system. To maintain the strong position of rail in freight transport completion of the hinterland connections through the TEN-T projects is judged advantageous. Priority could be given to corridors Va (Bratislava – Zilina) and VI, followed by IV, as these may have highest impact from a international (EU) perspective. Rail investments however should be embedded in an integrated strategy to develop rail freight operations on these corridors. Such strategies should not only concentrate on infrastructure, but need to take into account all aspects including marketing, safety (ERTMS), interoperability etc.

With respect to more national oriented rail projects care should be taken. As the distance travelled is relatively small (small size of the country) and the population pattern is dispersed investments for rail passenger transport may be inefficient. The present position of bus services is strong and car ownership and utilisation is likely to rise. Careful attention should be paid to the cost-benefit analysis of rail projects in this respect.

Such prioritisation may imply that the rail accessibility of the eastern regions remain relatively poor. As indicated, though, form the cohesion point of view investments in the east-west road corridor seem to be more efficient, as both per capita GDP and cohesion indicators are positively affected. It is quite clear, though, that such road and rail priorities should be regarded concurrently.

Inland waterways
The Rhine-Main-Danube corridor is the priority axis for inland waterway transport in Europe. The development of water transport will be stimulated by improving the
navigability on the river the Danube (TEN-T sections Slovak Republic and common Hungarian-Slovakian section) and on the Vah waterway. Investments in upgrading waterway sections can only be successful to stimulate waterway transport if inland ports are modernised to offer logistic services. Also the administrative capacity for investment projects in inland waterways should be strengthened and fine-tuning with neighbouring Danube countries is essential for the success of inland waterway transport in the Slovak Republic.

At present the use of use of the Danube for domestic cargoes is limited. Investments in this corridor may thus benefit international cargo (including transit cargo) in particular.

_Urban transport_
With rising motorisation in Bratislava and the other urban areas, development of the public transport system is certainly required. As use of public transport has been declining, the expected increase in car utilisation will negatively affect the accessibility of urbanisations. The need for renewal of urban transport rolling stock is already urgently felt. The conceptions for modernisation of the fleet in bus and railway transport haven been approved by the Slovak Republic. The programme of urban transport fleet reconstruction can be (partly) financed under EIB conditions.

However, at the same time the framework for public transport needs to be improved. The scope of public service obligations should be included in a public transport service plan that is fundamental for drawing up a public service contract. The basic distinctive features of the public transport service plan shall include the transport infrastructure network in the given area and directions of population mobility with commuting attraction centres in the region defined upon the results of transport–sociological surveys. The plan defines the way of ensuring transport services, and a framework scope of transport services standards (number of pair lines), financing of which would be bindingly granted by the administrative body. The plan should create legislative conditions and transparent financial conditions regarding the execution of public service obligations. Involvement en administrative capacity of regional authorities in the programming and implementation is necessary for future EU funded projects.

_Multimodal transport_
The development of water transport in the Slovak Republic is dependent on the completion of the public ports on the Danube. The modernisation of the technical equipment of the ports is necessary for further utilization of public ports on the Danube. The infrastructure of the existing intermodal transport terminals (11 selected transhipment points) should be further completed and modernised to provide logistics services and build logistics centres in the proximity of the intermodal terminals.

The strengthening of intermodal transport infrastructure stimulates intermodal freight transport via modern terminals and could be financed with PPPs constructions.
## Annex A: TEN-T priorities

### Table A.1. TEN priority projects and major Swiss projects

<table>
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<tr>
<th>No.</th>
<th>TEN project</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Railway axis Berlin-Verona/Milan-Bologna-Naples-Messina-Palermo</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>- Nurnberg-Munich (2006)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Munich-Kufstein (2015)</td>
<td></td>
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<tr>
<td></td>
<td>- Kufstein-Innsbruck (2009/2012)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Brenner tunnel (2015)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Verona-Naples (2007)</td>
<td></td>
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<tr>
<td></td>
<td>- Rail/road bridge over the Strait of Messina-Palermo (2015)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Channel tunnel-London (2007)</td>
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<tr>
<td></td>
<td>- Brussels/Brussels-Rotterdam-Amsterdam (2007)</td>
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</tr>
<tr>
<td>3</td>
<td>High-speed railway axis of south-west Europe</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>- Lisbon/Porto-Madrid (2015), including:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lisbon-Porto (2013)</td>
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<tr>
<td></td>
<td>- Aveiro-Salamanca (2015)</td>
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<tr>
<td></td>
<td>- Madrid-Barcelona-Figueras-Perpignan (2009)</td>
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<td></td>
<td>- Perpignan-Montpellier (2009)</td>
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<td></td>
<td>- Montpellier-Nimes (2015)</td>
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<tr>
<td></td>
<td>- Madrid-Vitoria-Irún/Hendaye (2010)</td>
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<td></td>
<td>- Irún/Hendaye-Dax (2015)</td>
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<tr>
<td></td>
<td>- Dax-Bordeaux (2020)</td>
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<tr>
<td></td>
<td>- Bordeaux-Tours (2015)</td>
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<tr>
<td>No.</td>
<td>TEN project</td>
<td>Completion</td>
</tr>
<tr>
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<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>4</td>
<td>High-speed railway axis east</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>- Paris-Baudrecourt (2007)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Metz-Luxembourg (2007)</td>
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<td></td>
<td>- Saarbrücken-Mannheim (2007)</td>
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<tr>
<td>5</td>
<td>Betuwe line</td>
<td>2006</td>
</tr>
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<td>6</td>
<td>Railway axis Lyon-Trieste-Divača/Koper-Divača-Ljubljana-Budapest-Ukrainian</td>
<td>2018</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>- Lyon-St Jean de Maurienne (2015)</td>
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<tr>
<td></td>
<td>- Mont-Cenis tunnel (2018)</td>
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<td></td>
<td>- Bussoleno-Turin (2011)</td>
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<td>- Turin-Venice (2011)</td>
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<td>- Venice-Ronchi Sud-Trieste-Divača (2015)</td>
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<td>- Koper-Divača-Ljubljana (2012)</td>
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<td>- Ljubljana-Budapest (2015)</td>
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<td>7</td>
<td>Motorway axis Igoumenitsa/Patra-Athens-Sofia-Budapest</td>
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<td>- Via Egnatia (2006)</td>
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<td></td>
<td>- Pathe (2008)</td>
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<td></td>
<td>- Sofia-Kulata-Greek/Bulgarian border (2010)</td>
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<td>- Nadlac-Sibiu motorway (branch to Bucharest and Constanza) (2007)</td>
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<td>Multimodal axis Portugal/Spain-rest of Europe</td>
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<td>- Railway La Coruña-Lisbon-Sines (2009)</td>
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<td>- Railway Lisbon-Faro (2006)</td>
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<td>- Lisbon-Valladolid motorway (2010)</td>
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<td>- La Coruña-Lisbon motorway (2005)</td>
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<td>Öresund fixed link</td>
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<td>Completion</td>
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<td>----------------------------------------------------------------------------</td>
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<tr>
<td>12</td>
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<td>- Railway Kerava-Lahtii (2006)</td>
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<td>- Helsinki-Vaalimaa motorway (2015)</td>
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<td>- Railway Helsinki-Vainikkala (Russian border) (2015)</td>
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<tr>
<td>15</td>
<td>Galileo (not included in reference scenario, only mentioned here for consistency)</td>
<td>2010</td>
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<tr>
<td>16</td>
<td>Freight railway axis Sines/Algeciras-Madrid-Paris</td>
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<td>- Vienna-Bratislava (2012)</td>
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<td>Rhine/Meuse-Main-Danube inland waterway axis</td>
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<td>- Vilshofen-Straubing (2013)</td>
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<td>- Palkovicovo-Mohács (2014)</td>
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<td>2020</td>
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<td>- Madrid-Levante and Mediterranean (2020)</td>
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<td>- Extremadura (2020)</td>
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<td>- Railway for access in Germany from Hamburg (2014)</td>
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<td>- motorway of the sea of south-east Europe (2010)</td>
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<td>22</td>
<td>Railway axis Athens-Sofia-Budapest-Vienna-Prague-Nürnberg/Dresden</td>
<td>2017</td>
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<td>- Railway Greek/Bulgarian border-Kulata-Sofia-Vidin/Calafat (2015)</td>
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<td>- Railway Curtici-Brasov (towards Bucharest and Constanta) (2013)</td>
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<td>- Railway Budapest-Vienna (2010)</td>
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<td>- Railway Brneclav-Prague-Nürnberg (2016)</td>
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<td>- Railway axis Prague-Linz (2017)</td>
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<td>23</td>
<td>Railway axis Gdansk-Warsaw-Brno/Bratislava-Vienna</td>
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<td>- Railway Gdansk-Warsaw-Katowice (2013)</td>
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<td>- Railway Katowice-Brneclav (2010)</td>
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<td>Railway axis Lyons/Genoa-Basel-Duisburg-Rotterdam/Antwerp</td>
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<td>- Genoa-Milan/Novara-Swiss border (2013)</td>
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<td>- Gdansk-Katowice motorway (2011)</td>
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<td>- Ireland road/rail modernisation (2010)</td>
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<td>- Road/railway axis Hull-Liverpool (2020)</td>
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<td>27</td>
<td>Rail Baltica axis Warsaw-Kaunas-Riga-Tallinn-Helsinki</td>
<td>2018</td>
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<td>Eurocaprail on the Brussels-Luxembourg-Strasbourg railway axis</td>
<td>2013</td>
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<td>- Luxembourg-French border (2013)</td>
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<td>Railway axis of the Ionian/Adriatic intermodal corridor</td>
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<td>- Kozani-Kalambaka-Igoumenitsa (2012)</td>
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<td>- Ioannina-Antirrio-Rio-Kalamata (2014)</td>
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<td>Inland waterway Seine-Scheldt</td>
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<td>- Navigability improvements Deulemont-Gent (2016)</td>
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<td>CH2</td>
<td>Lütschberg tunnel</td>
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Source: EC (2005) Trans-European transport network: TEN-T priority axes and projects 2005; Spiekermann & Wegener (Swiss projects)
Figure A.1. The TEN priority projects
Annex B: Accessibility “red flag” analysis

To determine the need for transport investments, the SASI model was used to assess the present and future situation of the road and rail systems in each country without the national transport projects to be examined later. For this the accessibility provided by the road and rail systems in each country was evaluated from both a national and a European perspective in order to identify regions with serious accessibility deficits that should be addressed by European transport policy taking account of the stated EU goals of competitiveness and territorial cohesion. In the SASI model accessibility, which is directly influenced by transport policy and investments, is judged to play a crucial role in promoting the realisation of the cohesion objectives.

To determine the appropriate assessment of transport investment need from the cohesion policy perspective an agreement on the indicator of accessibility to be used is required. Traditional accessibility indicators are not useful for this. They measure the total effect of both geographical location (periphery v. core) and quality of transport provided by the transport system and so always show a steep gradation in accessibility from the core to...
the periphery. However, public policy cannot change the fact that some regions are central and some are peripheral, i.e. provide the same level of accessibility to all regions. Public policy can only alleviate disadvantages through unequal transport provision.

This distinction is relevant for European transport policy. To invest only in transport in the most peripheral regions with the lowest accessibility according to such an indicator would benefit only the relatively few people living there and would ignore the needs of the densely populated central regions to combat traffic congestion and so endanger the competitiveness goal of the Lisbon Strategy of the European Union. On the other hand, to invest only in transport in the most densely populated central regions with the greatest congestion problems would not only lead to ever more traffic but also widen the existing gap in accessibility between the central and peripheral regions and would so run counter to the territorial cohesion goal of the European Union.

To avoid this dilemma, a new accessibility indicator was defined which distinguishes between geographical location and quality of transport. This indicator assumes that people in the peripheral regions cannot expect to enjoy the same level of accessibility (measured in traditional terms) as the central regions but that they can demand to be able to reach relevant destinations with the same travel speed ("as the crow flies") as the people in the central regions. In addition the indicator recognises the utilitarian principle of the happiness of the greatest number, i.e. that the transport needs of densely populated regions should be given more weight than those of regions with only few inhabitants. And finally, the indicator recognises that economically lagging regions with severe deficits in accessibility may offer greater potential for stimulating economic effects by transport investments than regions which enjoy already high accessibility.

These three principles avoid the pitfalls of both an extreme egalitarian view, which postulates that all regions in Europe enjoy the same level of accessibility and a purely efficiency-oriented view which postulates that accessibility in the already highly accessibly central metropolitan areas should be further strengthened because they bring the largest economic benefits. In other words, the three principles aim at a rational trade-off between the stated EU goals of competitiveness and territorial cohesion.

The Accessibility Problem Index

The indicator to be developed should have a number of properties to make it easy to understand and communicate to policy makers and stakeholders:

- It should be a "problem indicator", i.e. high values should indicate large deficiencies in regional accessibility, whereas low values of the indicator indicate above-average levels of accessibility.

- It should be standardised in order to be comparable between regions and countries, i.e. should not reflect the size or affluence of regions or countries.

- It should be independent of the arbitrary or historically subdivision of the territory into regions, i.e. its magnitude should not change if a region is subdivided into two or more regions or if two or more regions are consolidated to one region.

- It should be scalable, i.e. it should be possible to vary the impact of the weighting by population and inverse GDP to reflect different political priorities.
Based on these requirements, an indicator called Accessibility Problem Index was developed. The calculation of the Accessibility Problem Indicator proceeds in three steps:

### Average regional airline speed

The first step in the development of the Accessibility Problem Index is the calculation of average regional airline speed. Average airline speed $v_{rm}$ of all trips $f_{rm}$ from a region $r$ to all other regions $s$ in Europe by mode $m$ in year $t$ is defined as

$$v_{rm}(t) = \frac{\sum_{s} P_{s}(t) \exp[-\beta f_{rm}(t)] d_{rs}}{\sum_{s} P_{s}(t) \exp[-\beta f_{rm}(t)] c_{rm}(t)/60}$$  \hspace{1cm} (1)

where $P_{s}(t)$ is regional population in year $t$, $c_{rm}(t)$ is travel time in minutes between regions $r$ and $s$ by mode $m$ in year $t$, $\beta$ is the impedance parameter and $d_{rs}$ is airline distance in km between the central cities in regions $r$ and $s$ calculated from their geographical coordinates $x_r, y_r$ and $x_s, y_s$ by

$$d_{rs} = \sqrt{(x_s - x_r)^2 + (y_s - y_r)^2}$$  \hspace{1cm} (2)

### Standardisation

Next average regional airline speed, regional population and regional GDP are standardised as fractions of the average of all regions in the country (national perspective) or the average of all regions in Europe (European perspective). To neutralise the effect of region size, population is replaced by population density and GDP is replaced by GDP per capita. The benchmark for the standardisation of average regional airline speed is always the average of the base year $t_0 = 2006$ to show changes in accessibility:

$$v'_{rm}(t) = \frac{v_{rm}(t) \sum_{r} P_{r}(t_0)}{\sum_{r} v_{rm}(t_0) P_{r}(t_0)}$$  \hspace{1cm} (3)

$$p'_{r}(t) = \frac{P_{r}(t) \sum_{r} A_{r}}{A_{r} \sum_{r} P_{r}(t)}$$  \hspace{1cm} (4)

$$g'_{r}(t) = \frac{G_{r}(t) \sum_{r} P_{r}(t)}{P_{r}(t) \sum_{r} G_{r}(t)}$$  \hspace{1cm} (5)

where $A_{r}$ is the area of region $r$ and $G_{r}(t)$ is the GDP of region $r$. The $v'_{rm}(t)$, $p'_{r}(t)$ and $g'_{r}(t)$ then are the relative airline speed, relative population density and relative GDP per capita of region $r$ in year $t$, respectively. Values below one indicate below-average airline
speed, population density and GDP per capita and values above one indicate above-average airline speed, population density and GDP per capita of the region.

**Index**

With these relative indicators, the Accessibility Problem Index $q_{m}(t)$ of region $r$ by mode $m$ in year $t$ can be formulated:

$$ q_{m}(t) = \left[ v_{m}^{'}(t) \right]^{-1} \left[ p_{r}^{'}(t) \right]^{\alpha} \left[ g_{r}^{'}(t) \right]^{-\gamma} $$  \hspace{1cm} (6)

where $\alpha$ and $\gamma$ are weights indicating the relative importance of population density and GDP per capita, respectively. Note that average regional airline speed and GDP per capita have negative weights, i.e. the Accessibility Problem Index expresses deficits in average regional airline speed relative to the national or European average weighted by population and economic weakness. The index has the following properties:

- The higher the index the more severe is the deficiency in accessibility.
- The influence of weights of population density and GDP per capita can be changed by changing $\alpha$ and $\beta$: values below one imply less influence, zero no weighting.
- Regions with average airline speed, population density and GDP per capita have an index value of one.
- Index values are independent of region size and are therefore comparable between regions and countries.
- The index shows improvements in airline speed over time (and not only relative shifts between regions).

Sensitivity tests with different values of $\alpha$ and $\gamma$ showed that $\alpha = \gamma = 0.05$ gave the most plausible results and a reasonable level of responsiveness of the Accessibility Problem Index to changes of accessibility due to European integration and European transport projects over time.

The application of the Accessibility Problem Index for the evaluation of accessibility deficits in the country policy briefs use these values of $\alpha$ and $\gamma$ throughout. The regions analysed were the NUTS-3 regions or equivalent regions in the 25 countries of the European Union plus the accession countries Bulgaria and Romania. The overseas regions of France and the island regions of the Azores and Madeira of Portugal and the Canary Islands of Spain were excluded from the analysis.

The spatial distribution of the resulting values of the Accessibility Problem Index are presented in maps using a colour scale resembling that of a traffic light: green shades indicate average regional travel speeds above the national or European average, yellow values indicate speeds slightly above the national or European average and red shades indicate speeds significantly lower than the national or European average. Regions shaded in red are the targets of the "red-flag" analysis.

For each country first for road and then for rail the national and the European perspective are presented for the current situation (2006) and for 2016. The situation in 2016 is based
on a base scenario of the SASI model without the national projects, i.e. only with the
TEN priority road and rail projects and selected transport projects in Switzerland. The
assumed opening times of the individual projects are those of the 2004 TEN guidelines
(European Union, 2004)\textsuperscript{15} which in a few cases differ from the dates notified by the
individual countries (European Commission, 2005)\textsuperscript{16}.

\begin{footnotesize}
\begin{itemize}
Decision No 1692/EC on Community guidelines for the development of the trans-European transport network. \textit{Official
Journal of the European Union} L 201 (Corrigendum to L 167), 1-55.
\item European Commission (2005): \textit{Trans-European Transport Networks. TEN-T Priority Axes and Projects 2005}. Luxembourg:
Office for Official Publications of the European Communities.
\end{itemize}
\end{footnotesize}