Title: National background report on Transport for Republic of Macedonia

As publication by a project co-funded by the European Commission, the editors and project partners take note that the official name of the country is "The Former Yugoslav Republic of Macedonia"

Author: Dr. Zoran Krakutovski

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Executive Summary

The current document describes a transport sector in Republic of Macedonia and research activities in this sector. The paper is supported by analysis of several official data and relevant documents.

The transport system of the Republic of Macedonia consists of: road transport, railway transport, air transport, inland waterway transport, pipeline transport, telecommunication and broadcasting services and postal services as well.

The Ministry of Transport and Communications (MoTC) is the institution in charge of the transport sector in the country.

The Agency of State Roads is responsible for management and financing of the construction and maintenance of national and regional roads.

In April 2005, the Parliament adopted a law establishing the separation of the public enterprise "Makedonski Železnici" (MZ) into an infrastructure manager, Public Enterprise for Railway Infrastructure "Macedonian Railways-Infrastructure" and a transport operation company, Joint Stock Company for Transport "Macedonian Railways Transport Joint Stock Company."

Two Corridors X and VIII passing through the territory of Republic of Macedonia are parts of the TEN-T EU networks (Trans-European Networks -Transport). The North-South transport corridor X has transport infrastructure that has been constructed in a larger degree than the infrastructure of the East-West transport corridor VIII, but both corridors are regarded as being equally important in the development process.

Institutional structure for R&D development in Republic of Macedonia consists of the Macedonian Academy of Sciences and arts organized in 5 departments and 5 research centers, four state universities, Skopje, Bitola, Tetovo and Stip, two private universities in Tetovo and Skopje and several research units with industry. Low level of R&D financing is accompanied by very unfavourable structure of the funding sources, as almost all the funds are provided by the public sector.

The Department for Traffic Engineering on the Faculty of Technical Sciences (member of the University "St. Kliment Ohridski" in Bitola) and the Department of road and railway infrastructure on the Faculty of Civil Engineering (member of the University "Ss. Cyril and Methodius" in Skopje) are the most important research institutions in the field of Transport sector in the country.

The budgetary constraints and weak institutional capacity remain major impediments to development of research. With respect to participation in framework programmes, the positive trend of increasing participation under the Seventh EC Research Framework Programme (FP7) since its association is continuing.

As regards integration into the European Research Area, the country is part of the Euraxess Jobs Portal (formerly known as Mobility Portal) and Euraxess Service Network (formerly known as the ERA-MORE network) and is in the process of setting up its national Euraxess Portal and Network.

The modernization of transport infrastructure, the enlargement of the regional cooperation, the development of sustainable transport system and improvement of services by the transport service providers are the major objectives for the future research and implementation of the projects in the transport sector.

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0. Introduction

General information about the country

Republic of Macedonia is a small landlocked country located in the south-central part of the Balkan Peninsula. Country area is 25.713 sq km bordering with two EU member states: in the south - Greece with a border 246 km long and in the east - Bulgaria with a border 148 km long. The neighbor in the north is Serbia, including Kosovo, with a border 221 km long and Albania in the west with a border 151 km long.

Figure 1 Geographical location of Republic of Macedonia

Republic of Macedonia has varied topography with hills, valleys, mountains, rivers with small natural lakes, and three large natural lakes in the south of the country, each divided by a frontier line: Ohrid, Prespa and Dojran. About 49% of the territory is agricultural land, while forests account for other 37% of the territory. Republic of Macedonia is located in an area of high seismic activity. The capital city Skopje suffered a devastating earthquake in 1963.

Population

As reported by the last census of 2002, Republic of Macedonia has 2.022.547 inhabitants and 564.296 households. The estimation of age structure in 2006 is following: 0-14 years 20,1%, 15-64 years 68,9%, 65 years and over 11,0%. Life expectancy is 73 years. The average density is 78.7 residents per sq km; nearly 60% of population leaves in urban areas.

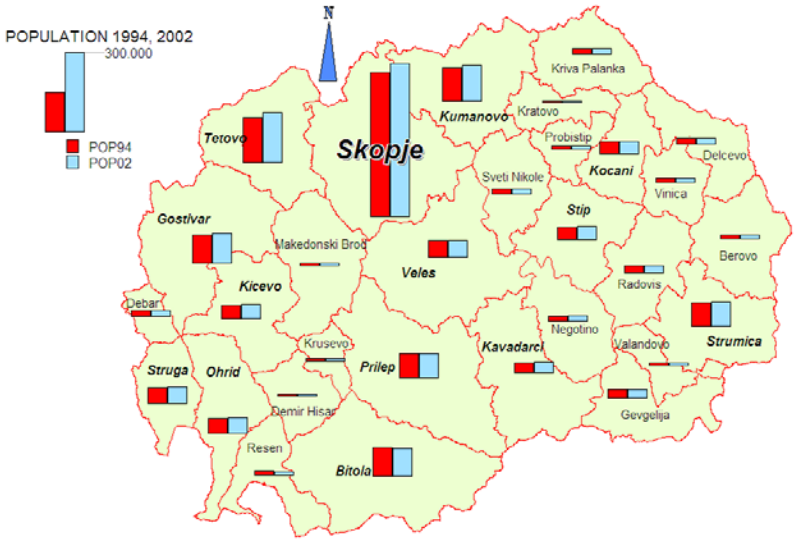

Figure 2 Population in some communes in R. of Macedonia according census in 1994 and 2002

Economical Background
Macedonia has a relatively open economy with foreign trade. Allowing that Republic of Macedonia is a small country it is susceptible to external changes and negative impact recurring several times since the Country's independence in 1991. Nevertheless, between 1996 and 2003 the growth rate was around 2% and the growth has been accelerated to around 4% in 2004 and 2005 and 5,9% in 2007. The macroeconomic stability has maintained with low inflation and stable exchange rate of the currency (denars).

GDP trend and industry structure
The economy has indicated to grow after 1996 and now the country has stabilized and is well advanced in its economic reform agenda process. Nevertheless, between 1996 and 2003 the growth rate was around 2% and it has accelerated to around 4% in 2004, 2005, 2006 and 5.9% in 2007. The expected growth rate of GDP in 2008 is about 5.3%[1]. The macroeconomic stability was maintained with low inflation and stable exchange rate of the currency (denars). The estimated GDP per capita at purchasing power parity in Macedonia in 2006 was around 6.600 EUR, which is 28 per cent of the EU 27 average[2], slightly behind Bulgaria, Romania and Turkey. The State Statistical Office published that in the structure of GDP in 2005 the biggest share of the Value Added had the following sectors: Manufacturing industry (16%), Wholesale and retail trade, repair of motor vehicles, motorcycles and personal and household goods (13%), Agriculture, hunting and forestry (11%), and Transport, storage and communication (8 %). This numbers show that the structure of economic activities in Macedonia changed considerably during the last fifteen years. The share of industry dropped significantly from around 45% in the early 1990s to arrive to around 25% in 2005, and the services are now dominant in the structure of GDP with around 60%[3]. The final consumption in 2005 increased in relation to 2004 by 5,6%, as a result of increasing of the household final consumption (6,6%) and of final government consumption (1,6%).

Foreign trade
The commodity international scope in 2007 was 8 583 millions US$; export share was 39,1% and import share was 60,9%. The import covered 63%, so the trade balance was negative and the deficit was 1 871 millions US$.

The most important products in the **export** were manufactured goods (33,4%) and several manufactured articles (28,9%), The most significant export in 2005 was for the following products: products of iron or non-alloy steel not in coils (124 million US$), blouses and shirts (111 million US$), ferro-nickel (107 million US$), tobacco (88 million US$). The EU countries have the biggest share in the total export (53,1%) and the states from the former SFRY (29,0%).

The biggest **import** come from the EU countries (45,5%) and the countries of Central and Eastern Europe (25,5%). The principal import were manufactured goods classified mainly by material (29,4%), mineral fuels, lubricants and related materials (19,2%) and machinery and transport equipment (17,4%). The import of the major products in 2005 was following: petroleum oils crude (396 million US$), motor vehicles for transport of persons (96 million US$), products of iron or non-alloy steel in coils (83 million US$), semi finished products of iron or non-alloy steel (74 million US$), electric energy (70 million US$).

The mainly important trading partner in 2003 was Germany, followed by country's southern neighbor Greece[4].

[1]Source: Main economic indicators for the Republic of Macedonia, National Bank of the Republic of Macedonia updating 30.01.2009
[2] Source: Eurostat and State Statistical Office in Republic of Macedonia No.3.1.8.04
[3] National Development Plan 2007 – 2009, august 2006
[4] Transport network development in western Balkans, JBIC, October 2005

Labour market
The process of enabling and improving business environment continues in order to attract private investors and start creating more jobs through private sector led growth. According the official statistics in 2005, the active population counted about 870.000 persons while 63% were employed (about 545.000 persons) and 37% were unemployed (around 324.000 persons). Though, if we take into account the informal sector in economy, the number of unemployed persons should be lower. The average monthly gross-wage paid per employee in 2005 was 430 US$ (21.330 denars), and the average monthly net-wage paid per employee was 260 US$ (12.925 denars).

International agreements – political relevance – regional integration
The Republic of Macedonia has consistently implemented a policy of external economic openness and liberalization, and has signed 10 free trade agreements, of which 8 are bilateral (5 SEE Stability Pact states, Ukraine and Turkey), and 2 are multilateral (with the EFTA states and the SAA with the EU). Macedonia has signed a Memorandum of Understanding on Trade Liberalisation and Facilitation with other SEE states.

In April 2003, the Republic of Macedonia became the 145th member of the World Trade Organization (WTO), and in 2005 Macedonia became also a CEFTA member. According to the new Foreign Trade Law, the trade regime has been completely harmonized with the trade regime of the WTO rules, which goes without saying complete liberalization of the foreign trade regime. The WTO (GATT) prescribes import and export licenses related to environment protection, protection of the human health, protection of animals and plants, protection of the historic heritage and trade with military arms.

Macedonia's over-encompassing goal is to join the EU. It was the first country in the region to sign Stabilization and Association Agreement (SAA) with the EU in April 2001, while in December 2005 the Presidency of the European Council awarded Macedonia a candidate EU member state status. Under the Stabilization and Association Agreement with EU the industrial products originating from the Republic of Macedonia are granted free export to the EU member countries. Thanks to these agreements the potential market of the Republic of Macedonia is over 500 million consumers.

General economic objective
The major intention of the Government concerns economical development and increasing employment through establishment competition and identical conditions for all economical subjects in the country. Seeing that the central role in economy have actually manufacturing goods, which haven't got high added values, the policy envisage to entice some of activities to improve national economy, like to increase investments in IT technology and knowledge, and upgrading the quality of labour force. The more specific measure and many structural and institutional reforms are aimed at attracting more foreign direct investments in the coming years. The country plans to have a more structured investment promotion activity, and the EU candidacy status is a good support to make easier these efforts.

Importance of transport sector activities in the economy
The share of the transport, storage and communication activities in GDP was 8% for 2005. The gross fixed capital formation in total was about 990 million US$ (48.868 million denars) and the share of transport, storage and communication was 13%. The gross fixed capital formation in machinery and equipment was around 370 million US$ (18.200 million denars), and for the motor vehicles, engines and other transport equipment 76 million US$ (3.759 million denars), or around 7,7% of all gross fixed capital formation in 2005.

In 2005 Macedonia had 175.557 business subjects. According to classification of section activities, the number of the transport, storage and communication activities had 16.781, or 9,6% of all business subjects. The statistics concerning number of employees by sector of

activities for 2005 show that about 33.110 persons worked in the transport, storage and communication activities, or 6% of all employed persons. The private transport business subjects had 19.103 employees, and other ownership of the business in this sector employed 14.007 persons.

The Ministry of Transport and Communication registers 2020 companies in Macedonia which work for international road transportation. The number of CEMT licenses for 2007 is 662.

Several significant transport routes connect Macedonia with Central and Eastern Europe and with South and South-East and beyond. Two TEN (Trans European Network) Corridors cross the country: corridors X in the North–South direction, which at the present is a major functional road and railway transport axis, and Corridor VIII, in direction East-West, is doing to construction. Three transport modes share the transportation market: road, railway and air transport.

The road mode of transportation has a high relative importance in the Republic of Macedonia, because he accounts the largest share of total transportation of goods and passengers in the country. Within the structure of all goods transported on the roads, internal transport participates with a dominant share while the rest is being distributed between international transport and transit. Though, the railway mode of transport has significant role to carry goods, especially for international transportation.

1. Purpose of the national background report and methodology/summary of the consultation process

The purpose of national background report in the Transport sector and research activities is to describe the situation concerning the transport sector research and also to announce the country's research priorities.

2. The Transport and S&T system in Republic of Macedonia

2.1 *The Transport policy framework in Republic Macedonia*

An Integrated transportation system has a key role to play in facilitating economic growth in remaining competitive by having access to fast, efficient and reliable transport services, as well as ensuring individual mobility through offered transport services. The transport system of the Republic of Macedonia consists of: road transport, railway transport, air transport, inland waterway transport, pipeline transport, telecommunication and broadcasting services and postal services as well. In general terms, the physical infrastructure of the Republic of Macedonia consists of about 13.183 km. public roads, 699 km railway lines, and 2 international airports. The pipeline system consists of a gas pipeline and a crude oil pipeline.

The North-South transport corridor has transport infrastructure that has been constructed in a larger degree than the infrastructure of the East-West transport corridor, but both corridors are regarded as being equally important in the development process. The favourable geographical location of the country has contributed to the development of international traffic on two Trans National Axes: North-South (Corridor X) and East-West (Corridor VIII) linked to the Trans European Transport Networks. Also several significant transport routes connect it with Central and Eastern Europe and with South and South-East Europe and beyond. The parts of the Trans National Axes passing the territory of the Republic of Macedonia, in the same time are the part of the Regional Core Transport Network.

Figure 3 Corridor X and Corridor VIII passing through R. of Macedonia

The development of the above mentioned transport axes shall contribute a lot to a better cohesion with the EU, among others, by reducing travel times, improved safety and quality of transport delivery both within the Country, to neighbouring countries and onward to other countries in the EU and the region. It will be achieved through activities aimed at development of motorway and railway infrastructures. In this manner, improvements will also accrue in the quality, efficiency and speed of transport services, feeder services, leading to increases in freight and passenger traffic.

2.1.1 The overall Transport policy framework

The national priorities for the development of the transport sector are defined in the following national and regional strategic documents:

- National Transport Strategy 2007-2017
- Public Investment Programme 2007-2009
- National Development Plan 2007-2009
- Road Investment Plan 2007-2012
- Final Report of the High Level Group 2005
- Five-Year Multi-annual Plan of SEETO 2007-2011

The Government recognises the importance of transport in the current phase of national development. The National Transport Strategy was adopted by the Government in 2007 determining the national transport development priorities for the period 2007-2017. The focus of the National Transport Strategy is on the following objectives:

- Promotion of the economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximize their efficiency
- Improvement of the safety of journeys by reducing accidents and enhancing the safety of pedestrians, cyclists, drivers
- Improvement of integration by making journey planning and ticketing easier and working to insure smooth connection between different modes of transport
- Protection of the environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimize emissions and consumption of resources and energy
- Promotion of the social inclusion by connecting distant and disadvantaged communities and increasing the transport network accessibility

These objectives will be achieved by:

- Modernisation and extension of the infrastructures on Corridors X and VIII to enable transport service delivery to be improved both in qualitative and quantitative terms
- Building modern transport infrastructures and facilities with enhanced safety features that, together with modern targeted safety awareness campaigns, contribute to safer and more secure transport
- Initiation of a public transport operators' forum to address ways to promote better integration between modes and thereby increase public transport patronage by providing easy and convenient ways to use the various modes
- More and better opportunities through improving the transport networks, to provide improved mobility for all, especially those in rural areas, to provide better access for goods and services, and particularly for those in the rural areas. These attributes then support improved social cohesion
- Better quality and more transport links that will enable improved access to health centres and facilities

The prime strategic improvements have to be towards promotion of market-orientated transport services, implement measures to ensure that infrastructure is technically and financially sustainable, and harmonized with the EU transport policy. The connectivity

improvements with the regional core network should be carried out through following activities:

- Ensure that the regional core network retains in its technical and legal coherence;
- Reduce the costs and time which incurred at border crossings, both for traffic within the region and beyond it with implementing the High Level Group Horizontal measures;
- Reducing the road bottlenecks;
- Determine maintenance standards;
- Provide a sound and continuous maintenance funding;
- Implement road safety standards in line with international best practices;
- Promote long-distance traffic to and from other countries.
- Introduce satellite radio navigational systems;
- Introduce transport management systems, ensuring the interoperability and standardized telemetric applications for freight services along the core transport axes.

In the railway transportation, The Government approved the plan to transform *Macedonian Railways* into two state-owned companies: *Public Enterprise Macedonian Railways Infrastructure,* which will manage the rail infrastructure, and a joint stock company, *Macedonian Railway Transport,* which will provide transport services. The restructuring is part of the action plan endorsed by the Government, which includes a debt relief program, employee lay-offs, sale of non-core assets and preparation of a five-year business plan. However, the financial position of the railway company remains poor, and the level of arrears remains high. Public service obligations are still not compensated. There has been no progress on the rules for the transport of dangerous goods. Preparations in this sector are on track.

The new Law on Aviation, which entered into force in February 2006, represents substantial progress in the field of air transport. It provides for the establishment of two independent institutions, enabling separation between the regulatory and the operational functions. The Agency for Civil Aviation will take on the regulatory functions, while a joint-stock company with a single shareholder - the State - will provide air traffic services. The Law also envisages the formation of an independent body for investigation of accidents and serious incidents, and an independent co-ordinator for slot allocation. By signing the European Common Aviation Area Agreement (ECAA), the Republic of Macedonia has undertaken to integrate into the EU internal aviation market and to apply EU aviation standards. This will require the application of the ECAA agreement in practice and the fast implementation of the first transitional phase of the relevant aviation *acquis,* including market access conditions, safety, security, airport policy, environmental and social issues and air traffic control, in line with the European Partnership short term priority.

There are no significant developments in the areas of combined transport, inland waterways and state aid.

2.1.2 The elements of research policy making

The Ministry of Education and Sciences (www.mon.gov.mk) is the governmental body responsible for R&D policy in the Republic of Macedonia. The Ministry has the responsibility to organise, finance, develop and promote science, technological development, technical culture, informatics and information systems as well as international cooperation.

Generally, the institutional structure for R&D development consists of the Macedonian Academy of Sciences and arts organized in 5 departments and 5 research centers, four state universities in Skopje, Bitola, Tetovo and Stip, two private universities in Tetovo and Skopje and several research units with industry. The number of researchers per million inhabitants was 1,519 in 2002 what is well below the comparable figures not only for the EU member

states but also for some countries in the region. Weak R&D potential is further confirmed with the volume of financial resources available for this purpose. The country spends only around 0.2 per cent of its GDP for R&D activities, and this amount declined substantially since 1997 when this share was almost twice higher (0.4 per cent of GDP).

All expenditures of R&D as share in GDP – compared by years

Year	2000	2001	2002	2003	2004	2005	2006
GERD (Gross Domestic Expenditure on R&D)/GDP	0,44	0,32	0,26	0,22	0.25	0.24	0.21
BERD (Expenditure on R&D in the Business Sector) / GDP	0.03	0.02	0.01	0.003	0.02	0.03	0.03
GOVERD (Government Intramural Expenditure on R&D) / GDP	0.15	0.16	0.15	0.14	0.12	0.11	0.10
HERD (Expenditure on R&D in the Higher Education Sector) / GDP	0.27	0.13	0.11	0.08	0.11	0.10	0.08

Source: State Statistical office

Low level of R&D financing is accompanied by very unfavourable structure of the funding sources, as almost all the funds are provided by the public sector. Privately funded R&D activity is limited to a handful of larger industrial companies.

Structure of Gross Expenditure on R&D in the country by sectors of performance

Year	2000	2001	2002	2003	2004	2005	2006
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Business sector	5.7	6.2	2.6	1.3	6.0	12.1	12.3
Government sector	34.1	51.5	56.5	62.3	48.2	46.1	47.9
Higher education	60.2	42.4	40.9	36.4	45.8	41.6	39.8

Source: State Statistical office

Structure of academic staff in the higher education institutions in the country

Year	2005	2006	2007
Teachers in higher education institutions	1 674	1 668	1 671
Assistants in higher education institutions	1 405	1 189	1 103
TOTAL	3 079	2 857	2 774

Source: MASA, Prof. Vlado Kmbovski

The R&D sector in the country in obviously faced with numerous problems. The most pressing among them seem to be the following:

- unsatisfactory level of funds for R&D activities, and within this low total volume, the share of private funds is very low,
- inadequate R&D infrastructure, equipment and materials,
- insufficient institutional infrastructure,
- complete lack of transfer of knowledge and research results into the business sector,
- unfavourable structure of researchers (high share researchers in social sciences vis-a-vis those one in natural sciences; low share of researchers in the industry R&D units,
- research activity is not focused on applied research and innovation, and
- the brain drain problem.

Due to the unfavorable situation in the industry, the resources for the research and technology development activities are mainly allocated from the Budget of the Republic of Macedonia. Thus, there is an urgent need to impose a more active role upon the business sector that, in turn, will be encouraged to invest in its own development via innovations, new products and new technology lines.

The Macedonian science will strengthen its competitiveness at an international level only if the scientific research entities are adequately supported in terms of personnel and technical equipment.

2.2 *Overview of Transport research activities*

2.2.1 Transport research projects

Due to the limited capacities in the country, the major research projects in the Transport sector are supported by the international donors (EU, USA, Japan, World Bank…) and in the biggest part were made by the foreign consultant companies. The more important studies in the transport sector carried out by the foreign donors and consultants are followings:

1. Transport Infrastructure Regional Study in the Balkans (**TIRS-2002**) is undertaken in the context of the Stability Pact. Its Terms of Reference have been established by the lead European agencies involved in the development of the regional transport network in South-Eastern Europe, namely the European Investment Bank (EIB), the European Commission and the European Conference of Ministers of Transport (ECMT). The French Government, through the "Agence Française de Développement" (AFD), provided the grant resources for this first phase, ECMT being responsible for the supervision of the work. The World Bank and the European Bank for Reconstruction and Development (EBRD) were also involved in the reviews and commented on the draft reports. The study area encompasses seven countries, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Federal Republic of Yugoslavia (Serbia, Montenegro and Kosovo), Republic of Macedonia and Romania. The objectives of TIRS are essentially:
- to identify major international and regional routes in the region,
- to define a coherent medium term network to be used as a framework for planning, programming and coordinating infrastructure investments, and
- to define short-term priority projects suitable for international financing.

2. The Regional Balkans Infrastructure Study-Transport (REBIS-2003) - funded by the EU Commission and focusing on the development of a multi-modal Core Transport Network for the Balkan region, similar to the Trans-European Networks of the European Union - concluded that the long-term (2004-2015) investments to develop a regional Core Network for roads to acceptable standards, require regional cooperation. REBIS aims to assist these countries in developing coherent strategies for transport infrastructure development. It focuses in particular on the development of a regional Core Network and on the identification of projects suitable for international co-financing.

3. US TDA (United States Trade Development Agency) - the technical assistance program and pilot project with the objective of increasing trade capacity in Southeast Europe along Corridor X, which has been identified by the European Union as one of the five most important strategic transport routes in Europe. The regional “single window” system seeks to relieve bottlenecks caused by increased cargo traffic along Corridor X, which includes Norway, Finland, Poland, Czech Republic, Slovakia, Austria, Slovenia, Croatia, Serbia, Macedonia, and Greece.

4. The SEETO (South-East Europe Core Regional Transport Network Development Plan) provides multi annual plans. The Memorandum of Understanding for the Development of the South East Europe Core Transport Network (MoU) signed in June 2004 sets out the requirements for cooperation, sharing information, improving performance, investment and institutional support. The MoU stipulates the preparation of a five year multi annual plan MAP that details the implementation of the MoU. The overall objective of the MAP is to bring benefits to transport users within and beyond the SEE Region of improved efficiency, lower costs and better quality of services. The specific objectives of the MAP can be stated as
- providing focus for regional cooperation essential for European integration,
- a base of information on the performance of the core network,
- a programme of soft measures to improve the management of the core network and
- a list of the highest priority investment projects that remove bottlenecks.

The process of preparing the MAP is evolving. The five year plan for the development of the South-East Europe Core Regional transport network for the period 2007-2011 is the second of an annual rolling process within a planning horizon of 2020. The Network covers the main road and rail routes, inland waterways and river ports, seaports, airports, and terminals.

The national research activities in the transport sector, based to the own funds, are most usually related to the realization of the projects and the needs of public administration for planning and managing this sector. The most important documents are following:

1. The Physical Plan of the Republic of Macedonia basic strategic determination of the is maintaining a fully and functionally integrated State territory and providing conditions for a notably higher level of infrastructural and economic integration with the neighboring and other European countries. A proper approach in the planning and construction of infrastructural facilities, which implies implementation of the Physical Plan of Republic of Macedonia and environment protection, is provided by the Environment Law ("Official Gazette of RM" no. 53/05) and the Decree on Determining the Projects and Criteria as the Basis for Determining the Need for Implementation of an Assessment Procedure regarding the Impact on the Environment ("Official Gazette of RM" no. 74/05).

2. The National Transport Strategy for 2007-2017 is one of the basic planning and action documents which will help the country to enhance the performance of the transport sector, in line with European Union (EU) principles and policies. It has been formulated and developed by the Ministry of Transport and Communication (MoTC) and supported by the European Agency of Reconstruction in the Republic of Macedonia. The priorities in road infrastructure in Republic of Macedonia lie primarily in its regional linkages, namely: a) Corridor X that spans the north-south corridor of the country from Serbian border to Greece, b) Corridor VIII than spans the east-west corridor from Bulgarian border to Albanian. The official stance of the Government is that the both Corridors are national priorities with equal importance.

2.2.2 Key competencies in Transport research fields

The Department for Traffic Engineering on the Faculty of Technical – Bitola and the Department of road and railway infrastructure on the Faculty of Civil Engineering - Skopje are the most important research institutions in the field of Transport sector in the country.

The both Faculties respect the principles of the Bologna Declaration and Declaration of Salamanka that refer to the inseparability of science and higher education introduces and conducts a unique policy of equal treatment of the two activities. The academic staffs are constantly involved in projects of great scientific significance in the country and as partner in the foreign research institutions. The international relation represents on of the most important segments of the functioning and strategic objectives of the both Universities.

The key competencies of the Department for Traffic Engineering on the Faculty of Technical Sciences in research activities concern several transport subjects, e.g. traffic engineering, traffic planning, security of transport, intelligent transport system, urban transport, public transport, logistic, transport regulation…

The Department of road and railway infrastructure on the Faculty of Civil Engineering Skopje strives to effectively and efficiently deliver practical, innovative, knowledge-based solutions addressing the infrastructure needs of the transport sector. The staffs play a leading role in the development, application and transfer of processes and technologies for the planning, design, construction, maintenance and management of transport infrastructure. The research includes all aspects of transport infrastructure planning, design, construction, maintenance and rehabilitation, including the assessment of socio-economic evaluation, materials and

pavement behaviour, and performance modelling. The academic staff of this department contributed in the EU research action COST-355 – Transport during 2005 to 2008.

2.2.3 Transport research infrastructure

The Ministry of Transport and Communications (MoTC) is the institution in charge of the transport sector in the country (web: www.mtc.gov.mk).

The management of the regional and national roads is regulated with the "Law on Public Roads", adopted in 2008 according to the best EU[5] practices ("Official Gazette of Republic of Macedonia" no.84/08). This Law regulates the issues concerning the construction, maintenance, management and financing of the public roads. The Agency of State Roads is responsible for management and financing of the construction and maintenance of national and regional roads.

In April 2005, the Parliament adopted a law ("Official Gazette of Republic of Macedonia" no.64/05) establishing the separation of the public enterprise "Makedonski Železnici" (MZ) into an infrastructure manager, Public Enterprise for Railway Infrastructure "Macedonian Railways-Infrastructure" and a transport operation company, Joint Stock Company for Transport "Macedonian Railways Transport Joint Stock Company." A Law on Railways was adopted in July 2005 that provides for infrastructure access and compensation for loss making passenger services.

The Department for Traffic Engineering on the Faculty of Technical Sciences (member of the University "St. Kliment Ohridski" in Bitola, www.tfb.edu.mk) and the Department of road and railway infrastructure on the Faculty of Civil Engineering (member of the University "Ss. Cyril and Methodius" in Skopje, www.gf.ukim.edu.mk) are the most important research institutions in the field of Transport sector in the country.

2.3 *Key drivers of Transport research*

2.3.1 Main Transport sector trends in Republic of Macedonia

Road network in Republic of Macedonia

The national road network is of a high density with the exception of the highways. Today, the overall road network of the country has a total length of 13.278 km. The network itself is a good starting basis for further development.

Type of roads	Total length (km)
Highways	216
Magistral roads	906
Regional roads	3 806
Local roads	8 566
TOTAL	**13 278**

National road network, Statistical office

[5] The "Law on Public Roads", was carried out by foreign consultant and a working group headed by the Ministry of Transport and Communication. The specific issues of a new road law will concern harmonization with the EU directives in the parts dealing with road traffic, permitted axle load, toll collection and also with the opening of the market for competition of maintenance.

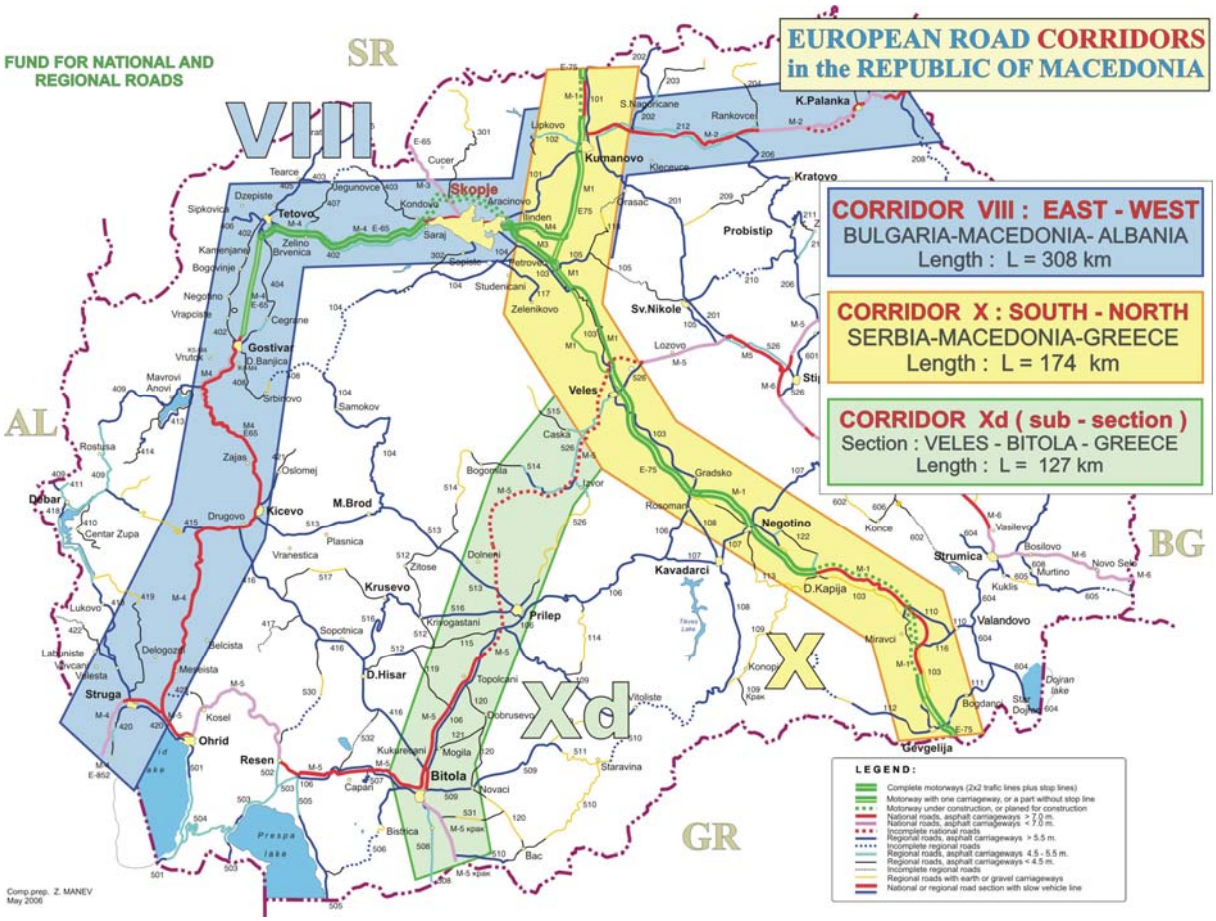

Figure 4 European road corridors in Republic of Macedonia

The overall condition of the road structure (main and important regional roads) is lower in comparison to European and some Neighboring Countries Standards. The existing constructions are in fact generally strong and of a good quality. The magistral roads, and in particular the highways, which have to carry the higher portion of traffic are in a better condition than those of second importance. The worst conditions can be assessed on low-traffic regional roads; most of them with dead ends.

Road traffic

The registered vehicles in the country on the whole were from 320 to 350 thousand in the period 1995-2003 and biggest share in 2003 represented passenger cars vehicles (90%).

The statistics indicate that in 2002 there were 152 cars per 1000 inhabitants, but in 2005 this number decreases for 20% to arrive on 278 thousand vehicles, or 136 cars per 1000 inhabitants. The analysis shows that this decline was due to reduction of registered cars from 300 thousand in 2003 to 250 thousand cars in 2005. A portion of this decline of registered cars could explain by age of vehicles.

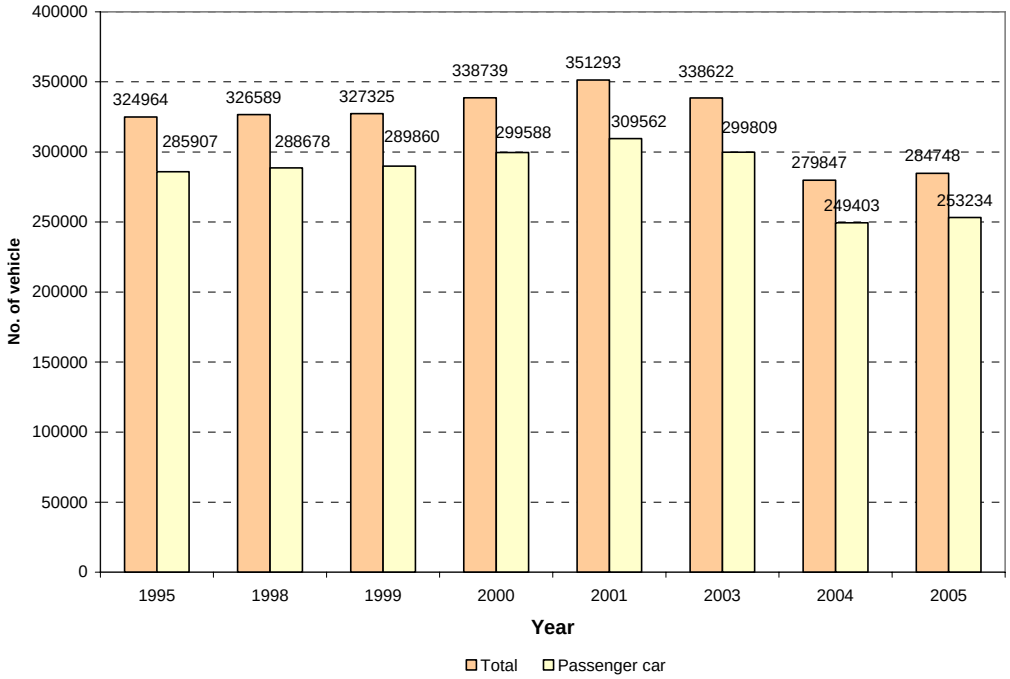

Figure 5 Number of registered motor vehicles

Unfortunately, a large part of cars are quite old, and in 2003 the average[6] age of vehicles was 15,5 years and around 50% were oldest than 20 years. Other explication of this state could be by increased of number of non registered cars which part is estimated about 40% of total passenger cars in 2006. In fact, non registration of cars at the same time means that they cars not are assured. The total number of drivers was about 675 thousand in 2005, or 550 thousand drivers with driving licences category B (for passenger cars).

The traffic flows have changed almost completely, several times, during the last 15 years, due to the change in the regional politics, but the density of motorway traffic is still low. The values of AADT (Average Annual Daily Traffic) in the last annual report from 2002 are around 3000 to 4000 vehicles per day. Traffic data are very limited and not very reliable. Unfortunately, this situation affects the whole planning and programming process. Though, all sources (toll, individual counts, interviews, vehicle registration) concord to admit that the traffic levels are very low: average of 3000 veh/d on national roads and 2200 veh/d on the more important regional roads. This data shows that there is no traffic growth in Republic of Macedonia. Nevertheless, the road urban traffic increases in the biggest towns in Republic of Macedonia, especially in the capital Skopje, due of individual car passenger transport.

The forecast of road traffic in Republic of Macedonia is very limited by deficiency of viable data concerning traffic in road network, and very limited availability of data about transport traffic. It could be judicious to refer a traffic forecast in the REBIS[7] (Regional Balkans Infrastructure Study - Transport) final report. In this report, the forecasts are based on data of current traffic levels obtained from local authorities, and on the GDP and demographic forecasts to year 2025.

According to GDP forecast growth, three scenarios are considered for the period 2006-2025:

- high scenario with 6,00% GDP growth,

[6] The Second National Environmental Plan for Republic of Macedonia, 2005, p.171

7 European Commission “Regional Balkans Infrastructure Study – Transport”, appendix 3 - traffic projections, July 2003, p.29.

- moderate scenario with 4,25% GDP growth, and
- low scenario with 2,50% GDP growth.

In the same period population should be increased for 0,5% for all scenarios. Two models are considered to forecast road freight transport and passenger cars transport express by AADT (Average Annual Daily Traffic). The model for forecasts of traffic is based of elasticity between traffic, GDP, population and level of car ownership growth. The results of forecast models give follower previsions: the growth of road passenger cars traffic (AADT) in the moderate scenario is 207% and for the trucks and busses is 222% for the period 2001-2025.

Road safety

The recent mortality data in 2004 show that road traffic injuries account for 30-50% of all injures as causes of deaths at different age groups of children and adolescents (the proportion is increased with age). The data for 2005 indicate that the number of road accidents increased significantly for 40% in relation to data in 2004 or from 2015 accidents in 2004 to 2830 accidents in 2005 with about 7 thousand people involved. The number of injures in 2005 was around 4 thousand, and there were 143 dead persons.

Railway network in Republic of Macedonia

The total length of railway network in R. of Macedonia consists of 699 km open line, with an additional 226 km of station and yard track, and also 160 km of industrial track. The network is single track, and only the sections of Corridor X are electrified (235 km) (figure 3). All tracks have standard gauge 1435 mm. The railway network mainly consists of continuous welded rails (CWR), but jointed tracks are still in use.

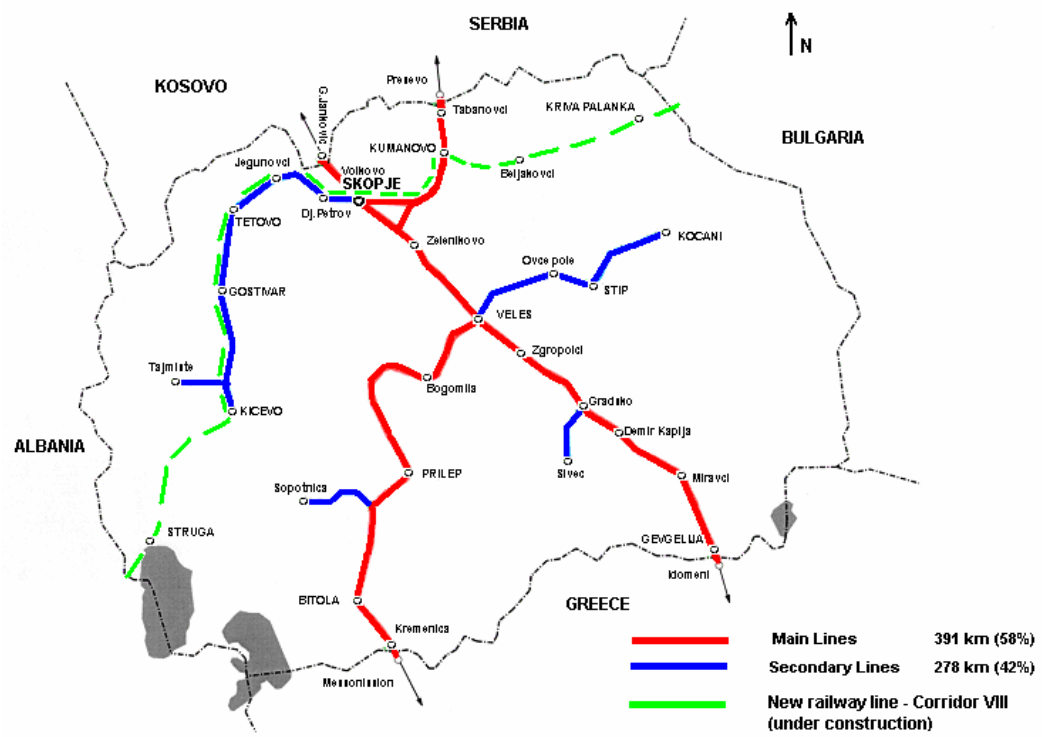

Figure 6 Railway network in R. of Macedonia

The main railway Corridor X going through R. of Macedonia has a total length of 214,9km completely electrified type 25 kv/50 Hz with a relay safety device type SIEMENS, in 25 stations with APB[8].

[8] APB Automatic line block

The main function of railway section of Corridor X passing through Republic of Macedonia is to improve access to foster better relations between neighbouring countries, and to support the development of the country's economy and faster communication with the rest of Europe.

In April 2005, the Parliament adopted a law establishing the separation of railway public company "Makedonski Zeleznici" (MZ) into an infrastructure manager, Public Enterprise for Railway Infrastructure "Macedonian Railways," and a transport operation company, Joint Stock Company for Transport "Macedonian Railways Transport Joint Stock Company." A Law on Railways was adopted in July 2005 that provides for infrastructure access and compensation for loss making passenger services.

Very important for the Macedonian Railways is the corridor X, from Vienna (Austria) to Thessaloniki (Greece), which is an European project. The EU wants to improve this connection, because they expect an increase of traffic. Another important project is the Corridor VIII, to link the Black Sea (Burgas-Bulgaria) to the Adriatic Sea (Dürres-Albania), via Kriva Palanka-Skopje-Kicevo-Struga. In September 2007, the ministries of Transport from Bulgaria and Macedonia signed an agreement to build the last railway sections between Kumanovo (MK) and Kjustendil (BG). The section between Kicevo and the Albanian border will be also built, as part of the Corridor VIII, and at present the preliminary design and feasibility study are doing by the Bulgarian's consultant company.

Railway traffic

The railway passenger traffic declined significantly in the early 1990s. With less than 105 million pass-km in 2006, passenger traffic is at less than a third of the 1991 level. The freight traffic decreases by 57 percent during 1990-2002. In 1994-1995, when Greece imposed a trade blockade, freight traffic reached its lowest point with only 150 millions ton-km (1994). In 2002 traffic volume decreases by almost 30 percent, due mainly to the opening of an oil pipeline to Thessalonica and the consequent loss of oil traffic. In 2003 and 2004, freight traffic recovered, resulting in a 13% growth compared to 2002.

Freight accounts for roughly 80 percent of physical traffic (in traffic units) and over 90 percent of total transport revenue.

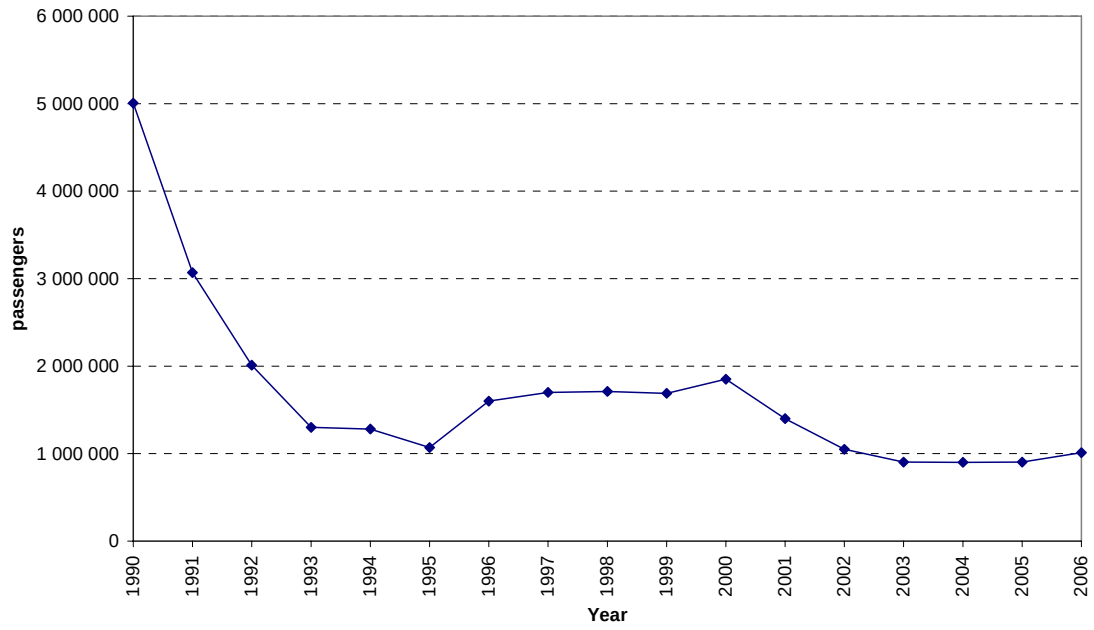

Figure 7 Evolution of rail passenger traffic since 1990

The number of passengers increases 12% in 2006 in relation to 2005, and the increasing is 11,7% in national traffic and 18,6% in international traffic.

The freight services of railway traffic is dominated by some customers, like MITTAL and MAKSTIL iron plants located in Skopje, the iron plant SILMAK located in Jegunovce, the newly opened Smelting plant located in Skopje and the nickel metallurgy FENIMAK located near Kavadarci. These customers' traffic moves on the main north-south corridor toward Thessalonica or to Tabanovce.

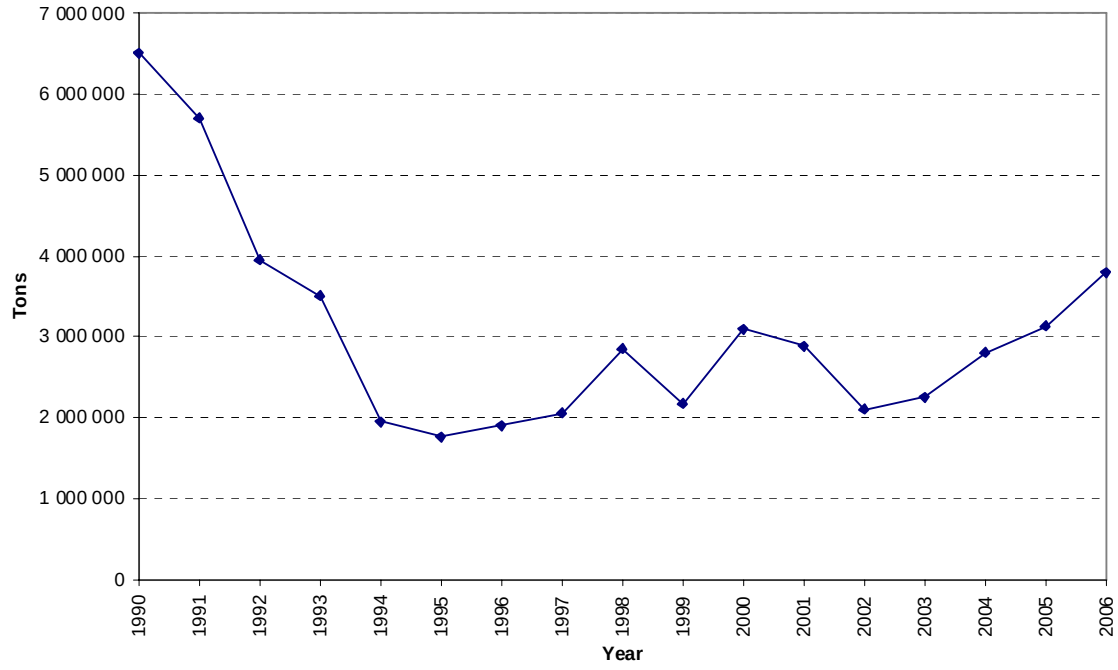

Figure 8 Evolution of rail freight traffic since 1990

In 2006 about 96,6% of volume of freight transported is in international rail carriage and 3,4% in national railway transport. In international rail carriage in 2006 imports participate with 50%, exports with 17% and transit with 33%.

The data in the first quarter of 2008 show that in passenger rail transport, the number of carried passengers increased by 17,0% due to national traffic (+19,5%), compared with the same period of 2007, and in the same period the quantity of carried goods increases 2,7% (State Statistical Office N. 8.1.8.09).

Modal split

The road mode of transportation has a high relative importance in the Republic of Macedonia, because he accounts the largest share of total transportation of goods and passengers in the country. Within the structure of all goods transported on the roads, internal transport participates with a dominant share while the rest is being distributed between international transport and transit.

Though, the railway mode of transport has significant role to carry goods, especially for international transportation. Taking into consideration that the most of total railways transport are performed on corridor X, the Ministry of Economy mentions[9] that "special attention should be given to the infrastructure conditions in order to satisfy the total technical conditions".

[9] Ministry of Economy of the Republic of Macedonia: official web page.

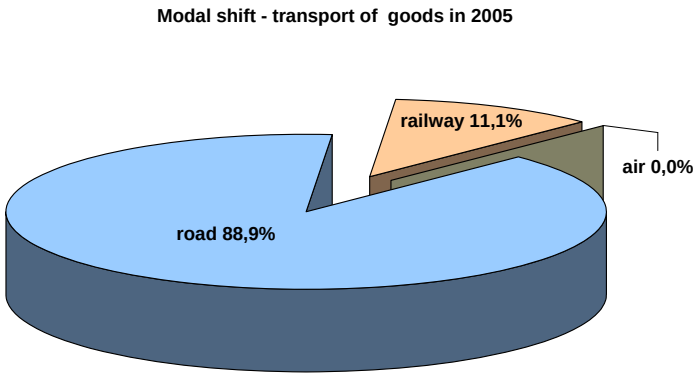

Figure 9 Modal shift - transport of goods in 2005 (source: official statistics for 2005)

As far as passenger transportation is concerned, road transportation is even more dominant, as only a negligible per cent of all passenger travels in the country is done by railways and air transport.

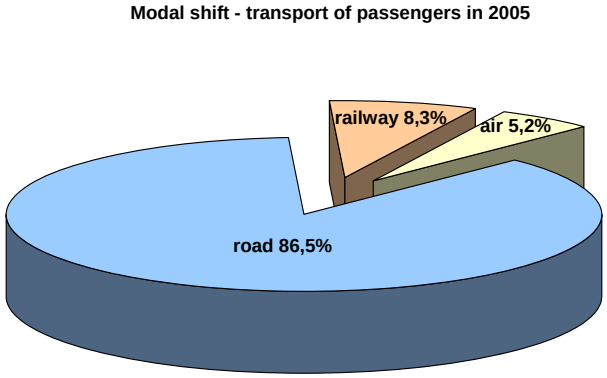

Figure 10 Modal shift - transport of passengers in 2005 (exempt individual road transport)

In 2005, the road network in Macedonia carried 9,4 million passengers and 25 million tons of cargo, while the railway carried 0,9 million passengers and 3,1 million tons of cargo. In terms of distance and volume combined, the road network carried 1086 million pa-km and 5577 million ton-km, while the railway network carried 94 million pa-km and 531 million ton-km. The railway derives 55% of its revenue from international traffic which indicates the importance of its role in international trade.

2.3.2 Main socio-economic challenges in Republic of Macedonia

The Macroeconomic stability is the overall objective of the Government, especially in the period of the global economic crisis.

Output growth accelerated to 6% in the first half of 2008, compared to 5% in 2007 and 4% in 2006. The main factors underpinning growth were investments and private consumption.

Export growth has slowed down, while import growth remained strong, reflecting buoyant domestic demand. Industrial production rose by an average of around 10% during the first eight months of 2008, compared to some 2.5% for the same period the year before. Overall, economic activity has remained stronger than in the past.

The current account deficit widened markedly from autumn 2007, reflecting a less favourable global environment with decelerating global demand and increasing energy prices, but also strong domestic demand. In the last quarter of 2007, the current account went from a surplus of nearly 2.5% of GDP to a deficit of 3% of GDP for the whole year. This trend continued and by mid-2008 had pushed up the current account deficit to some 13% of GDP. The main factors were higher expenditures for imports, mainly for fuel but also machinery. Overall, external imbalances widened sharply, putting an end to several years of overall balanced current account outcomes.

The number of unemployed declined by about 1.5% during the last year, which brought unemployment down to 33.8% in mid- 2008, which is about 1 percentage less than a year ago. A significant share of unemployment is structural in nature, partly resulting from a mismatch between required and available qualification. There has been a significant amount of job creation in low value added sectors, such as agriculture. About 20% of the unemployed are aged between 15 and 24. The unemployment rate in this age group is still very high (56% in the first half of 2008), but has marginally declined in line with the overall marginal decrease in unemployment.

Integration of the country into the NATO and the EU, full implementation of the Ohrid Framework Agreement accompanied with decentralisation from central to local level, and coherent long-term development of the country that would include higher economic growth, job creation and poverty reduction are the key overreaching goals which encompass all political elements of the country and enjoy the overwhelming support of the population.

Ambitious structural reforms are also fully consistent with the country's efforts towards EU accession, and more specifically towards meeting the Copenhagen economic criteria. In order to meet these criteria, i.e., to establish itself as a functioning market economy that is able to withstand the competitive pressure of the EU common market, the country's production and exports will have to grow at high and sustainable levels. That, in turn, will require strengthened efforts to speed up transition, to improve the functioning of economic institutions, and to increase public investments in development oriented activities of the country

3. Integration of Republic of Macedonia in the European Research Area in the field of Transport

The Republic of Macedonia has made further efforts to improve its ability to assume the obligations of membership. There was some progress in the fulfilment of the short term priorities of the European partnership. EU Financial Assistance under the Instrument for Pre-Accession Assistance (IPA) for the country are: 70.2 in 2008, 81.8 in 2009, 92.3 in 2010 and 98.7 in 2011.

In the Progress Report for 2008 concerning the progress of Republic of Macedonia to the EU integration, published by the Commission of the European Communities, in the component related to the Transport sector, in the conclusions is mentioned that the "good progress can be reported in the area of transport policy. However, administrative capacity in all sectors remains insufficient. Regulatory bodies and safety authorities have yet to become operational in the fields of land, air and rail transport. The reforms undertaken in railways still need further implementation. In the area of transport policy, preparations are advanced." In the

part concerning the Trans-European networks is concluded also that the country has made good progress through to participate actively in implementation of the Memorandum of Understanding for development of the Core Regional Transport Network by starting to implement the multi-annual plan for 2008-2012 made by SEETO.

Progress has been made also in the area of research policy with the adoption of the Law on scientific research activities and the Law on promotion and support of the technological development. Both laws aim at better structuring the organisation and management of national research funding and better linking research to social and economic development. However, budgetary constraints and weak institutional capacity remain major impediments to development of research. With respect to participation in framework programmes**,** the positive trend of increasing participation under the Seventh EC Research Framework Programme (FP7) since its association is continuing. The Memorandum of Understanding has been smoothly implemented.

As regards integration into the European Research Area, the country is part of the Euraxess Jobs Portal (formerly known as Mobility Portal) and Euraxess Service Network (formerly known as the ERA-MORE network) and is in the process of setting up its national Euraxess Portal and Network. Further action is expected to stimulate investment in research.
A national action to increase public funding in research and stimulate the private sector to contribute more to the EU objective of investing 3% of GDP in research by 2010 is still missing. The budgetary allocation for science in 2008 is still less than 1% of GDP. The level of private investment in science and research remains symbolic.

Progress has been made on organisation of research cooperation at national level, which now needs to be turned into more effective research funding in support of socioeconomic development. Implementation capacity is still insufficient. The first year of participation in FP7 has produced good results. Substantial efforts remain necessary to strengthen research capacity. Overall, the country is on track in the area of science and research, but further efforts are necessary, in particular as regards the integration into the European Research Area.

4. SWOT analysis of the Transport research capacity in Republic of Macedonia

4.1 Strengths

- Good geographical position of the country concerning the main transport Corridors in the region contributes to the importance of transport sector and research in this field
- Participation in the SEETO multi annual planning of the regional core network
- Active participation in regional transport activities
- Active participation in the EU research actions COST and in framework programme FP7
- Republic of Macedonia has EU accession candidate country status
- Main institutional regulations are in place

4.2 Weaknesses

- Insufficient of own founds for research activities
- Insufficient of academic staff and researchers
- Insufficient implemented measures toward integration into the European Research Area
- Insufficient of implementation of capacity of research
- Low (symbolic) participation of private sector in the investment in research

4.3 Opportunities

- Increase the participation in the EU research programmes
- Increase country regional collaboration in the research
- Integrate the public and private sector in the research
- Founding the national transport research institute

4.4 Threats

- Inadequate investments and own founds for research
- Low number of researchers and research institutions
- Current economic recession
- EU and regional research priorities and interests are avoiding the country priorities
- Political and security stability conditions in the region

5. Transport research priorities for Republic of Macedonia

5.1 *Transport research priorities on the basis of the country's readiness*

The transport research priorities at the level of transport sectors should be defined according to the following goals:

- Road Traffic: enhancing international competitiveness of road traffic to effectively cope with foreign competition, enhancing the safety of road traffic, and limiting the harmful impact of road traffic on the environment to an optimal level;

- Railway Traffic: enhancing the international competitive position of the railway;

- Air Traffic: integration of the Republic of Macedonia into the single air-transport market, and effective regulation of service provision in air traffic.

- Development of combined transport and multimodal transport terminals.

- Investigation the possibility for PPP (public private partnership) in the transport sector

- Improvement of the PT (public transport) in the biggest towns in the country

The goals of the transport sectors related to harmonising with EU legislation concern to complete harmonisation of the national legislation with the EU standards, especially in the social and fiscal harmonization and continuous promotion of the existing legislation defining technical regulations and standards.

A commercial approach for the provision of transport services is a common denominator of all the measures that are to be undertaken in the Republic of Macedonia aimed at improving the international competitiveness of the transport sector. The commercialization of transport services applies to all the reforms that stimulate the business approach of these enterprises.

The modernization of transport infrastructure, the development of sustainable transport system and improvement of services by the transport service providers is a major objective for the future research and implementation of the projects. One of the most important is the transport tariff and price policy. As a general rule, the prices of transportation services should be defined at a level that will reflect all the costs, both internal and external. This general rule has different implications for the prices in different transport sub-sectors. In order to

internalise the negative externalities of road transportation, including the costs of air pollution and traffic congestion, it is realistic to expect a significant increase in fees in this segment of the transport sector. For the purpose of implementing policy where the beneficiaries are to pay for the costs of externalities, there will be a continuous increase in other transportation fees in the medium-term related to the utilisation of roads, and especially the road-tolls. Conditions will be created for the prices of the railway services to be established at a level that will stimulate the transfer of cargo traffic from the roads to the railway, especially in transit transportation.

The price increase for transportation services should be accompanied by relevant measures for reducing the negative effect that the increase of tariffs will have on the vulnerable segments of the population. The traditional system of indirect subsidy through low prices will have to be replaced by a system where subsidies will come directly from the budget funds for social protection. Such subsidies will be allocated to beneficiaries based on clearly defined rules, and, wherever possible, they will be gradually abolished.

5.1.1 Priority 1: Feasibility study with Cost Benefit Analysis and Environmental Impact Assessment for upgrading road infrastructure of Corridor VIII

5.1.2. Priority 2: Preliminary design and Feasibility study with Cost Benefit Analysis and Environmental Impact Assessment for building railway line on Corridor VIII section Kicevo-Border line with Albania

5.1.3 Priority 3: Feasibility study with Cost Benefit Analysis and Environmental Impact Assessment for modernization of railway line on Corridor X

5.1.4 Priority 4: Traffic study for the capital city Skopje

5.1.5 Priority 5: Improvement of public transport in the capital city Skopje

5.1 *Transport research priorities on the basis of future potential*

The transport research priorities on the basis of future potential should be followed the main objectives for development of transport sector mentioned in the National Transport Strategy. The research priorities could be determined in the following sectors:

5.2.1 Promotion of the economic development of the country through the improvement of transport infrastructure connectivity with the regional transport infrastructure network.
5.2.2 Safety in the Transport Sector (vehicles and infrastructure safety, behaviour of the users).
5.2.3 Improvement of accessibility and mobility of citizens through the efficient and affordable public transport system, accessible facilities and services.
5.2.4 Environmental sustainability and reducing the negative impact of transport activities.
5.2.5 Urban Transport System – transport planning and urban development.
5.2.6 Multi Modality of Transport Systems, development of combined transport.
5.2.7 Financing and investments in the transport network, public assessment and possibility to introduce the public-private partnership (PPP) in the transport sector.
5.2.8 Inequality in the transport sector – social and physical discrepancies.
5.2.9 Management of maintenance and define the strategy for maintenance of transport infrastructure.
5.2.10 Management of traffic flows.
5.2.11 Development in the area of state aid and satellite navigation.