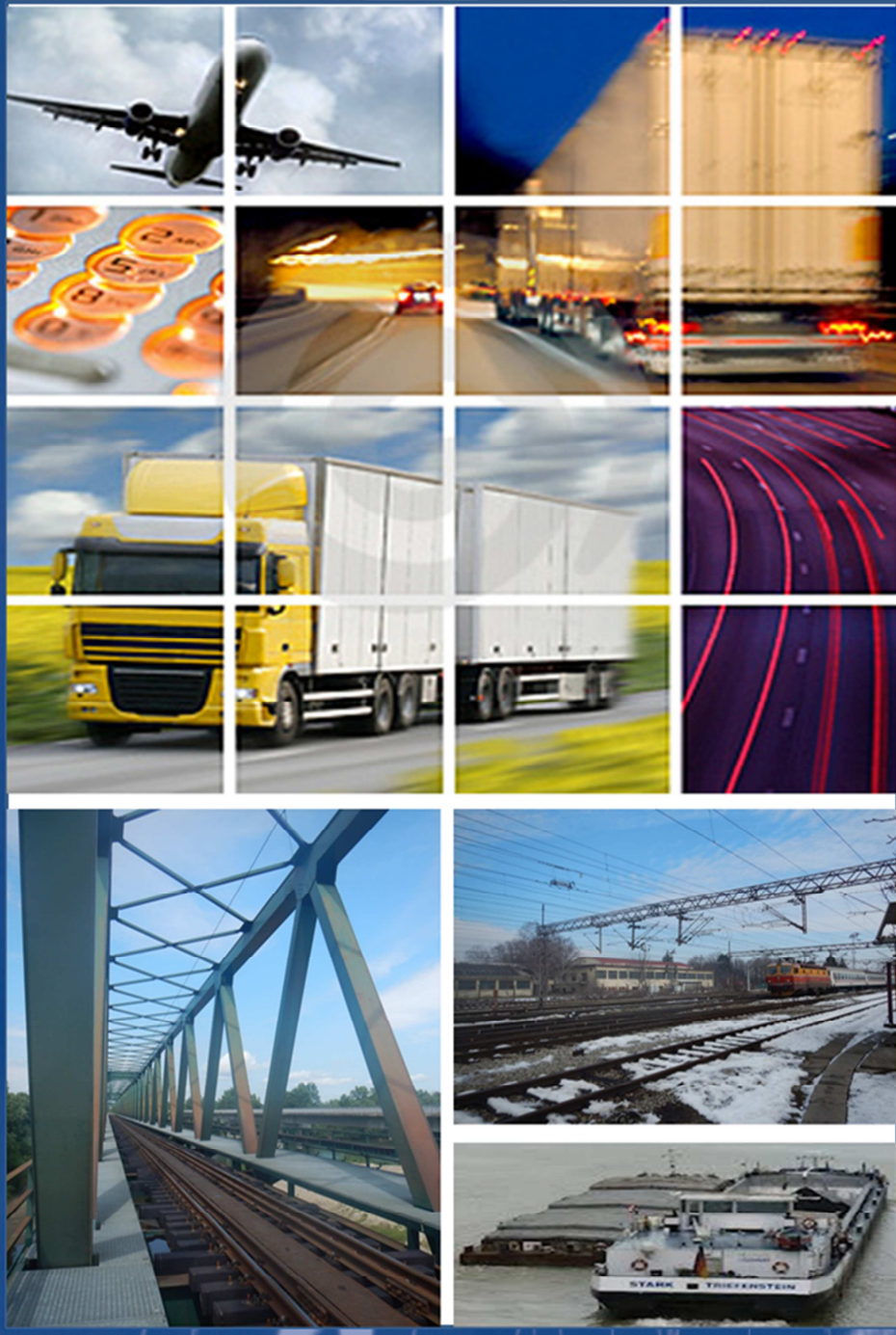
TRANSPORT DEVELOPMENT STRATEGY OF THE REPUBLIC OF CROATIA (2014 – 2030)



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ANNEX II: SECTOR ANALYSIS

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Republic of Croatia
MINISTRY OF MARITIME AFFAIRS, TRANSPORT AND INFRASTRUCTURE

idom

otp Hungaro-Projekt

INDEX OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

LIST OF ABBREVIATIONS

AADT	Average Annual Daily Traffic
ATM	Air Traffic Management
CTN	CROATIA AIRLINES
CVTMIS	Croatia vessel traffic monitoring and information system (CVTMIS
EC	European Commission
EU	European Union
GDP	Gross Domestic Product
GT	Gross tonnage
HAC	Hrvatske autocested.o.o.
HC	Hrvatske ceste d.o.o.
HEMS	Helicopter Emergency Medical Service
HRK	Croatian Kuna
HŽI	HŽ Infrastruktura d.o.o.
ICAO	International Civil Aviation Organization
ITS	Intelligent Transport Systems
LAU	Local Administrative Units
LCC	Low Cost Carrier
MARPOL	International Convention for the Prevention of Pollution from Ships
MET	Maritime Education and Training
MMATI	Ministry of Maritime Affairs, Transport and Infrastructure
MRCC	Maritime Rescue Coordination Centre
PSC	Public Service Contracts
PSSA	Particularly Sensitive Sea Area
PT	Public Transport
RIS	River Information Services
rkm	River Kilometre
RoC	Republic of Croatia
RRT	Railroad terminal
RO RO	Roll on / Roll off
SAR	Search and rescue
SB	State Border
SESAR	Single European Sky ATM Research
SSS	Short Sea Shipping
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAC	Track Access Charges
TDS	Transport Development Strategy
TEN-T	Trans-European Transport Networks
TEU	Twenty-foot equivalent units
TOP	Transport Operational Programme
UIC	International Union of Railways
VTMIS	Vessel Traffic Monitoring and Information System Service

1. RAIL SECTOR

1.1. Analysis

1.1.1. Rail transport structure in the Republic of Croatia

The legal and institutional framework for the rail transport sector is harmonized with the EU "Acquis Communautaire", being the main criteria of compliance fulfilled by Croatia, including:

1. Gradual opening of the transport market,
2. Establishment of regulatory institutions and
3. The adoption of Public Service Contracts (PSCs) to fund passenger services and rules for financing the infrastructure.

The Ministry for Maritime Affairs, Transport and Infrastructure (MMATI) is responsible for setting the sector policy, supervises the state-owned railway companies as owner and as provider of budgetary resources and contracts services with the railway companies.

The restructuring of the former HŽ Holding approved in June 2012 meant its dissolution into three independent companies: HŽ Infrastruktura d.o.o., HŽ Cargo d.o.o. and HŽ putnički prijevoz d.o.o.

HŽ Infrastruktura d.o.o. manages the railway infrastructure as a public good in general use on the basis of multi-year contracts.

The other two companies, HŽ Cargo d.o.o. and HŽ putnički prijevoz d.o.o. face the need to compete in the open market and therefore will need to adopt a business oriented philosophy.

1.1.2. Croatian rail network

The total length of railway lines in Croatia is 2.604 km, according to the Decision of the Classification of the Railway Lines of the Government of the Republic of Croatia (OG no. 03/14). The ratio of kilometres of rail lines versus area of the country gives a value of 0,06, which lays close to the average of the countries considered.

Something similar arises when considering the ratio of railway kilometres over the population of the country, 4.262.140 persons in Croatia. This value is 1.566 people per kilometre, which is close to countries like Switzerland, and higher than other like the Czech Republic or Hungary.

Croatia has 2 Core Network Corridors crossing its country:

The **Mediterranean Corridor** links the Iberian ports of Algeciras, Cartagena, Valencia, Tarragona and Barcelona through Southern France, with link to Marseille, and Lyon to Northern Italy, Slovenia and a branch via Croatia to Hungary and the Ukrainian border. It covers rail and road, airports, ports, RRT's and, in Northern Italy, also the Po river inland waterway. The Corridor`s integral part is the Rijeka-Zagreb-Budapest rail and road corridor, representing also the Pan-European Corridor Vb. A continuation of the Mediterranean Corridor and its integral part is also the road and rail corridor from Zagreb to Slovenia (Pan-European Corridor X). Through this corridor the Republic of Croatia is connected to the Baltic-Adriatic Corridor, which runs from the Baltic Sea through Poland, via Vienna and Bratislava to Northern Italy.

The **Rhine-Danube Corridor** connects Strasbourg and Mannheim via two parallel axes in southern Germany, one along Main and Danube, the other one via Stuttgart and Munich, and with a branch to Prague and Zilina to the Slovak-Ukrainian border, through Austria, Slovakia and Hungary to the Romanian ports of Constanta and Galati. It covers rail, road, airports, ports, RRT's and the inland waterways system of Main, Main-Danube Canal, the entire Danube downstream of Kelheim and the Sava river. The Rhine-Danube Corridor represents also the Pan-European Corridor VII in the Republic of Croatia.

Within the territory of the Republic of Croatia, international Corridors are named as follows:

- RH1. TEN-T core network (Paneuropean Corridor X), Salzburg – Thessaloniki,
- RH2. TEN-T Mediterranean corridor (Paneuropean corridor Vb) Budapest – Rijeka and
- RH3. TEN-T comprehensive network (Paneuropean corridor Vc), Budapest – Ploče.

Railway lines are connected between themselves and also to sea and inland waterways ports in Croatia by means of the railway lines that are significant for the international transport, according to the Decision of the Classification of the Railway Lines of the Government of the Republic of Croatia (OG no. 03/14).

Pružna mreža HŽ Infrastrukture d.o.o.
Railway network of HŽ Infrastruktura d.o.o.

1 Figure Occupation of the Croatian rail network managed by HŽI, 2009, Source: HŽI Network Statement

Based on the Decision of the Classification of the Railway Lines of the Government of the Republic of Croatia (OG no. 03/14) and to the purpose of determining the manner of governing and management of the railway infrastructure and planning its development, the railways in the Republic of Croatia are classified as follows:

- **Railway lines that are significant for the international transport (M);**
  - M101 State border-Savski Marof-Zagreb GK,
  - M102 Zagreb GK-Dugo Selo,
  - M103 Dugo Selo-Novska,
  - M104 Novska-Tovarnik-State Border,
  - M201 State Border-Botovo-Dugo Selo,
  - M202 Zagreb GK-Rijeka,
  - M203 Rijeka-Šapjane-State Border,
  - M301 State Border- Beli Manastir-Osijek,
  - M302 Osijek-Strizivojna-Vrpolje,

- M303 Strizivojna-Vrpolje-Slavonski Šamac-State Border,
- M304 State Border-Metković-Ploče,
- M401 Sesvete-Sava,
- M402 Sava-Zagreb Klara,
- M403 Zagreb RkPs-Zagreb Klara,
- M404 Zagreb Klara-Delta,
- M405 Zagreb ZK-Trešnjevka,
- M406 Čulinec-Zagreb Resnik,
- M407 Sava-Velika Gorica,
- M408 Zagreb RkOs-Mićevac,
- M409 Zagreb Klara-Zagreb RKPS (s),
- M410 Zagreb RKOS-Zagreb RKPS,
- M501 State Border-Čakovec-Kotoriba-State border,
- M502 Zagreb GK-Sisak-Novska,
- M601 Vinkovci-Vukovar,
- M602 Škrljevo-Bakar,
- M603 Sušak-Rijeka Brajdica,
- M604 Oštarije-Knin-Split,
- M605 Ogulin-Krpelj,
- M606 Knin-Zadar,
- M607 Perković-Šibenik.

- **Railway lines that are significant for the regional transport (R);**
  - R101 State Border-Buzet-Pula,
  - R102 Sunja-Volinja-State Border,
  - R103 State Border-LD Polje-Knin,
  - R104 Vukovar-Borovo naselje-Erdut-State Border,
  - R105 Vinkovci-Drenovci-State Border,

- o R106 Zabok-Đurmanec-State Border,
- o R201 Zaprešić-Čakovec,
- o R202 Varaždin-Dalj.

- **Railway lines that are significant for the local transport (L).**
  - o L101 Čakovec-Mursko Središće-State Border,
  - o L102 Savski Marof-Kumrovec-State Border,
  - o L103 Karlovac-Kamanje-State Border,
  - o L201 Varaždin-Golubovec,
  - o L202 Hum Lug-Gornja Stubica,
  - o L203 Križevci-Bjelovar-Kloštar,
  - o L204 Banova Jaruga-Pčelić,
  - o L205 Nova Kapela-Našice,
  - o L206 Pleternica-Velika,
  - o L207 Bizovac-Belišće,
  - o L208 Vinkovci-Osijek,
  - o L209 Vinkovci-Županja,
  - o L210 Sisak Caprag – Petrinja,
  - o L211 Ražine – Šibenik Luka,
  - o L212 Rijeka Brajdica – Rijeka,
  - o L213 Lupoglav – Raša.

1.1.3. Present condition of the infrastructure

Pursuant to the Decision of the Classification of the Railway Lines of the Government of the Republic of Croatia (OG no. 03/14), the total length of the Croatian rail network comprises 2.604 km of railway lines, 90% of which are single lines, while only 36% of the lines are electrified. Regarding types of lines, almost 55% of the network is dedicated to those railway lines that are significant for the international transport.

The analysis of the investment made between 2007 and 2012 shows that line length has been practically constant over the last 6 years. Thus, it can be implied that investments made have not

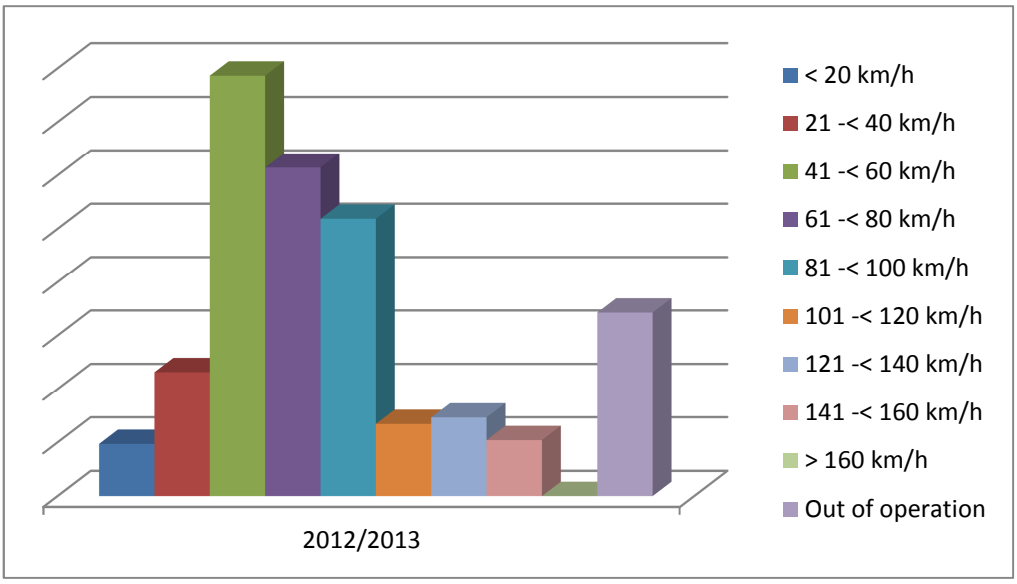
focused on the construction of new lines, but on the reconstruction and modernization of existing lines.

When studying the load capacity of tracks over the last years, it can be seen that track length of higher categories with respect to axle load (C4 and D4) has slightly decreased in the last 3 years. In the same period, lower categories (A" and A) have remained unchanged. Lastly, category B2 has increased its track length in 75%, especially in international and local lines.

Length of tracks which have become out of operation has also substantially increased over the last five years (approximately 90%) both in regional and local lines. The arising idea is that conservation of tracks has not been over the years enough to keep the exiting axle load category of the line.

The same conclusion is reached when reviewing the allowable speeds, which are shown in the graph below (Figure no. 2).

The facts show that around 34% of the total open track length allows speeds up to 60 km/h, while only 4,9% of the total is capable for the speeds from 140 km/h to 160 km/h, and equally insufficient 15.6% is capable for the speeds above 100 km/h.



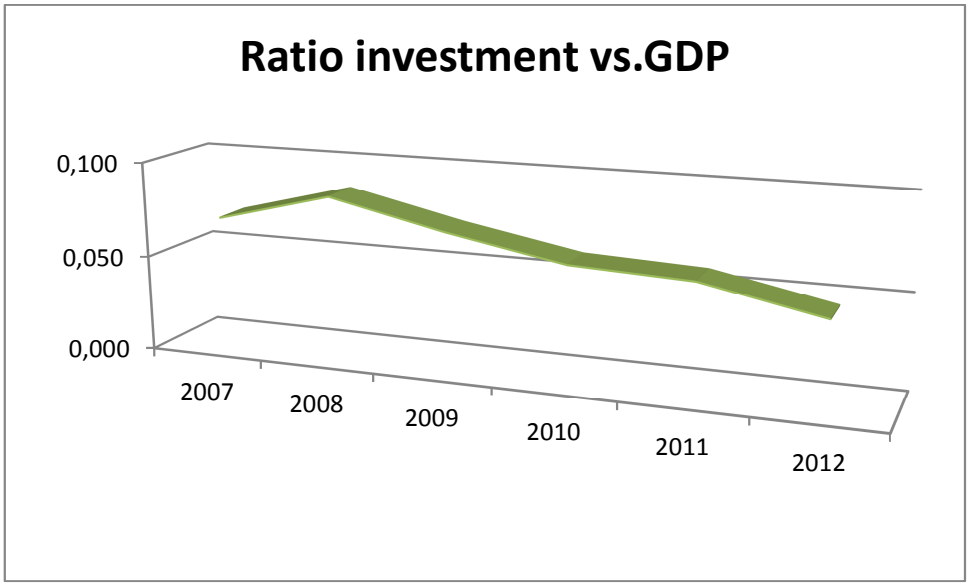
2 Figure Distribution of allowable speeds in the Croatian rail network, Source: HŽI statistics

These speeds, together with the distance between stations, the traffic control and signalling systems have a direct impact on the transportation capacity of the lines.

Regarding the transport and control, and signalling and interlocking infrastructure subsystem, the traffic of trains running in opposite directions and consecutive trains is controlled by traffic controllers from occupied stations by giving permission i.e. approval and announcing departure.

Freight trains formation is primarily carried out at the following stations: Zagreb Ranžirni kolodvor, Zagreb Zapadni kolodvor, Kutina, Novska, Slavonski Brod, Vinkovci, Sisak Caprag, Karlovac, Ogulin, Rijeka, Knin, Ražine, Solin, Ploče, Koprivnica, Varaždin, Osijek, Split Predgrađe and Bibinje. Zagreb Ranžirni kolodvor has the primary function of freight train formation and is equipped with special facilities necessary for splitting or joining trains.

Going deeper in the investment made in railway infrastructure over the last years, the following graph shows the evolution of the ratio investment vs. GDP, which proofs to have been decreasing since 2008.



3 Figure Rail Investment vs. Croatian GDP, Source: Eurostat and HŽI statistics

As the graph displays, 2008 was the year that more investments were carried out, amounting to 908 million HRK. Afterwards, the investments have decreased until 2012, being approximately half of the former.

Greater investments are addressed for the reconstruction and modernisation of international lines, which follows the general tendency of the overall investments. Investments in regional and local lines have significantly decreased over the last years, while the investment in the Zagreb railway node has had a notable increase.

Although investments in construction of new lines have decreased over the last six years, the share of the total investments has slightly increased. Investments in reconstruction and modernisation of international lines, although decreased in whole amount, have kept its share in the overall investment constant.

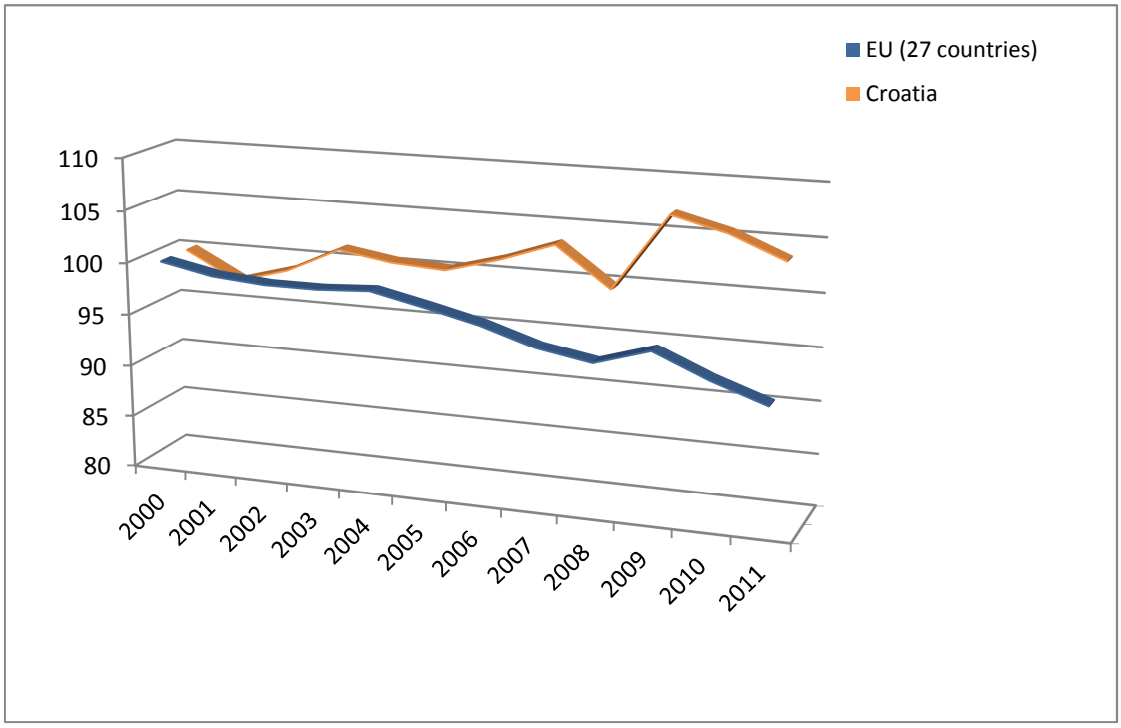
It can be concluded that although the total length of railway lines in Croatia is in the average ratios with other European countries, its present condition is a limiting factor for its capacity.

This is so because of several reasons, among which the length of single tracks, allowable speeds, distances inter stations, communications and signalling systems can be included.

Besides that, the fact that the ratio of investment with respect to the GDP has decreased in the last years, has contributed to this situation.

1.1.4. Rail transport in Croatia

The railway transport in Croatia is predominantly transit, as Croatian Adriatic ports serve as an entry-point for international cargo to South East European and Central European markets. The intermodal transport share in total transport in net tons kilometre in 2012 was 5,6% and directly related with containers.



4 Figure Evolution of energy consumption in transport compared to EU27 (in %), Source: Eurostat.

On International lines most of the realized transport is related to freight, excepting M101, M102, and M302. The first two lines are part of the RH1, the TEN-T core network and Paneuropean corridor X and are in the area of influence of Zagreb. M301 connects Osijek with the Hungarian border.

The realized transport on regional lines is significantly lower than M class lines. Only R102 Sunja-SB and R202 Varaždin-Dalj have relevant traffic volumes and in both cases, % share of freight versus passengers is high.

On local lines traffic volumes are again clearly lower that M and R lines, and only L209 Vinkovci-Osijek have relevant numbers. Freight traffic share is high (around 92%) on this line, while in the rest of local network most of the traffic is related to passengers.

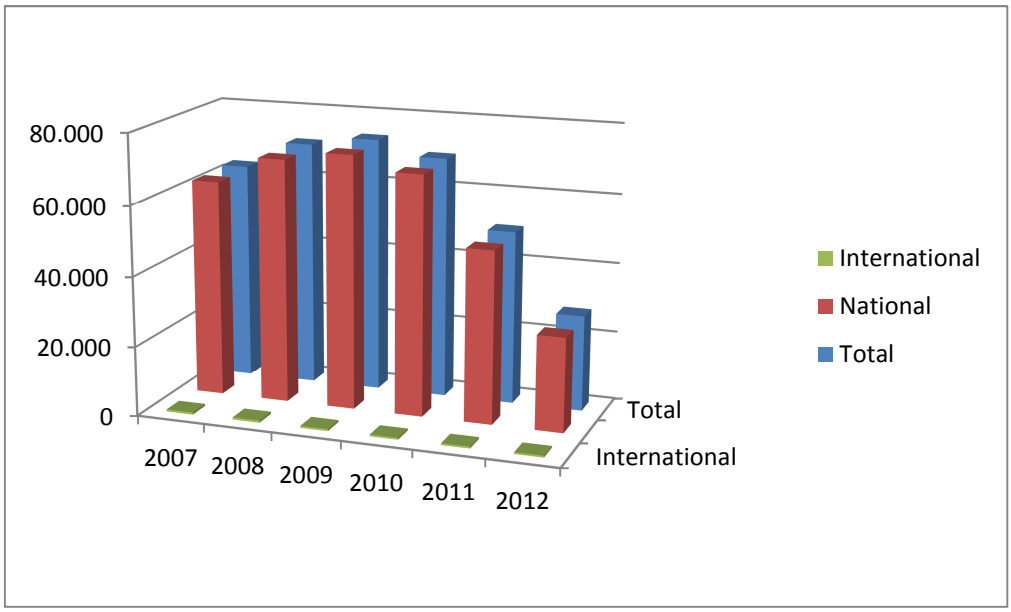
1.1.4.1. Passenger transport

Comparing the total passenger transport related to total population of different countries in Europe, it can be seen that Croatia is on the low range of this ratio, which means that the impact of rail in the total inland passenger transport is lower in Croatia than in neighbouring countries. This ratio has even decreased in the last years in Croatia.

National railway passenger transport was gaining importance the last few years and with 50% of the total passenger transport in 2009, it exceeded the share of road transport two years in a row.

Passenger transport is at the moment carried out by HŽ putnički prijevoz d.o.o. Average European passenger traffic intensity is three times higher than that in Croatia, while the railway network for passenger traffic is comparable in size to benchmarked railways.

An important aspect to be outlined is that in the last years the share of international transport compared to the total passenger transport is almost negligible, according to the data studied (see Figure no.5).



5 Figure Share of national and international passenger transport (1000 pax), Source: Eurostat

In order to understand these ratios, some facts must be taken into consideration. First of all, Zagreb has good connection with Ljubljana and Beograd. Within the country the settlements along these railway lines are served with rail services. Between Zagreb and Novska the 100 km trip takes about 2 hours, while the 250 km trip between Zagreb and Vinkovci takes 4 hours. These travel times are hardly competitive with the road transport using the motorways but avoiding the high motorway tolls, local citizens tend to use the primary road network or bus and rail services instead. The distances from Zagreb to the rest of main cities are as follows:

Distances from Zagreb in km	
Split	385
Rijeka	165
Osijek	300
Zadar	270
Pula	270
Slavonski Brod	200
Karlovac	55
Varaždin	83
Šibenik	350

1 Table Distances from Zagreb in km

Zagreb-Split travel time is 6 hours daytime and 8 hours night time and the 2 departures/day service is not a real alternative compared to car. The Zagreb-Rijeka trip takes twice as much time by train than by car.

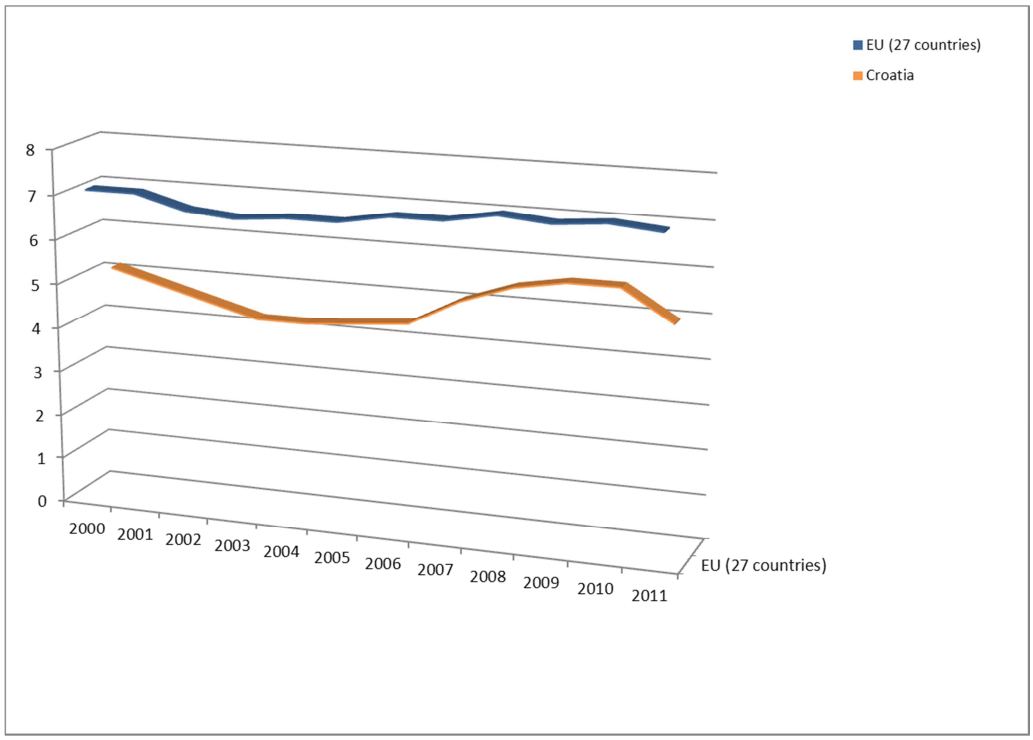
With those speeds, Zagreb can be reached with a one-day round journey only from a small part of the country by rail, which means that rail mode is at present not competitive against other modes of transport, especially for this kind of trips. Possibility of increasing traffic on regional and local lines is clearly limited by its capacity.

The modernisation of the rolling stock, in parallel to the planned line improvements, will be vital for strengthening the competitiveness of rail transport in comparison with other transport modes. According to international experience, trains that tilt can go up to 25% to 40% faster around curves than conventional trains without inconveniencing passengers, and hence can significantly increase average speeds and cut journey times without the need to change the railway track geometry.

Touristic traffic is not relevant since the seasonal distribution of movements is quite stable according to the data provided by HŽI[1]. Also, the distances and travel times from Zagreb to cities like Split or Zadar make railway transport not competitive against road or even air transport. The

[1] data on passenger movements is still not available

modal split of rail passenger transport as a percentage of the total inland transport, compared to EU27 is presented below:



6 Figure Croatian modal split of passenger transport vs. EU27 as a % of total inland transport, Source: Eurostat

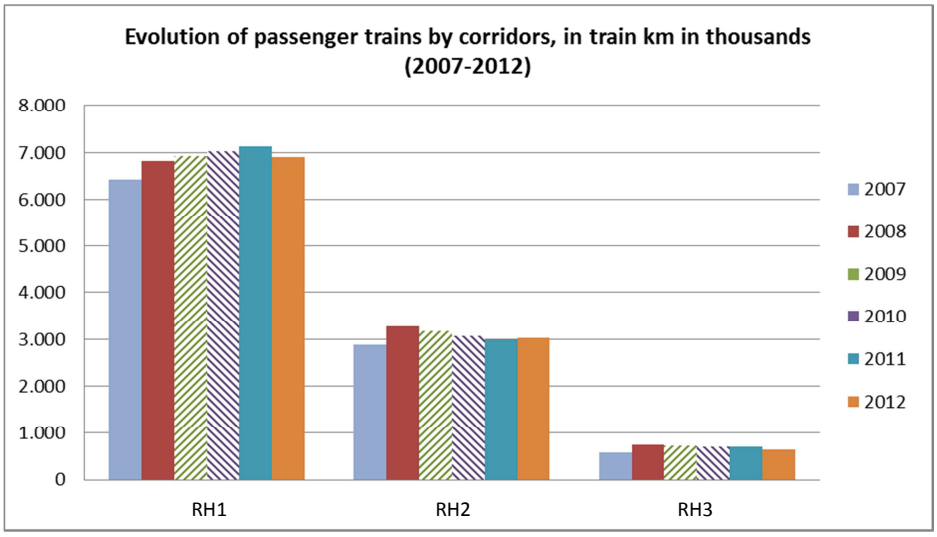
The evolution of passenger traffic in the main international corridors is shown in Figure 7 which is based on HŽI Statistics. No data is displayed for years 2009 and 2010 for not being referred in the corresponding "Statistics" of HŽI in the same manner as the rest of years. However, it should be noted that since figures are of the same order of magnitude, the data is considered valid.

As shown in Figure 7, total amount of train-km for passengers can be said to be steady over the last 2 years. Passenger trains have slightly decreased in the last two years in corridors RH1 and RH3, while they have slightly increased in corridor RH2.

The analysis of the main lines in each corridor shows that only line M101 has seen its passenger traffic decreased, while the others (M102, M103, M104), increased. Passenger traffic has decreased in both lines of corridor RH2 (M201 and M202), while it has increased in all lines of corridor RH3, except for line M303.

It should be noted how corridors RH2 and RH3 show a small peak in 2008, from which traffic had started to decrease until the present day.

No data is displayed for year 2009 for not being referred in the corresponding HŽI statistics in the same manner as the rest of years.



7 Figure Evolution of passenger trains by corridors (2007-2012), Source: HŽI statistics, 2007 – 2012

The chart and graphs above show that there is a general decrease from years 2007 and 2008 in relation to data of the last three years. Prior to stating that there has been a decrease in the amount of passenger traffic, it should be noted that data displayed in the HŽI statistics have remarkably changed from one set of years to the other (i.e. different sections for the same line). For this reason, there is a possibility that data might not have been consistently measured.

Passenger's traffic in the Zagreb area is the most relevant and needs to be considered together with the whole urban transport system. International traffic is concentrated in the corridors RH1 and RH2 and certain sections connecting major cities.

According to HŽI statistics for 2012, the railways passenger's traffic is clearly related to lines M101 State border-Zagreb GK and M102 Zagreb-Dugo Selo. On a second level, attending at the traffic volume, lines M103 Dugo Selo-Novska, M104 Zagreb GK-Novska, M105 Novska-Tovarnik-State Border, M201 Sate Border-Botovo-Dugo Selo, M202 Zagreb GK-Rijeka, and R201 Zaprešic-Čakovec can be considered. A third level would include M301 Sate Border-Osijek, M501 State Border-Čakovec-State Border, R202 Varaždin-Dalj, L103 Zabok-Đumanec-State Border, L204 Križevci-Kloštar, L206 Nova Kapela-Našice and L207 Pleternica-Velika.

When looking at the scheme of the Croatian rail network, it can be seen that the railway lines mentioned in the first group above are located nearby the Zagreb area and also along the corridor RH1.

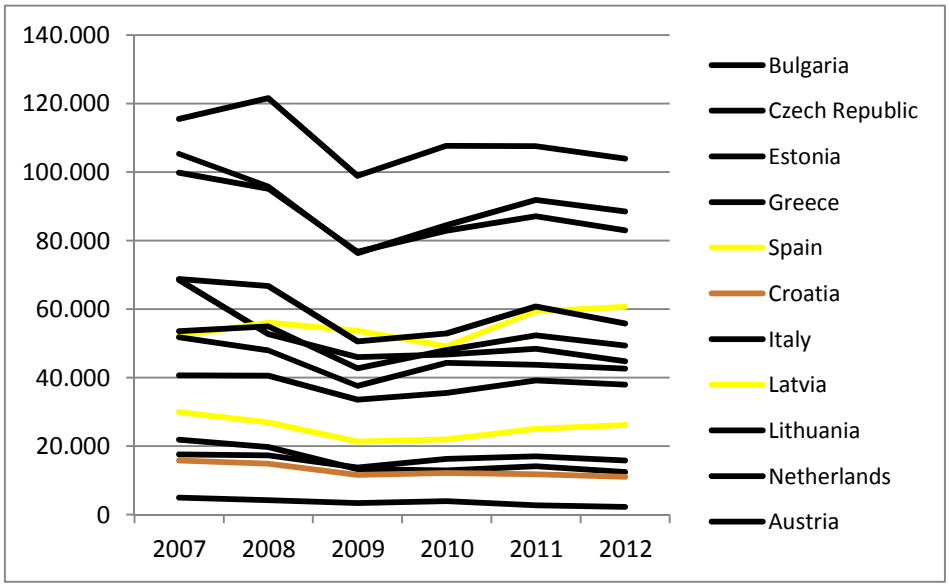
The lines mentioned on the second group (excepting R201) are also located either along the corridor RH1 or corridor RH2. The third group includes lines in the areas of Osijek, Varaždin and Koprivnica with connections to the state borders.

In the major cities in the Republic of Croatia, where the existing railway network passes through a larger number of suburbs and villages, there is a possibility of its greater inclusion into the urban and suburban public transport, primarily in the cities of Zagreb, Split, Rijeka, Osijek and Varaždin, where the railway network is fairly well-developed.

1.1.4.2. Freight transport

Freight traffic has a clear international component, connecting Adriatic ports (especially Rijeka) with the continent. Other ports like Ploče are not well connected to the Croatian rail network.

When one looks at the evolution over the years of the freight transport in neighbouring countries (see Figure no. 8), it can be seen that Croatia follows a slight decrease, which is common for the majority of countries, with few exceptions (Spain and Latvia).



8 Figure Railway transport - Goods transported (in thousand tonnes), Source: Eurostat

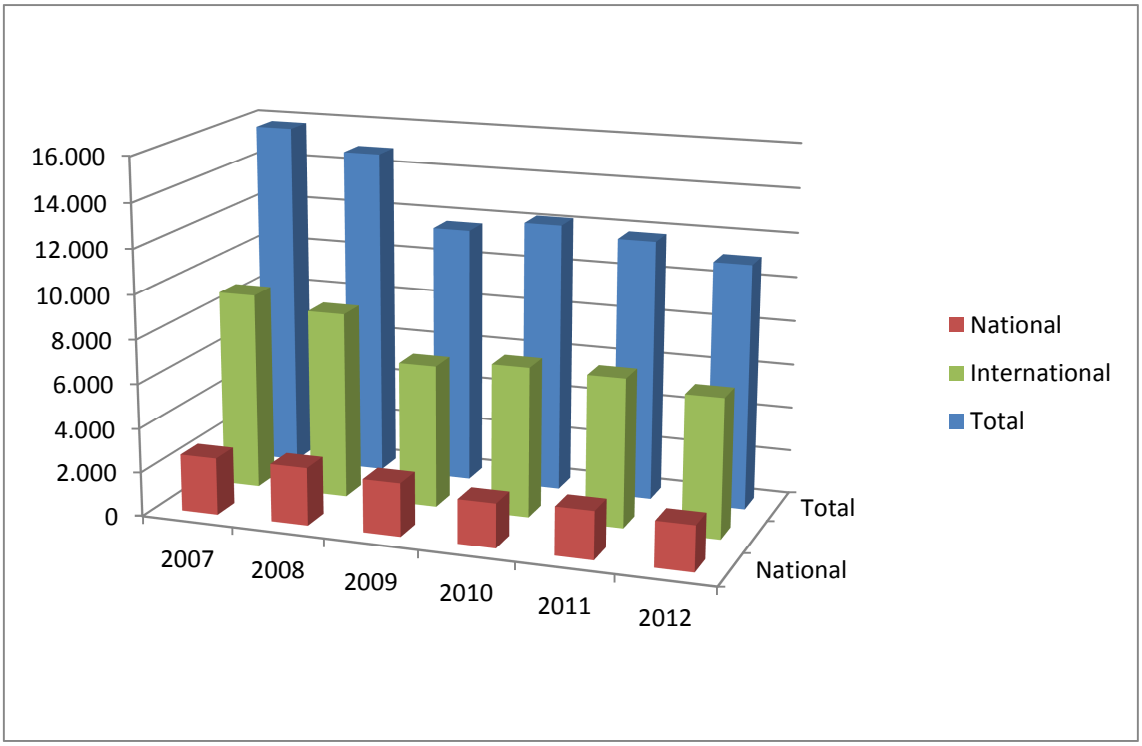
Regarding realized freight transport, first level group, with over 1.5 million net tons trains, includes M101 State border-Zagreb GK, M103 Dugo Selo-Novska, M104 Zagreb GK-Novska, M105 Novska-State border, M201 Dugo Selo-Botovo-State border, M202 Zagreb GK-Rijeka. These lines are a part of corridors RH1 and RH2.

Within a second level are, according to HŽI statistics, M102 Zagreb GK-Dugo Selo, M301 State border-Osijek, M303 Strizivojna - Vrpolje-State border, M304 State border-Metković-Ploče, M604 Oštarije-Split Predgrađe, R102 Sunja-State border, some sections of the line R202 Varaždin-Dalj and L209 Vinkovci-Osijek.

Lines within this second group are related to connections of these two corridors, either to trans boundary lines or to typical cargo generations points such ports (Split). Also, the Croatian section of corridor RH3 (Ploče-Metković) is in this group.

A third group comprising lines with a total volume between 300.000 and 500.000 net tons of trains includes M501 State border-Čakovec, M203 Rijeka-Šapjane-State border, M601 Vinkovci-Vukovar and M607 Perković-Šibenik.

The lines mentioned are, in the line with the second group, related to connections to corridors RH1 and RH2.



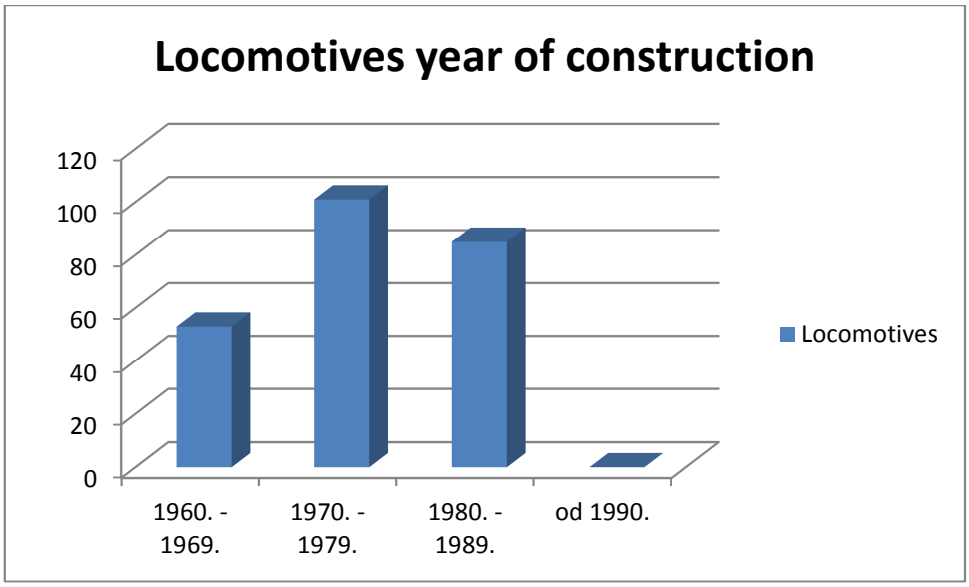
9 Figure Share of national and international freight transport, Source: Eurostat

Railway infrastructure under the management of HŽI is connected with public railway infrastructure at ports, managed by port authorities. Railway stations linked by rail with public railway infrastructure at ports managed by port authorities are:

Station	Port	Infrastructure manager
1 Rijeka	Rijeka	Port Authority Rijeka
2 Rijeka Brajdica	Rijeka	Port Authority Rijeka
3 Bakar	Bakar	Port Authority Rijeka
4 Raša	Raša	Port Authority Rijeka
5 Pula	Pula	Port Authority Pula
6 Bibinje	Zadar	Port Authority Zadar
7 Šibenik Luka	Šibenik	Port Authority Šibenik
8 Solin	Split	Port Authority Split
9 Ploče	Ploče	Port Authority Ploče
10 Vukovar	Vukovar	Port Authority Vukovar
11 Osijek Donji Grad	Osijek	Port Authority Osijek
12 Sisak	Sisak	Port Authority Sisak
13 Slavonski Brod	Slavonski Brod	Port Authority Slavonski

2 Table Railway stations and infrastructure manager, Source: HŽI Network Statement 2014

Freight transport in Croatia at present is operated by HŽ Cargo d.o.o., which is at the moment in restructuring phase and under preparation for privatization process. In order to maintain a good quality of service and to introduce new types of services for freight, HŽ Cargo d.o.o. must be able to rehabilitate and renew the rolling stock in operation.



10 Figure Locomotives construction, Source: HŽ Cargo d.o.o.

The chart above shows the distribution of freight locomotives per year of construction. Similar shape is shown by the distribution of wagons. This circumstance may be limiting the access of this type of rolling stock to neighbouring countries.

1.2. List of hypothesis

Below is presented the list of hypothesis already defined as part of the methodological procedure employed in the Croatian Transport Development Strategy definition, because of the existing lack of accurate data and/or information. In order to proceed with the objectives definition these establish concepts of reflection and analysis.

HYPOTHESIS
1. Comparing the projected technical and functional parameters of the railway line in the Republic of Croatia with the requirements that need to be met by the railway lines of Trans European railway network, the result is mostly unfavourable.
2. Possibility of increasing traffic on Regional and Local lines is clearly limited by its capacity, which is based on allowable speeds, distance between stations and interlocking system.
3. Croatian membership in the European Union increased competition in the domestic market for HŽ Cargo d.o.o. and HŽ putnički prijevoz d.o.o.
4. Croatian membership in the European Union increased traffic demand in the Republic of Croatia.
5. Regarding the connectivity with the most populated cities in Croatia, Karlovac and Varaždin are in the range of distances that could make possible commuter connectivity with Zagreb.
6. Construction of new rail facilities in certain urban areas may put existing infrastructure out of service.
7. In some of the major cities in the Republic of Croatia, the railway network is fairly well developed.
8. The railway freight transport in Croatia is predominantly transit, as Croatian Adriatic ports serve as an entry-point for international cargo to South East European and Central European markets.
9. Passenger's traffic is relevant in the national inland transport, especially in short distance urban and suburban traffic. This can be seen as an important growth market for railways.
10. According to EC Policy Croatia will need to achieve enhancement of safety for railways transport.
11. The Croatian rail sector needs to follow EC Policy in terms of environmental sustainability, with particular attention to noise and its treatment.
12. The Croatian rail sector needs to follow EC Policy in terms of Security Framework.
13. Government policy: Establish a sustainable railway system in the Republic of Croatia.
14. New geopolitical position of the Republic of Croatia - border country of the EU; integration of Croatia in the Schengen Area.
15. New geopolitical position of the Republic of Croatia - border country of the EU; integration of neighbouring countries in EU and in Schengen Area.

3 Table List of hypothesis Rail sector

1.3. SWOT Rail sector

STRENGTHS	WEAKNESSES
• Geostrategic position as entry point from Adriatic • Location as entry point of the Balkan Region, one of the areas of potential extension of EU • EU membership; Structural funds availability • Well developed rail network in Zagreb • Key sections of TEN-T transport corridors crossing the country, both for passenger and freight traffic • Legal and institutional framework according to EU requirements	• Poor condition of railway infrastructure • Tough geomorphologic conditions for connecting the Adriatic to central Croatia • Low passenger traffic intensity • Obsolete signalling and interlocking systems • Obsolete rolling stock for freight and passengers • Non correspondence in ticketing with other modes of passengers transport • Historic dependence on public financing • Not competitive against road or air transport for international passenger traffic due to distances and connectivity • Not competitive against road or air transport for passenger traffic among the major cities of Croatia (i.e. Split and Dubrovnik), due to distances and connectivity between cities
OPPORTUNITIES	**THREATS**
• Increase freight traffic from Adriatic ports • Contribute to the development in urban, suburban and regional traffic of passengers, by increasing the share of railways in these markets. Special relevance in main cities like Zagreb, Split, Rijeka, Osijek and Varaždin • Introduce new types of services for freight • New regional services for passengers • Reduction of emissions by shifting transport from roads/air to railways • Increase quality and reliability of passengers transport by means of the Public Service Contract • Harmonization of TAC with surrounding countries • Potential new services when entering Schengen	• Global economic crisis • Increased competition from private companies for HŽ Cargo d.o.o. and HŽ putnički prijevoz d.o.o. • Need of relevant public investment in infrastructure • High staff costs • Need of coordination with rail administrators from neighbouring countries • Unpreparedness of administration to apply for, use or manage EU funds in full extent

4 Table SWOT Rail sector

2. ROAD SECTOR

2.1. Analysis

2.1.1. Croatia in the European Union

Croatia' EU accession has a significant effect on the conditions for road traffic development. Being an EU member, Croatia has to harmonize its legislation in all areas. Also, all documents of national relevance, which certainly include documents related to roads and road infrastructure, must be developed in line with EU best practice and EU principles.

Croatia has to use its international political and geostrategic position as well as the possibilities arising from Croatia becoming the “Gate to Europe“ for eastern and south-eastern countries. Croatia must learn to channel its efforts for economic advancement and connection of the European Union and neighbouring countries outside EU borders, especially Croatia being the border country of the EU.

- Develop new strategic documents which reflect Croatia's new situation and position within the European territory:
  - Prepare development documents in accordance with the interests of the Republic of Croatia, as well as those of the neighbouring countries and the European Union as a whole.
- Achieve high EU standards and complying with the EU traffic policy:
  - Regulate legislation on the level of the Republic of Croatia as regards planning, designing, administrative procedures and obtaining of necessary permits,
  - Implement constant education and training of staff employed in the road sector for the purpose of maintaining quality and improvement up to the level of European and world trends.

New geopolitical position of the Republic of Croatia - border country of the EU

- Establish an uninterrupted road connection with EU countries and other surrounding countries:
  - Completion of the international road corridors' sections,
  - Conversion of facilities of border crossings with the Republic of Slovenia and Hungary after the establishment of the Schengen Agreement,

- Regulate border crossings with the Republic of Serbia, Republic of Bosnia and Herzegovina and Republic of Montenegro, all in accordance with EU regulations.

- Align documents with the needs of the newly developed situation, create new spatial and planning possibilities:
  - Create spatial plans in accordance with the possibilities of realization and implementation.

- Create new possibilities in the road traffic system in terms of increase of capacities and development of transit traffic with countries which are within and outside the EU territory:
  - Increase the level of serviceability of the total road network,
  - Quality connections to the main road routes of the neighbouring countries,
  - Aligning the regulation with the laws and provisions of the neighbouring countries,
  - Better inform drivers and carriers on international routes.

2.1.2. Human resources

Existing human resources in the field of transport infrastructure were relatively satisfactory for conditions before Croatia's accession to the EU. Now it has become inevitable to invest great efforts in harmonization, training, coordination, information and human resources development. Members of management in leading road infrastructure companies, public companies, public services, transportation services etc. must be trained in line with new models and principles of modern and developed EU countries. This includes continuous training but also a change in the way of thinking, introducing new methods, relating the transport system to other segments of transport for achieving efficiency and further economic development.

Lack of potential in human resources

- Strengthen human resources because of the increased need for participation in the alignment of documents between the Republic of Croatia and the European Union regarding traffic policy:
  - Inform and educate the existing staff employed in all areas of road traffic,
  - Train and educate new staff in accordance with the newly arisen needs,
  - Education and training of staff employed in transport and logistics for the purpose of maintaining quality and improvement up to the level of European and world trends,
  - Inform and train staff for the purpose of inclusion into programmes related to EU funds.

- Provide traffic participants with quality education and introduce them to road regulations of other EU countries:
  - Align the level of education of drivers in the Republic of Croatia with the level of education of drivers in the EU,
  - Constantly inform drivers of amendments to the existing or adoption of new laws regarding road traffic segments in the Republic of Croatia.
- Strengthen business management operating in the road traffic segment:
  - Informing for the purpose of adjusting the activities and business trends on the market,
  - Prevent deficiencies in investment management in the domain of road traffic,
  - Education of staff specialized for traffic matters management, during spatial plan creation,
  - Constant education of staff due to the adoption and implementation of new technologies.

2.1.3. International corridors and the motorway network

The following international road corridors cross the territory of the Republic of Croatia. Corridors passing through the territory of newly associated members of the EU now become the part of the TEN-T core and comprehensive network, as for Croatia, Pan -European corridors Vb, Vc, X and Xa are now a part of the TEN-T network as follows: Vb (TEN-T Mediterranean corridor), Vc (TEN-T comprehensive network), X (TEN-T core network) and Xa (TEN-T comprehensive network).

Here is to mention that there is a project with special importance for the country which is a part of the TEN-T core network, namely the Adriatic Ionian Road Transport Corridor. The Corridor connects 7 countries (Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania and Greece, between Trieste and Kalamata. Along the Adriatic coast, it connects the main ports of the sea (Trieste, Koper, Rijeka, Zadar, Šibenik, Split, Ploče, Dubrovnik, Bar, Durresi, Igoumenitsa, Patras, Kalamata), and a number of Pan European corridors (V, Vb, Vc, and VIII). In terms of its geographical position Croatia has the status of a central European and Mediterranean country.

- TENT-T Mediterranean Corridor (Paneuropean corridor Vb): Rijeka – Zagreb – Budapest,
- TEN-T comprehensive network (Paneuropean corridor Vc): Ploče – Sarajevo – Osijek – Budapest,
- TEN-T core network (Paneuropean corridor X).: Salzburg – Ljubljana – Zagreb – Beograd – Niš – Skopje – Veleš – Thessaloniki,

- TEN-T comprehensive network (Paneuropean corridor Xa): Graz – Maribor – Zagreb.

The motorway infrastructure on international road corridors has been constructed to a high extent. The remaining problem is the completion of the Vc corridor and the solution regarding the zone within the area of the City of Zagreb, i.e. a solution regarding the junction of international motorway corridors.

The necessity to construct a motorway loop around Zagreb, which would receive and distribute the international motorway traffic from the stated corridors, will be assessed in further studies.

The company Hrvatske autoceste d.o.o. has already taken certain measures regarding that matter, i.e. created conceptual designs and environmental impact studies, for the purpose of defining the route of the motorway loop on sections Pojatno – Horvati-Ivanić Grad – Sv.Ivan Zelina with connections to the existing motorway network.

It may be concluded that the level of motorway construction in Croatia is rather good, with approximately almost 90% of motorways constructed.

The following roads are classified as motorways (OG 66/2013 and 13/2014):

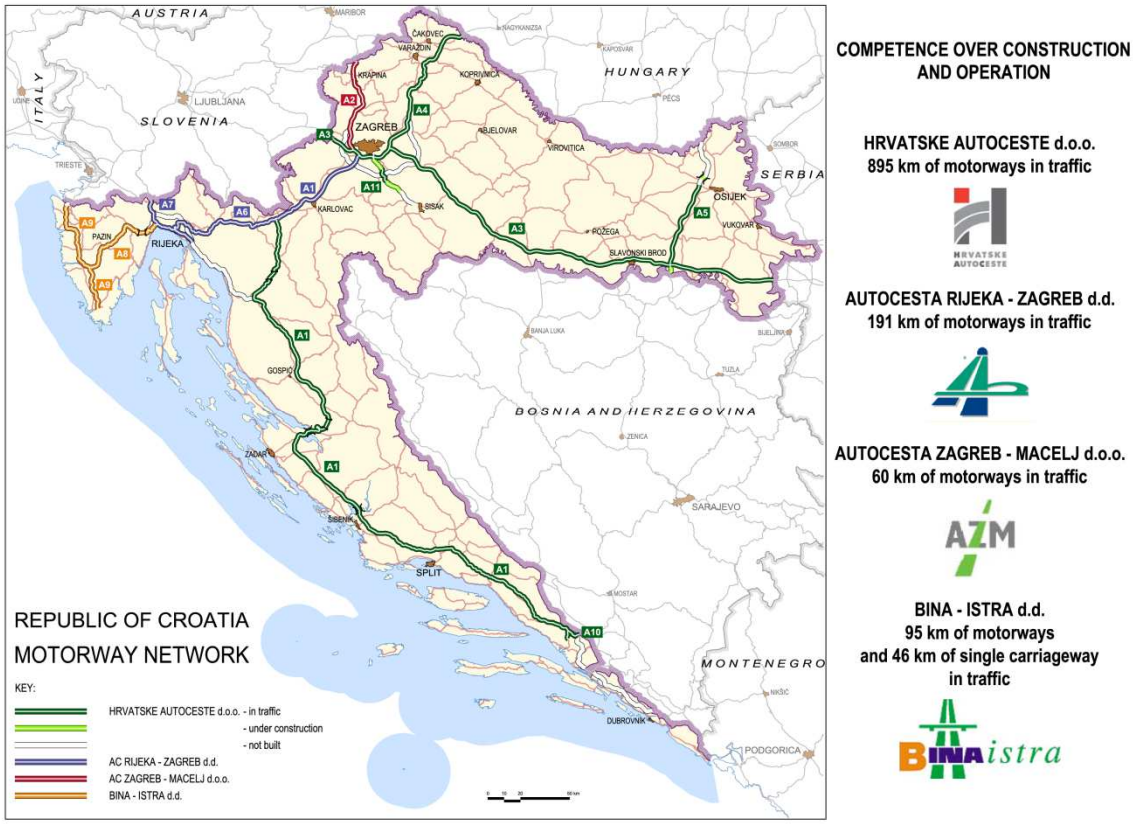
CODE	DESCRIPTION	LENGTH (km)
A1	Zagreb (node Lučko, A3) – Karlovac –Bosiljevo – Split – Ploče (A 10) – Karamatići – Opuzen – B&H border) and B&H border– Dubrovnik	550,0
A2	Border crossing Macelj (Slovenian border) – Trakošćan – Krapina – Zagreb (node Jankomir, A3)	61,0
A3	Border crossing Bregana (Slovenian border) – Zagreb – Sl. Brod – Border crossing Bajakovo (Serbian border)	306,0
A4	Border crossing Goričan (Hungarian border) – Varaždin – Zagreb (node Ivanja Reka, A3)	97,0
A5	Border crossing Branjin Vrh (Hungarian border) – Beli Manastir – Osijek – Đakovo – node Sredanci (A3) – Border crossing Svilaj (B&H border)	88,1
A6	Node Bosiljevo 2 (A1) – Delnice – Rijeka (node Orehovica, A7)	81,0
A7	Border crossing Rupa (Slovenian border) – Matulji – Orehovica – Sv. Kuzam – Križišće (D523) including the acces road node Draga – City of Rijeka (port Brajdica) and access road node Križišće –Krk bridge	42,4
A8	Node Kanfanar (A9) – Pazin – Lupoglav – node Matulji (A7)	64,0
A9	Node Umag (D510) – Kanfanar – node Pula (D66)	77,0
A10	B&H border– node Ploče (A1)	8,9
A11	Zagreb (node Jakuševec, A3) – Velika Gorica – Sisak	42,0
	Total km motorways:	**1.416,5**

From the stated length, 1.287 km is in traffic.

Legal persons operating the motorways in the Republic of Croatia are:

- Hrvatske autoceste d.o.o. (HAC) – A1 (section), A3, A4, A5, A10 and A11 – in total length of 895 km and
- Concessionaires:
    - Autocesta Rijeka – Zagreb d.d. - A1 (section), A6, A7 - in total length of 191 km,
    - BINA Istra d.d. - A8, A9 - in total length of 141 km,
    - Autocesta Zagreb – Macelj d.o.o. – A2 - in total length of 60 km

which constitutes a network in traffic of total 1.287 km.



COMPETENCE OVER CONSTRUCTION AND OPERATION

HRVATSKE AUTOCESTE d.o.o.
895 km of motorways in traffic

AUTOCESTA RIJEKA - ZAGREB d.d.
191 km of motorways in traffic

AUTOCESTA ZAGREB - MACELJ d.o.o.
60 km of motorways in traffic

BINA - ISTRA d.d.
95 km of motorways
and 46 km of single carriageway
in traffic

In order to improve cooperation between these companies through the exchange of experiences, knowledge sharing and discussion of the issues that members meet individually with the aim of joint action, **Croatian Association of Toll Motorways Concessionaires** (HUKA) was formed. The Association cooperates with national and international associations and organizations dealing with issues related to motorways.

A problem of high maintenance costs arises after motorways have been constructed since, due to the low traffic volume on most motorways, resources for financing and maintenance of the

system cannot be assured. Expensive facilities require expensive maintenance, which is at this point carried out at defined intervals. An increase in traffic volume would increase the need for maintenance, but would also ensure higher income, which would provide a better basis for maintenance activities. It is to be emphasised that regular maintenance ensures long-term high-quality functioning of the system without large-scale additional investment, which is ultimately rather important. A high level of serviceability on motorways is essential from the point of view of safety.

For this purpose the following objectives and measures are identified:

- Maintenance of high level of serviceability on motorways:
  - Conduct regular maintenance of the motorway infrastructure, facilities, signalization and equipment,
  - Ensure maintenance and traffic control centres on motorways,
  - Build a sufficient number of rest stops of different types (A, B, C, D) along the motorway for drivers' to rest.
- Implement monitoring on motorways:
  - Monitor road's status,
  - Monitor the traffic status and introduce new technologies regarding motorway equipping,
  - Gather information in one centre.
- The solution of the transmissibility of Zagreb node is therefore crucial for proper traffic functioning within Zagreb, the capital city and strongest national business centre, and its surrounding areas. The best solution to connect motorway routes A1, A2, A3, A4, A11 in the “Zagreb loop” zone and enable higher-quality and faster flow of transit traffic to international road corridors Vb, X and Xa and TEN-T network will be identified in further studies which will analyse the capacity needs, the necessary connections and the specific technical parameters of the loop.

Motorway network interoperability

- Connect motorway traffic management and state roads traffic:
  - Implement measures of monitoring traffic flows on motorway routes and quality distribution to the state road network,
  - Consolidate information,
  - Fast and efficient system adjustment.

- Combine all motorway toll payment systems into a joint system:
  - Determine the most favourable toll payment system,
  - Use modern technologies in the payment system,
  - Use experiences of other EU countries.
- Connect the motorway network with the zone of activities of other significant infrastructural facilities in the Republic of Croatia:
  - Connecting motorways to the main sea and inland ports,
  - Connecting motorways with significant railway interchanges,
  - Ensure fast and efficient flow of goods and services.

2.1.4. Insufficiencies of the public roads network

Basic network characteristics

Public roads are classified according to various criteria and features.

Regarding their social and economic importance, roads are classified as:

- motorways,
- state roads,
- county roads and
- local roads.

According to the type of traffic roads are classified as roads for motor vehicles (motorways and high-speed roads) and as roads for mixed traffic.

According to the traffic volume (AADT) vehicle/day the class and road category is defined (motorway, 1-5 classes or road categories).

Total length of the road infrastructure is 26.964 km:

- motorways 1416,5 km
- state roads 6868 km
- county roads 9703 km
- local roads 8980 km

A total of 98 105 persons is employed in the road transport sector (7% of the total number of employees in the Republic of Croatia, with an average salary of HRK 4,676.00).

Transport structure in the Republic of Croatia

- Passenger transport,
- Freight transport,
- Over the past few years in the Republic of Croatia, the number of passengers in all modes of public transport has decreased.
- At the same time, the number of registered cars has increased, as well as the number of kilometres covered by cars and the use of cars in general.
- Traffic jams in the corridors leading up to urban centres, resulting in a higher level of pollution, increased level of noise, lack of parking space and higher costs for citizens.
- Inter-modal terminals, which enable transferring from one type of public transport to another, do not exist or are very rare. At the same time, there are “parallel lines” offered by bus and railway carriers.

The origin and recent history of organizational structures, institutions and operational systems in the sector or institutional area:

- Public transport, directly or indirectly, affects almost every structure, as well as any financial, organizational and infrastructural problem, and there is no joint strategy and policy.
- The legal framework is inadequate and it fails to foster integration of different types of traffic communication.

Upgrading the state road network

- Intensify activities regarding the improvement of the existing road network:
  - Regular maintenance,
  - Monitoring the status and removing deficiencies,
  - Changing the road's category in accordance with the social and economic importance of a certain state road and traffic capacity,
  - Reconstruction of roads according to the ordinance on planned types of profiles and improvement of traffic and technical elements on state roads,
  - Regulating existing crossroads, junctions, introducing lighting, and new signalization.
- Construction of new state roads:
  - Creation of plans for the realization of state roads in accordance with the programme and plans of competent institutions, counties and cities,

- Construction and equipping of new state roads with modern safety equipment, all according to the highest standards.

Isolation of a part of the Dubrovačko-neretvanska County due to physical separation from the remaining part of the Croatian territory and the necessity to pass through Bosnia and Herzegovina which is not a member of the EU:

After Croatia gained independence, part of the Dubrovačko-neretvanska County has in a way become separated from the rest of the Croatian territory. The issue of having to cross the territory of Bosnia and Herzegovina has so far been Croatia's problem. But with Croatia's accession to the EU this matter gains wider importance since traffic taking place in Croatia involves also crossing non-EU territory. Therefore, with regard to the road sector and road connectivity it is necessary to consider all possibilities of transport connectivity and put forward a permanent solution in agreement with Bosnia and Herzegovina and the EU. In this respect, certain actions have already been taken i.e. the implementation of the prefeasibility study which has identified the Pelješac Bridge as the best solution in the context of most optimal connectivity of the functional region Southern Dalmatia with the rest of the Croatian territory. Activity that follows is the implementation of the feasibility study, which will re-evaluate in more detail and consider all options for the transport connectivity of this region.

Regarding the roads sector and roads communication it is therefore necessary to consider traffic connection options, carry out additional studies and put forward a permanent solution in agreement with Bosnia and Herzegovina and the EU. Certain actions in this respect have already been taken, so this issue needs to be resolved to the satisfaction of all interested parties.

- Consolidation of the road network of the Dubrovnik region and the remaining part of Croatian territory:
  - Consider connecting options,
  - Consider financing possibilities from existing sources, by borrowing or using means from EU funds,
  - Carry out all preparations for the purpose of making a decision and realization.

Adriatic islands are connected to the mainland or to each other with ferry ports and ferry lines which constitute an indirect part of the road system. Roads on islands are poorly maintained and reconstructed slowly, causing a poor state of the traffic infrastructure

Roads on islands are a very important element of islands and island life as they ensure inhabitation, economic survival and possible progress, playing also a very important role for tourism. In the past, roads were built on larger islands with only some sections of these roads

offering a certain level of service. The upgrade of the islands road network progresses very slowly due to lack of financing, which governs the construction dynamics. Most island roads are of county and local importance. Technical characteristics of roads mostly comply with onsite conditions, following the route of old paths and trails formed in the past. Unresolved transport and technical issues are a great problem. To a certain extent, the situation is better on larger islands with more inhabitants and better working and living conditions. On the other hand, islands focused mostly on tourism experience problems during the peak summer tourist season when tourists arrive to the island in great numbers.

- Roads on islands must be regulated and smooth traffic for all types of road vehicles must be ensured:
    - Create a programme regarding repairs, reconstruction and construction of new roads on islands,
    - Establish priorities in accordance with the economic and tourist needs of certain islands,
    - Coordinate realization and dynamics during the period which doesn't include summer months and the tourist season,
    - Implement regulation of roads on islands and quality connections between settlements and ferry ports in accordance with demanding on-site conditions,
    - Take into account the environmental protection and natural resources protection on islands.

Insufficient mutual connections between county centres, larger cities and the problem of high traffic congestion on state roads in cities

- Ensure quality connections through reconstruction of existing or construction of new roads:
    - Carry out an analysis of the existing layer,
    - Review the possibilities for the improvement of the existing one and its efficiency,
    - Review the existing state road corridors which are located on county plans and lower class plans.
- Reduce traffic in larger city zones:
    - Construction of by-pass roads,
    - Construction of better connections to the existing road network,
    - Move transit traffic outside city centres,

- Limit cargo vehicles' traffic through settled settlements permanently or during specific times of the day.

Poor connections between tourist zones, especially coastal settlements with the state road and motorway network

It is possible to relatively quickly and comfortably arrive to outer areas of tourist towns owing to motorway infrastructure and, in part, state roads, which are maintained as much as possible, i.e. at a sustainable level. Problems arise after switching to local and unclassified roads, which are in technical terms poorly equipped, the signalisation and notification system is insufficient, the roads are damaged, traffic is inadequately organized and in cities on the coast, which are mostly tourism-oriented, there is a chronic lack of parking spaces. These are all elements which must be improved to increase the level of service.

- Ensure fast and safe distribution of traffic, especially in zones with increased tourist traffic:
  - Plan and construct quality junctions of the basic road network with local roads in tourist zones,
  - Ensure adequate traffic signalization and tourist signs needed in tourist areas,
  - Improve the local roads system in tourist zones,
  - Ensure a sufficient number of parking spaces, especially during the tourist season.
- Ensure good connections between state roads and ferry ports, sea ports and airports:
  - Determine critical points and places on which traffic jams and problems occur, between road and sea (ferry line) traffic,
  - Ensure additional parking spaces and waiting zones in ferry ports and harbours,
  - Inform the users better,
  - Improve the payment system.

Shortages on the county network, local and lower class roads are the insufficient connection to the state roads system, unequal traffic and technical parameters for that road profile.

- Establish a county roads and lower class roads system in a satisfactory way, suggesting a quality connection between county centres, connections within counties:
  - Check the status of the existing network of county and local roads,
  - Establish priorities in terms of road's status, traffic capacity and needs,
  - Plan preparation for the realization covering the creation of the necessary documentation and implementation of the administrative procedure,

- Ensure financial means.

Traffic congestion in cities and county centres due to the increasing number of vehicles and outdated traffic infrastructure

In most cases the development of villages and cities wasn't accompanied by development of the road infrastructure. Consequently, there are many major residential areas, suburban parts of towns and new parts of towns without the necessary road infrastructure. Another problem is the traffic in city and village centres the volume of which has increased, but was not accompanied by an upgrade of spatial and infrastructural elements, especially not in city centres, so that traffic very often takes place on old roads. City roads are congested, air quality is poor, and there is a chronic lack of parking spaces in city centres. Construction of public garages has become inevitable, as parking on sidewalks and public areas has become part of the "usual" driving behaviour in cities. Turning these spaces into paid parking spaces has also become common practice, taking up pedestrian space.

- Ensure quality traffic flow in cities, county centres and larger settlements:
  - Repair the existing traffic system in settlements, reconstruction of existing roads,
  - Construction of by-pass roads for the purpose of decreasing the city centres' traffic congestion,
  - Increase the number of parking spaces by building parking garages or rearrange open parking areas.

A problem with connecting the existing and planned business zones, terminals, port terminals etc. to the traffic system

Business zones, terminals and port terminals are defined in enforceable spatial plans which should take into account all spatial elements and, in this case, establishment of traffic communications. Often investment into construction of a certain zone or terminal does not include the construction of roads necessary for operability of the zone, so new solutions must be sought. Also a problem is that corridors planned for cargo traffic i.e. roads foreseen in the spatial plan, are made before exact preliminary design, and in some cases these planned corridors must be changed. In these cases new solutions must be sought, which slows down investments and leads to time being lost due to longer administrative procedure and obtaining of permits. In order to prevent such scenarios, investments should be taken into account and necessary studies and solutions developed parallel to the drafting of the spatial plans. This would ensure implementation of investment projects without additional costs.

- Ensure good connections of business and industrial zones, terminals and port terminals located in the outskirts of cities and larger settlements to the system of county, state and international road routes:
  - Construct connecting roads,
  - Connect the Rijeka port terminal to the A7 by constructing a new state road D403,
  - Rearrange crossroads and junctions between business zones and local, county or state roads,
  - Provide access roads to business zones with traffic and technical elements which satisfy cargo vehicles traffic demands,
  - Provide users at the entrance into business zones and terminals with the information related to the access and manner of communication within the zone.

Uneven capacity of the road network (motorways, state roads, county roads) and the seasonal nature of the traffic load.

Possibilities to increase and harmonize transport services:

- Increase traffic on motorways during the whole year, not just during the tourist season (reduce the seasonality):
  - Better and higher quality tourist promotion of the Republic of Croatia,
  - Boost and develop economy on the territory of the entire Republic of Croatia,
  - Establish continuous transit flows from EU countries and other countries in the region through motorways in the Republic of Croatia.
- Ensure capacities on roads in tourist regions, especially during the tourist season:
  - Improve conditions on lower class roads at access points and in tourist settlements,
  - Take constant care of the road's condition, equipment and signalization in order to reduce possible traffic congestion due to certain shortages,
  - Mandatory regulation of traffic, with the help of the traffic police, during the summer and especially over the weekends during the tourist rotation.
- Integrate all traffic flows, meaning connecting with other forms of transport; railway, sea and air transport, combined for the purpose of increasing capacities and faster flow of people, goods and services:
  - Create an economic concept based on possibilities of the overall traffic system with the use of the road infrastructure as the basic system connection,

- Gather and provide information on possibilities, length of the trip, transport time schedules, possible places of transhipment of certain goods to final destinations which might be within or outside the Republic of Croatia.

2.1.5. Road safety

The basis of each infrastructural traffic system is safety and the possibility of applying safety measures during its use and its implementation in the given time and space.

Ever since Croatia gained independence, tests have been performed and data collected on the territory of the Republic of Croatia for the purpose of decreasing the negative road safety indicators. After a number of individual activities of entities competent for road safety and achievement of certain short-term results, it has been concluded that without a systematic and continued implementation of measures, no long-term goals can be achieved. To that end, as early as 1994, the National Road Safety Programme was adopted which immediately started yielding positive results. Therefore, three more Programmes were subsequently adopted which reviewed the achieved objectives of the previous Programme, but were improved compared to the previous periods.

The basic valid document, which defines the elements important for road safety, is the **National Road Safety Programme of the Republic of Croatia 2011-2020,** (OG no. 59/11).

This document summarizes the effects that the implementation of the national programme has shown so far and defines the inputs for the realization of safety elements, approach and monitoring of activities regarding implementation of European and global trends into the national programme.

The European Road Safety Action Programme 2011-2020, adopted by the European Commission, is the framework for EU countries' national strategies as well as for the strategy of the Republic of Croatia. Croatia is obligated to harmonize and incorporate the guidelines and elements of the Action Programme into its national programme. The activities under this Programme apply to the period until 2020, that is, "the Decade of Action for Road Safety" with the implementation of the programme with two-year interim periods, after which an analysis of the completed activities and an evaluation of the impacts is to be carried out. The evaluation of the impacts will serve as a basis for any corrections of the objectives, activities, holders, co-holders or deadlines for the realization of the objectives for the next reporting period.

The objectives of road safety programmes implementation

Realization of the set objectives regarding the implementation of a particular programme will, in the end, define its successfulness and provide the basic guidelines for defining the next steps to be taken for the purpose of improving the system.

Satisfactory performance, especially when it comes to the road safety system, can yield positive results in the sense of improvement of statistical data, but, in any case, there are always solutions, which can improve the system and yield better results in each subsequent step. It is ultimately almost impossible to set up a perfect system because there will always be tragic accidents. However, it is likely that with each new step in the realization of the programme, some of the elements can be improved.

The main goal is to drastically decrease the rate of fatal accidents and severe traffic-related injuries, decrease the high costs of traffic accidents, and improve health and the quality of life, as well as to achieve safe and sustainable mobility.

For that purpose, it is necessary to:

- Implement the recommendations from the action programme report on the prevention of injuries in road traffic,
- Strengthen the role of the competent institutions of the Republic of Croatia in the domain of road safety,
- Set the ultimate goal of decreasing the number of accidents at national level,
- Create specific solutions within the safety programme for the purpose of protecting all traffic participants, especially “vulnerable groups” such as pedestrians, cyclists, motorcyclists and the users of public transport, children, the elderly and disabled persons,
- Harmonize the regulations related to road safety,
- Systematically improve all legislation elements,
- Improve the roads' level of service and enhance the work on road safety standards,
- Regularly maintain all segments of the road system,
- Improve the methods and manner of collecting data so as to make them comparable at the international level,
- Strengthen the medical care for persons injured in traffic accidents, that is, provide care on the location of the accident, as well as transport, admittance into the hospital and treatment.

According to the objectives of the Action Programme accepted at EU level, it is planned to decrease the number of fatalities in road accidents by 50%. The Republic of Croatia, as a member of the European Union, is obligated to harmonize the common objectives.

The standard to be accepted, promoted and supported is the awareness - raising regarding the equality of all traffic participants which can be achieved through activities focused on the improvement of safety of the most vulnerable traffic participants. A comprehensive approach to road safety in the future traffic safety policy also needs be considered by other policy areas, which should at the same time incorporate these same objectives. Road safety is closely linked to the policy of energy, environment, employment, education, youth, public health, the judiciary and insurance.

Areas of activity for which measures are to be set up

The measures which are to be implemented in order for the objectives to be achieved can be divided in five areas of activity:

1. **Changing the behaviour of the traffic participants**

- Driving speed,
- Driving under the influence of alcohol, drugs or medications,
- Safety belt and safety helmet,
- Education in the domain of road safety,
- Training candidates for the driver's license and driver's license exams,
- The most vulnerable traffic participants,
- Driving at an insufficient distance,
- Aggressive driving,
- Driver tiredness and distractions while driving.

2. **Better road infrastructure**

- Detecting and repairing dangerous spots,
- Improving safety on urban roads,
- Driving in the opposite (prohibited) direction on the motorway,
- Road safety in tunnels.

3. **Safe driving**

- Active and passive vehicle safety,
- Vehicles for the transportation of children,
- Cargo vehicles and buses,

- Proper technical condition of vehicles.

4. Efficient medical care after traffic accidents

- Emergency medical services,
    - The number of subsequent fatal results could be reduced by as much as 20% (launching helicopter transportation of injured persons, that is, the Helicopter Emergency Medical Service - HEMS).
- Care for the injured in health care institutions,
- Educating citizens about providing first aid.

5. Other areas of activity

- Citizens' associations and the public,
- Legislation,
- Establishment of new entities,
- Research as a tool for road safety,
- Media as a tool for road safety.

6. Measures-road transport and road inspection

1. Based on the planning documents of the EC (period 2011-2020) in the field of road safety, it is necessary to increase the intensity of road transport and road inspections.

Concrete measures:

- Strengthening administrative capacity and number of mobile teams performing the road transport and road inspection.

Conditions for the implementation of activities:

- Adequate equipment for Road Transport and Road Inspectors and the police,
- A continuous activity plan.

2. According to the European Commission Plan and the Plan of the Council on the establishment of cross-border exchange of information in the field of road safety and the creation of a common strategy for road safety; which is also defined in Regulations and EU Directives, it´s necessary to develop and maintain a database.

Concrete measures:

- Adequate IT equipment and applications to create a database defined in Regulation, and EU Directives.

Conditions for the implementation of activities:

- Equipping inspectors and police officers with adequate equipment in order to have direct communication from the field to a database

- further procurement of IT equipment in order to complete the implementation of EU system EUCARIS (MMATI and the Ministry of Interior) to commitments
- A continuous activity plan

Basic objectives and measures to be implemented in terms of road traffic safety in the Republic of Croatia can be summarized as follows:

Traffic safety - problems related to the status of the road infrastructure and the behaviour of traffic participants

- Maintenance of the existing road system and construction of new roads in accordance with objectives of the road safety programme implementation:
  - Implementation of the "Action programme for road traffic safety for the period from 2011 – 2020",
  - Alignment and incorporation of guidelines and elements of the Action plan into the national programme,
  - Implementation of the programme with two-year interim periods after which analysis of implemented activities is performed as well as assessment of effects,
  - Correction of objectives, activities, deadlines for the implementation of objectives for the following reporting period,
  - Systematic improvement of all legislation related elements,
  - Increase the level of road serviceability and improve work on road safety standards,
  - Regular maintenance of all road system segments,
  - Improve methods and ways of gathering information so that it is comparable on an international level.
- Improve the safety system on roads in terms of receiving positive results, all in accordance with statistical indicators:
  - Enforce recommendations from the Action programme's report,
  - Strengthen the role of competent institutions of the Republic of Croatia in the field of road area safety,
  - Creation of special solutions within the safety programme for the purpose of protecting all traffic participants, especially the "vulnerable groups" which include pedestrians, cyclists, motorcyclists, public transportation users, children, elderly persons, disabled persons,
  - Aligning regulations regarding traffic safety on roads.

- Reduce the number of casualties in traffic accidents by 50%:
  - Respect the allowed speed limit regarding vehicle movement in optimal traffic conditions in case of 90% of drivers, and other drivers must not exceed the stated limitations by more than 15 %;
  - Degree of scatter of all vehicle movement speed levels in traffic by a maximum of 10%,
  - Degree of using the safety belt (drivers and passengers in the vehicle) around 98%,
  - Degree of using the safety helmet (moped and motorcycle drivers and passengers on those vehicles) 100%,
  - A decrease of proportion of drivers under the influence of alcohol who caused a traffic accident from the current 13.5% to 8% and a decrease of the number of persons who died in those accidents from 30% to 15%,
  - A decrease of the number of person who died during transportation to a hospital or who died within 30 days from being injured in a traffic accident by 30 %.
- Education in the field of road traffic safety:
  - Driving candidates training and driver's exams,
  - Raise the awareness and responsibility of traffic participants by changing the behaviour while driving under the influence of alcohol, drugs or medications, movement speed, aggressive driving, driver's tiredness and driving at an insufficient distance,
  - Include science into traffic safety,
  - Include the media into traffic safety.
- Improve road infrastructure
  - Monitor the status and implementing the road repair programme,
  - Regular maintenance of the complete road system,
  - Increase traffic safety on city roads,
  - Traffic safety in tunnels,
  - Prevent driving in the opposite (forbidden) direction on the motorway.
- Detection and repair of dangerous spots, “black spot roads”
  - Implement the “Dangerous spots repair programme” according to the marked locations which need to be repaired:
    - 46 locations which are partially repaired,

- 67 locations to be fully repaired.

- Increase efficiency of medical care after traffic accidents:
  - Constant education of staff employed in the emergency medical aid,
  - Increase the number of emergency medical aid vehicles,
  - Equip the emergency medical aid vehicles with all the necessary medical equipment,
  - Improve the system of medical care of persons injured during hospital admission and treatment,
  - Educate citizens for giving first aid.
- Maintain existing vehicles and reduce the average age of the vehicle:
  - Implement frequent technical vehicle accuracy tests especially in the segment of children transport, in case of cargo vehicles and buses,
  - Improve the vehicle safety systems, brake system control in case of cargo vehicles at certain spots (after longer demanding sections, before entering a settlement etc.),
  - Improve the ways of financing the purchase of new vehicles by reducing excise duty, toll and other duties for the purpose of decreasing the average age of vehicles in the Republic of Croatia.

2.1.6. Environmental protection

Apart from industrial pollution, traffic greatly contributes to overall pollution in terms of air pollution, noise and light pollution. Great improvements have been made by introducing unleaded fuel, but there are still a great number of vehicles using other types of fuel, causing increased CO_2 concentrations and emissions.

Improvements in terms of environmental protection are significant; however, old road infrastructure and the age of vehicles greatly contribute to pollution present especially on high volume roads near city centres, or roads used by cargo vehicles. Motorways in Croatia have been constructed in line with high environmental protection standards. While this category of the road infrastructure meets environmental protection standards, under the condition it is being maintained and monitored, other public roads require further investment in this respect. Negative environmental impacts cannot of course be eliminated, but reducing those impacts as much as possible must be a priority.

Impacts of transport on the environment, pollution, harmful gases, noise impact

- Preservation of the environment and natural values:
  - Reducing emissions from fuel combustion,
  - Checking of protective measures during planning, construction and operation of roads,
  - Horticultural Planning at the perimeter roads,
  - Reducing the noise impact.

2.2. List of hypothesis

Below is presented the list of hypothesis already defined as part of the methodological procedure employed in the Croatian Transport Development Strategy definition, because of the existing lack of accurate data and/or information. In order to proceed with the objectives definition these establish concepts of reflection and analysis.

CONCEPT	HYPOTHESIS
1. Croatia in the EU	1. By accessing the EU, the circumstances for road traffic development in Croatia have changed significantly.
	2. New geopolitical position of the Republic of Croatia - border country of the EU
2. Human resources	3. Lack of potential in human resources
3. International corridors and the motorway network (TEN-T network and Pan-European)	4. Good motorway construction in the Republic of Croatia of approximately 90%.
	5. Not all possibilities of connecting the motorways and the surrounding area have been used, with the purpose of development of these areas.
	6. A problem of expensive maintenance arises after motorways have been constructed.
	7. Motorway network interoperability
4. Insufficiencies of the public roads network	8. The state road network is incomplete.
	9. Isolation of a part of the Dubrovačko-neretvanska County due to physical separation from the remaining part of the Croatian territory and the necessity to pass through Bosnia and Herzegovina which is not a member of the EU.
	10. Adriatic islands are connected to the mainland or to each other with ferry ports and ferry lines which constitute an indirect part of the road system. Roads on islands are poorly maintained and reconstructed slowly, causing a poor state of the traffic infrastructure.

CONCEPT	HYPOTHESIS
	11. Insufficient mutual connections between county centres, larger cities and the problem of high traffic congestion on state roads in cities
	12. Poor connections between tourist zones, especially coastal settlements with the state road and motorway network
	13. Shortages on the network of county, local and lower class roads are the insufficient connection to the state roads system, unequal traffic and technical parameters for that road profile.
	14. Traffic congestion in cities and county centres due to the increasing number of vehicles and outdated traffic infrastructure
	15. A problem with connecting the existing and planned business zones, terminals, port terminals etc. to the traffic system
	16. A problem of road levels (motorways, state roads, county roads) and their possibilities being aligned with existing load capacities.
5. Safety	17. Traffic safety - problems related to the status of the road infrastructure and the behaviour of traffic participants.
6. Environment	18. Impacts of transport on the environment, pollution, harmful gases, noise impact.

5 Table List of hypothesis Road sector

2.3. SWOT Road sector

STRENGTHS	WEAKNESSES
• Good geostrategic position, Central Europe, Mediterranean region • Border country of the European Union • Extensive network of constructed motorways on the routes of international road corridors (TEN-T network and Pan-European) • Good motorway connections between regions and major cities in Croatia • Extensive network of constructed motorways as part of routes of international transport corridors • Good motorway connections to major seaports • Very good roads conditions in terms of environment protection • Dominance of the road system in relation to other forms of transportation • Safety of high-level service roads • Established legislation • Tourist destination with traditional Mediterranean characteristics	• Poor road connections with the Dubrovnik area because it is necessary to cross the territory of Bosnia and Herzegovina • Insufficient links between motorways and lower category roads • Problems with maintenance of the road system, lack of funding • Incomplete network of state roads • Insufficient connections with the wider Zagreb area • Lack of city bypass roads • Inadequate and outdated traffic signs on state roads as well as on lower-class roads, county and local roads • On some parts of the road network, technical elements do not meet traffic safety requirements • Dynamics of road maintenance depend on financial possibilities • Dangerous places – "black spots" on roads • No pool of data for the purpose of analysis of existing conditions for county and local roads • Poor organisation of transport services in ferry terminals • Poor connections to other elements of the transport

	infrastructure, railways, maritime transport • Average age of vehicle fleet • Poor road connectivity of island and the mainland • Poor road connections in areas of high tourism activity • Poor road infrastructure on islands
OPPORTUNITIES	**THREATS**
• Legislative changes according to EU best practices. Preparation of development strategy documents in the interest of the Republic of Croatia taking into account the interests of neighbouring countries and the EU • Construction of planned motorway routes and quality connections to the international transport corridors (TEN-T network and Pan-European) • Equipping the border crossings with Bosnia and Herzegovina, Serbia and Montenegro • Change the purpose of existing border crossing facilities • Strengthening of human resources due to higher level of involvement in EU programs • Improving training of employees in the road sector • Better links with countries within the European area and increasing of transit traffic • Development of business zones near motorway corridors • Creation of new spatial planning possibilities • Removal of administrative barriers in order to introduce modern technologies in road construction • Increasing road safety • Ongoing education of traffic participants • Investment in the maintenance and development of road infrastructure along with identification and removal of black spots • Renewal of road vehicles • Active involvement of research in solving problems	• Insufficient investment in existing road infrastructure • Insufficient investment in vehicles and in reducing the average age of vehicles • Lack of investment in the development of new road safety systems • Inadequate maintenance of the road system due to unclear responsibilities regarding different road categories • Problems regarding spatial plans and discrepancy in terms of road infrastructure needs

6 Table SWOT Road sector

3. AVIATION SECTOR

3.1. Analysis

3.1.1. Overview

The existing network of air routes is based on the optimal usage of available airspace, recognizing operational capacities of sectors, availability of technical equipment and qualified personnel, for the purpose of obtaining maximum safety and optimal efficiency of air transport and keeping in mind economic interests and requirements of and needs of all airspace users – domestic and foreign, civilian and military, commercial and non-commercial.

The air traffic control system is successfully performing all of its duties in respect of requirements and needs for aircrafts with origin or destination to Croatia, as well as for the aircraft flying over Croatia. Having in mind the responsibilities of Croatia Control for the provision of air navigation services this relates, in a major part, to the Bosnia and Herzegovina airspace as well.

Future local network of air routes would not change substantially, particularly in respect of domestic needs, however the air routes network could be modified as being required by capacity factors or others. As regards to international needs, the air traffic control system has been following and applying all the latest in technology, agreed upon and adopted on the international level, and in coordination with neighbouring air navigation service providers and all stakeholders (users, Network manager, partner ANSP`s, military etc.), continuously working on improvements to the network in order to achieve an optimized and efficient air traffic management system.

Central Croatia can be reached by Zagreb International Airport. The other regions of Croatia have international airports also located in Pula, Rijeka, Split, Dubrovnik, Osijek and Zadar. These airports serve regular international and domestic air transport (network, charter and low cost carriers) and also charter services especially during the tourist season (summer, a bit of spring and autumn). There are regular services towards the larger neighbouring airports and international hubs like Paris, Frankfurt, Vienna, Munich and London.

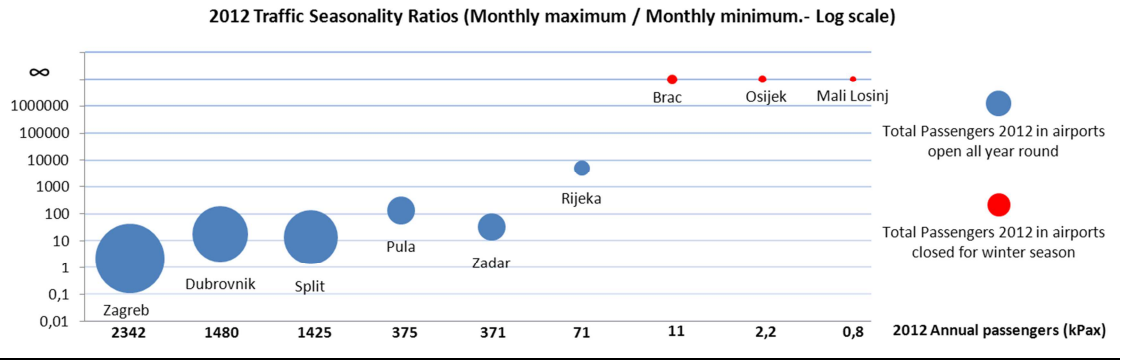
3.1.2. Capacity and demand

According to inputs and information gathered from main sector stakeholders:

- "[…] it has been found that the capacities and capabilities of the same is the greatest obstacle to a successful response to the current trend of increasing traffic demand to and from Croatia, and certainly across the sky in Croatia".
- "[…] risk that insufficient development of tourism and the failure to extend the tourist season become limiting factors preventing the seasonality in air transport."
- "Insufficient capacity in the aviation sector is the main limiting factor for the further development of Croatian aviation: here, in most cases refers to infrastructure limitations, but this objection to a lesser extent applies to human resources".

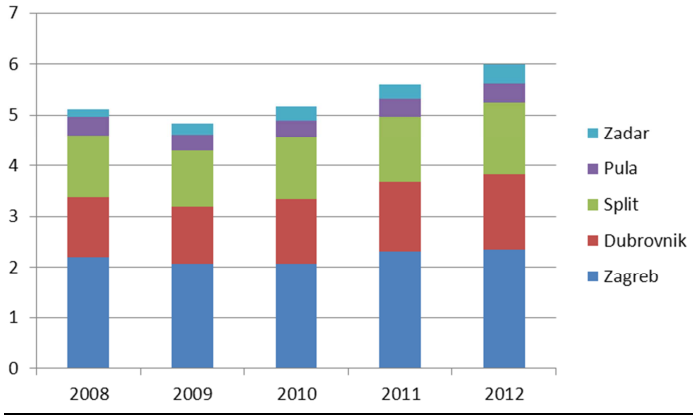
ANALYSIS

From existing documentation about Airports (mainly Master Plans and traffic figures) the demand behaviour is clearly seasonal, provoking bottlenecks in both terminals and aprons, as at present the infrastructure lacks the required capacity. The main reason for this is due to the most important driver: the tourism industry. In terms of traffic, for example even at Zagreb, with its proportion of business trips, the summer figures of passengers double the winter ones.

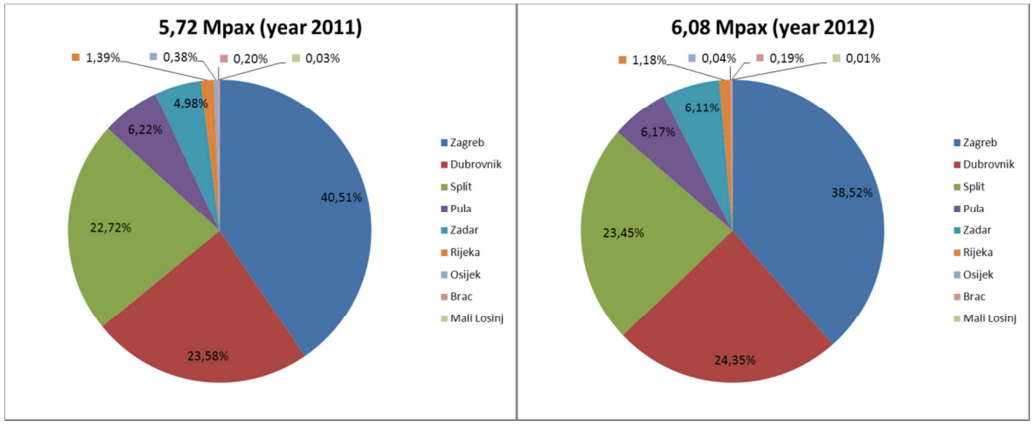


11 Figure Seasonal behaviour of airports, Source: Official Airport website /Croatian Bureau of Statistics website

On the other hand there is a general trend of increasing the passengers demand in the country even in the years of the crisis, as shown in the next figure:



12 Figure Increase of traffic from 2008 to 2012 for airports with less seasonality, Source: Airport data



13 Figure Traffic change from 2011 to 2012, Source: CBS website

Regarding the Air Navigation System there were some bottlenecks until 2011, but at present days the situation has changed for better with the implementation of operational and infrastructure measures.

Regarding the lack of capacity, but focusing on other modes of transport, airports may give an extra connection capability, when roads, railroads or waterways fail to tackle the required capacity. A clear example is the surrounding area of Dubrovnik, suffering from bottlenecks in roads and waterways, which can be mitigated by an extra airport capacity for processing both passenger and cargo.

CONCLUSIONS

1. The subsector existing lack of capacity (operational and infrastructure) provokes a number of bottlenecks in the summer season, with a result of restrictions on affluence and degradation of quality service.
2. Solid Tourism Industry is the main driver for demand.

3.1.3. Croatian membership in the European Union

According to inputs and information gathered from main sector stakeholders:

- "Participation in the single European market will certainly cause some adjustments or even change the business model of the airline industry in Croatia. Additional features in the single market mean increased competition in the domestic market, but the end result will certainly be an increase in the intensity of the traffic demand in the Republic of Croatia, and in this sense it is necessary to take all possible measures to additional traffic demand largely satisfied factors Croatian aviation system".
- "Aviation authorities system is well prepared for the challenges posed by EU membership. Establishment of special authorities and the division of responsibilities thereto made in accordance with European practice and standards. A high level of competence and expertise in aviation authorities system confirmed the number of assessment visits carried out by the experts of ICAO, the European Commission, EASA and EUROCONTROL".
- "Switching to a single European transport market opportunity for further development of the internal traffic regardless of national capacities on the other hand also provides easier access to the rest of the European market for the aerospace industry in Croatia."
- "[…] EU membership brings with it many new administrative duties. There is a need to address these new obligations in the right time and performance avoiding any gap with administrative requirements.

ANALYSIS

Definitely the integration of Croatia in the European Union is a major breakthrough, which obviously changes the socioeconomic structure of the Country.

Competition structure was completely changed by intense arrival of LCCs to the Croatian air traffic market from 2006.

In terms of competition, it is expected for local airlines to keep the local market and the routes that are feeder of major hubs (especially Croatia Airlines with Frankfurt, Munich and Vienna), if the strategy of Star Alliance keeps the same behaviour. The figures of Zagreb International Airport reflect a steady market share of 65% among the scheduled flights for CTN during the last five years. It seems that the entry of new LCC might reduce at some point the yield for local airlines when competing for the same route through the hubs; i.e. direct flights to London with LCC's vs. one scale flight trough Munich or Frankfurt. This may provoke worse conditions for local airlines economic sustainability, being one of the reasons for Croatia Airlines present restructuring process.

On the Croatian international air transport market foreign nationals generate traffic with respect to the share of Croatian citizens which is only 16% (2012).

During the summer season over 90 airlines operate on the Croatian market and more than half of all passengers are transported in the Q3, while in winter the competition presence is minimal.

Other side effect of competition is that the performance of the whole system is going to be checked by the market, including some issues detected in former reports:

- Regulations should enhance the capabilities of the Croatian Aviation Subsector,
- The insufficient preparation of all structures for the new market might derive in losses of competitiveness, mainly due to deficient or nonexistent risk awareness analysis.

On the other hand, the opening of the new market gives an opportunity for development of new routes, mainly because LCC's with point to point destinations from mayor cities of the rest of Europe; thus lowering the average ticket price, with the effect of increasing the demand. For example in Spain, during the period from 2000 to 2012 despite the crisis, the number of passengers rose from 141 million to 194 (38%) while the local airlines kept their market around 65 – 70 million passengers, falling from a market share of 50% to the present 33%. In Croatia, during the period from 2003 to 2012, the number of passengers rose from 2.46 million to 5.52 (124%) despite the crisis. Croatia Airlines rose from 1.47 million to 1.95 (33%) passengers, falling from a market share of 60% to the 35% in that period.

In parallel to the development of regular and charter aviation, an increase of general aviation operations is expected due to the simplifications of procedures in the cross – border flights due to the expected integration into the Schengen system.

Regarding the industry, there is another side effect from the EU membership: the new opportunities for aviation sector in Croatia due to two main factors:

- Possibility of foreign new investment in Croatian aviation,
- Opening of a new market of customers, from an enhanced competitive position.

CONCLUSIONS

1. The Croatian membership in the European Union adds to the high level of competition in the market of international routes, while the local routes are less affected.
2. Using the leverage of the Croatian membership in the European Union, an increase of demand is expected in the next ten years, because of the development of new routes due to LCC's.

3. Sufficient preparation and planning needed to assess the risks of the entry in the new market.
4. An increment of general aviation operations is expected in the following years.
5. Aviation authorities system is well prepared for the challenges posed by EU membership. Establishment of special authorities and the division of responsibilities had been completed in accordance with European practice and standards, and with close cooperation with the European Commission.
6. A breach with new administrative EU duties might generate legal actions against Croatia.
7. A new scenario with opportunities for the Croatian aviation sector, due to the new open market.
8. Enhanced cooperation with neighbouring and other countries in terms of the provision of certain services, such as production or exchange of documentation, exchange or secondment of expert supervision and training.

3.1.4. Sustainability

According to inputs and information gathered from main sector stakeholders:

- "Insufficient capacity in the aviation sector is the main limiting factor for the further development of the Croatian aviation: […] bottlenecks in the acceptance of passengers and cargo, lack of investment in maintenance and obsolete equipment".
- "The further development of EU and national legislative framework and technological projection and specifications may be a limiting component of socially sensitive development which will certainly affect the rate of growth and technological development of air transport and the ultimate achieved the same level".

ANALYSIS

The sustainability of the subsector is absolutely imperative, in the three different aspects: environment, economics and social.

Regarding the economic point of view, from the inception of every part of the subsector (i.e. NAV aids, airports) to its final implementation, the maintenance of infrastructure and operative costs must be economically sustainable. So, both the specific designs of infrastructure and the future maintenance policy strategies have to be considered as a whole, taking into consideration the operational costs derived from the design choices.

CONCLUSIONS

1. Part of the capacity problem comes from the deficient renovation of equipment and lack of maintenance.
2. The development of the subsector has the risk of leaving behind the social component of sustainability.
3. Government policy: establish a sustainable aviation system in the Republic of Croatia, based on the appropriate traffic demand forecasts.
4. Ensure adequate connection between all Croatian regions in accordance with relevant EU legislation (PSO).

3.1.5. Quality of Service

According to inputs and information gathered from main sector stakeholders:

- "Insufficient capacity in the aviation sector is the main limiting factor for the further development of the Croatian aviation: […] decline on the level of service to end users provokes decline of trust beneficiaries, and thus in the future choice of alternative transport options or business partners".

ANALYSIS

The quality of service affects to both of the airport's clients: passengers and airlines.

In theory for the passenger the airport is almost a natural monopoly, considering the catchment areas of each airport, but this consideration is challenged by the surrounding airports and combination of modes of transportation. In fact, the performance of competitor modes and neighbouring airports would make a shift in the demand, provoking a different election of the way to arrive to destination. One of the key factors in performance is the quality of service, so it has to be enhanced in order to compete, but of course with a sustainable policy.

Regarding the **airlines**, apart from the concepts about quality shared with passengers (i.e. good looking terminal, enough area for boarding, check-in, etc.), there is another critical one: the **operational costs** at every airport, which should be at least similar to the neighbouring ones.

CONCLUSIONS

1. Low quality service might lower the passenger experience and increase the cost for airlines, provoking a shift to use competitor airports or other modes of transportation.

3.1.6. Alignment with EU policies and legislation

The integration of Croatia entails the country to a series of commitments with EU rules and policies. Some of them are very specific about transportation and the aviation subsector. Here are shown some assumptions that will lead to objectives:

1. Enhancement of safety for civil aviation,
2. Environmental sustainability, with particular attention to noise and its treatment and reduction of CO2 emissions,
3. Security Framework,
4. TEN-T and connections for isolated regions,
5. Single European Sky initiative (SES I and II legislative packages) and SESAR.

3.1.7. Scenario: Integration in the Schengen Treaty

The integration with the Schengen Treaty will transform Croatia's borders in the new boundaries of most of the EU. Apart from the changes in the border controls, which will simplify the Schengen passenger flows but make the terminal design more complicated, there is one main geostrategic issue: the surrounding region of Dubrovnik might be more isolated due to restrictions in road communications with the rest of the country. In case this event happens, the air traffic might grow (both passengers and cargo), as used as a substitute for the road transport.

For further planning at Dubrovnik, this scenario must be considered even as it seems low probable, because the implications in terms of quality service and national strategy would be dramatic.

3.2. List of hypothesis

Below is presented the list of hypothesis already defined as part of the methodological procedure employed in the Croatian Transport Development Strategy definition, because of the existing lack of accurate data and/or information. In order to proceed with the objectives definition these establish concepts of reflection and analysis.

	HYPOTHESIS
1.	It has been found that the capacities and capabilities of the same is the greatest obstacle to a successful response to the current trend of increasing traffic demand to and from Croatia, and certainly across the sky in Croatia.
2.	Croatian membership in the European Union: increased competition in the domestic market for local airlines. During the summer season currently over 90 airlines operate on the Croatian market.
3.	Croatian membership in the European Union: increased traffic demand in the Republic of Croatia.
4.	Croatian membership in the European Union: increased traffic demand in the Republic of Croatia Insufficient preparation of the impending risk of the circumstances that must be kept to a minimum. The reduction of business risk, in addition to regulators, a key role is played by factors of air traffic, which their business policies must adapt to new market conditions."
5.	Croatian membership in the European Union and Schengen Treaty: great opportunity to step up in the general aviation because of simplification of procedures of cross-border flights within the EU.
6.	Aviation authorities system is well prepared for the challenges posed by EU membership. Establishment of special authorities and the division of responsibilities thereto made in accordance with European practice and standards.
7.	[…] EU membership brings with it many new administrative duties range. There is a need to address these new obligations in the right time and performance, avoiding any gap with administrative requirements
8.	Switching to a single European transport market is an opportunity for further development of the internal traffic regardless of national capacities. On the other hand it also provides easier access to the rest of the European market for the aerospace industry in Croatia.
9.	Enhanced cooperation with neighbouring and other countries in terms of the provision of certain services, such as making or exchange of documentation, exchange or giving expert supervision and training.
10.	Insufficient capacity in the aviation sector is the main limiting factor for the further development of the Croatian aviation (human resources)
11.	Insufficient capacity in the aviation sector is the main limiting factor for the further development of the Croatian aviation: […] bottlenecks in the acceptance of passengers and cargo, lack of investment in maintenance and obsolete equipment.
12.	The further development of EU and national legislative framework and technological projection and specifications may be a limiting component of socially sensitive development which will certainly affect the rate of growth and technological development of air transport and the ultimate achieved the same level.
13.	Insufficient capacity in the aviation sector is the main limiting factor for the further development of the Croatian aviation: decline on the level of service to end users provokes decline of trust beneficiaries, and thus in the future choice of alternative transport options or business partners
14.	Full membership in the EU is increasing efficiency of these options and therefore the risks for the entire aviation system the Croatia.
15.	Risk that insufficient development of tourism and the failure to extend the tourist season become limiting factors preventing the seasonality in air transport.
16.	EU Policy and Rules.
17.	Integration of Croatia in the Schengen Area.

7 Table List of hypothesis Aviation sector

3.3. SWOT Aviation sector

STRENGTHS	WEAKNESSES
• Solid Tourism Industry is the main driver for demand • Aviation authorities system is well prepared for the challenges posed by EU membership. Establishment of special authorities and the division of responsibilities thereto made in accordance with European practice and standards • Government policy: establish a sustainable aviation system in the Republic of Croatia	• The subsector existing lack of capacity (operational and infrastructure) provokes a number of bottlenecks in the summer season, with a result of restrictions on affluence and degradation of quality service • Insufficient preparation and planning needed to assess the risks of the entry in the new market • Part of the capacity problem comes from the deficient renovation of equipment and lack of maintenance
OPPORTUNITIES	**THREATS**
• Using the leverage of the Croatian membership in the European Union, in the next ten years an increase on the demand is expected, because of the development of new routes due to LCC's • Increase of activity in general aviation • New opportunities for the Croatian aviation sector, due to the new open market • Enhanced cooperation with neighbouring and other countries in terms of the provision of certain services, such as making or exchange of documentation, exchange or giving expert supervision and training	• Low quality service might lower the passenger experience and increase the cost for airlines, provoking a shift to use competitor airports or other modes of transportation • The Croatian membership in the European Union gives high level of competition in the market of international routes, while the local ones are less affected • A breach with new administrative EU duties might generate legal actions against Croatia • The development of the subsector has the risk of leaving behind the social component of sustainability

8 Table SWOT Aviation sector

4. INLAND WATERWAYS SECTOR

4.1. Analysis

4.1.1. Inland waterways network

The total length of current inland waterways in Croatia is 1016.8 kilometres, of which 601.2 kilometres is included in the European inland waterways network of international importance.

According to the AGN *(European Agreement on main inland waterways of international importance)* agreement, the following inland waterways are included in the European inland waterways network:

Waterway mark.	Waterway - route	Requested class according to AGN	Length km
E 80	Danube from Batina to Ilok	VI c	137.5
E 80-08	Drava to Osijek	IV	22.0
E 80-10	Future multi-functional Danube-Sava canal from Vukovar to Šamac	V b	61.5
E 80-12	Sava from Račinovci to Sisak	IV	380.2
Total length international waterway acc. AGN:			**601.2**

9 Table European inland waterways network[2]

The most significant inland waterways in Croatia are the Danube and the Sava rivers. The Danube is part of Rhine-Danube Corridor (TEN-T network): Wels/Linz – Wien – Bratislava – Budapest – Vukovar. The Rhine-Danube Corridor covers rail, road, airports, ports, RRT's and the inland waterways system of Main, Main-Danube Canal, the entire Danube downstream of Kelheim and the Sava river. Ports of Vukovar on Danube and Slavonski Brod on river Sava are TEN-T core ports. Inland waterways ports Sisak on river Sava and Osijek port on the river Drava are TEN-T comprehensive ports.

The main inland waterways are not connected at Croatian territory. The River Sava and Danube join in Belgrade (Serbia). In Croatia there are two separated sub-systems with their specific characteristics:

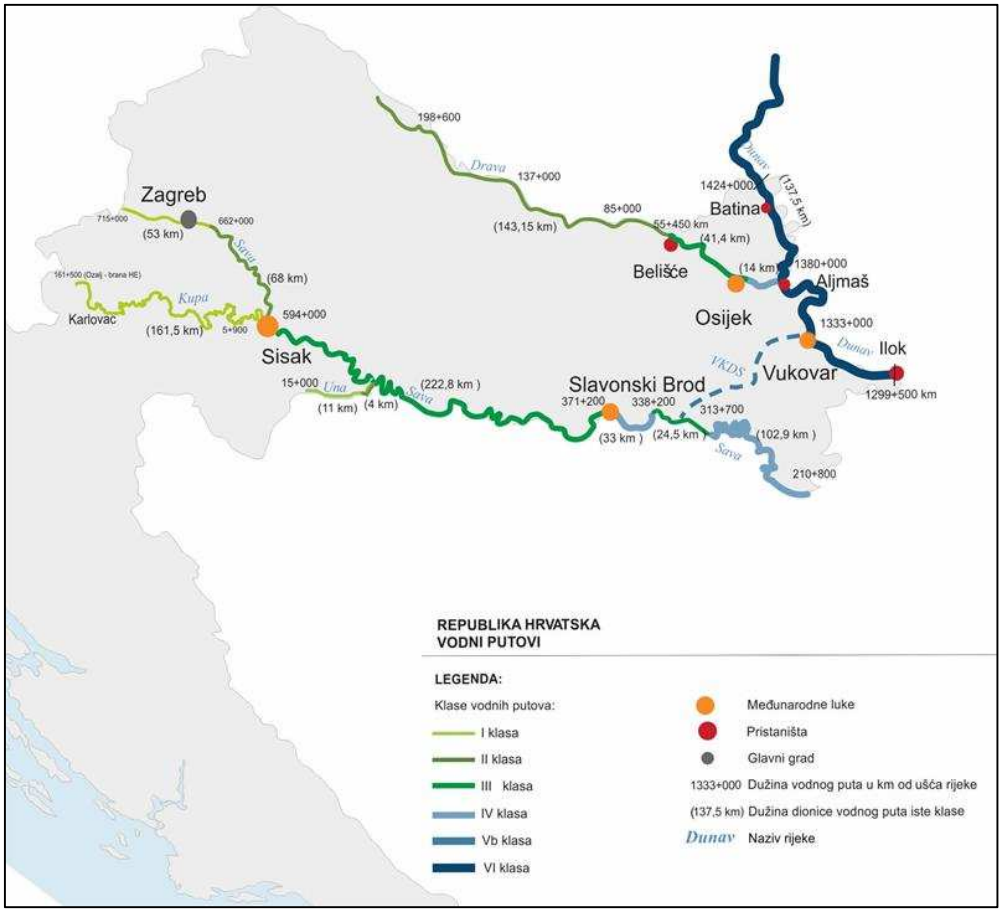
- The Danube basin subsystem which encompasses the Danube's waterway as well as Drava's waterway connected with the European inland waterways network and the

[2] Drava is category IV up to rkm 14. Up to the city of Osijek, it is category III

- The Sava basin subsystem which encompasses the waterways of the Sava, Kupa, and Una, which are not connected with the European inland waterways network through the territory of the Republic of Croatia.

The existing international inland waterways on the Danube, Drava to Osijek, and Sava downstream of Slavonski Šamac meet the requirements of the classes determined by the AGN, while the parameters of the upper part of the waterway on the Sava do not meet the standards of the classes determined by the AGN agreement. The other inland waterways in the Republic of Croatia are classified as the state/local or interstate inland waterways, not having the minimal class for inland waterway of international importance according to the AGN agreement classification of international inland waterways network.

The river Sava on its flow in Croatia is the largest section which does not meet the minimal requirements of the international navigation status in its bigger part.



14 Figure Classification of inland waterways, two separated sub-systems of inland waterways in Croatia, Source: MMATI, www.mppi.hr

The total Danube's length of 137.5 km through the Republic of Croatia is regarded as an international inland waterway allowing free navigability for the vessels under all flags. The fairway is marked and Croatia has committed itself internationally to maintain the inland waterway. Current status accompanied with the maintenance measures are in compliance with the requirements of the VIc class.

4.1.1.1. Drava River

The total length of the Drava River is 749 km, of which 330 km is within the Republic of Croatia, of which 198.6 km is navigable. From its mouth into the Danube to Osijek (22 km), the Drava is an international inland waterway allowing navigability to ships under all flags**,** with shipping to the international port of Osijek. From 70.0 km to 198.6 km (the mouth at Ždalice) the river Drava is an international inland waterway between the Republic of Croatia and the Republic of Hungary. On the reach from the mouth to 22.0 km (14-22 rkm), the present status of the inland waterway does not comply with the requirements of an international inland waterways determined in the AGN agreement.

4.1.1.2. The Sava River

Out of the total amount in the Republic of Croatia, the river Sava is navigable on 380.2 km, i.e. from Račinovci to Sisak, rkm 210.8 to rkm 593. Navigation upstream to Zagreb with the purpose of exploitation of gravel, sport and leisure is possible (Rugvica km 662), but during a small percentage of days annually. The morphology of the Sava's riverbed does not meet the requirements of the IV class on its entire length, but there are potentials for achieving it, by river training and regulation works.

From the border with Serbia, the inland waterway runs through the bordering area with Bosnia and Herzegovina in the length of 304.2 km. Upstream from Jasenovac, the Sava is completely in the territory of the Republic of Croatia.

4.1.1.3. The Kupa River

The overall length of 294 km is in Croatia completely. The Kupa is navigable 161,5 rkm in class I while the first 5,9 rkm is an international inland waterway and the rest 155,6 rkm is classified as state inland waterway.

The navigation on Kupa upstream from Sisak to Karlovac (km 137), due to numerous natural obstacles in its riverbed, is not possible at present. However, possibilities of initiation of navigation with the purpose of tourism, sport and leisure should be taken into consideration.

4.1.1.4. The Una River

The overall length is 212 km, of which 129 km is within the Republic of Croatia and 130 km of Una's river channel forms the state border line. The Una is classified as an inland waterway from its mouth to river Sava to 15 km upstream, being 4 km considered as class II, and 11, as class I. Navigation with the purpose of exploitation and dredging of gravel is exercised, and sport and leisure in a limited scope.

4.1.1.5. Planned multipurpose canal Danube-Sava

Multipurpose canal Danube – Sava is planned to have four equally important functions: shipping, irrigation, drying out and equalisation of low water level. Due to its multiple functions, the canal would have major significance for the Croatian economy.

The canal would connect the rivers of Danube and Sava on the Croatian territory. In addition to the fact that the canal connects the Croatian network of inland waterways, its construction would connect the Croatian maritime ports with the Danube and thereby with the Central Europe. The canal is planned to connect the Rhine-Danube (Pan-European corridor VII) and the TEN-T core network (Pan-European Corridor X). In order to obtain the best possible value of the Danube region - Adriatic region traffic corridor, the construction of the future canal should take place along with the new Zagreb – Rijeka railroad construction project and the Sava waterway development project for reaching navigation class IV. The completion of these projects would lead to an intermodal traffic corridor on the Vukovar – Rijeka route, in length of 566.9 km that would connect the Danube and the Mediterranean countries through inland waterway ports.

The length of the canal between the Sava and the Danube is 61.4 kilometres. It starts in Vukovar (1334+700 of the Danube) and ends seven kilometres upstream from Slavonski Šamac (310+750 of the Sava). The canal route mostly follows the existing watercourses or their valleys, and mostly flows through the lowland agricultural area.

Transport exploitation of the canal would shorten the navigation route upstream from Vukovar and upstream from Slavonski Šamac by approximately 417 km, and downstream from the Sava mouth into the Danube and upstream from Slavonski Šamac by approximately 85 km. Navigation from Sava to the Western Europe would be shorter by 417 km and to the Eastern Europe by 85 km.

The construction of the multipurpose Danube – Sava canal would influence the necessity of reconstruction and modernisation and capacity increase of inland waterway ports in the Danube and Sava port basin.

4.1.2. Inland port system

The Croatian inland navigation port system consists of national ports of international importance: Sisak, Vukovar, Slavonski Brod and Osijek. Up to present day, inland waterway ports Vukovar, Osijek, Slavonski Brod and Sisak and their port areas have been characterised by an undeveloped infrastructure and unconnected logistical port network.

The crucial characteristic of the Croatian inland navigation port system is its internal disintegration so that it is possible to speak about the river Sava's port system or the ports in the Sava basin, and Danube port system which encompasses the ports of Vukovar, Osijek, and the future county ports and piers (Ilok, Batina, Aljmaš, etc.). Unbalanced market demand for cargo shipping on the Sava and Danube rivers resulted in the fact that the ports of Osijek and Vukovar record growth of transport.

By improving the navigability of the Sava River, the ports Slavonski Brod and Sisak will become more competitive, considering as well their close connection to Zagreb and therefore to the ports of Rijeka and Zadar.

4.1.2.1. The Vukovar port

The Vukovar Port is located on the 1335 km of the Danube river course in the area of the so-called central Danube. Apart from being located on a 2500 km long Danube waterway between Sulina in Romania and Rotterdam in the Netherlands, it is also located on the intersection of the west-south cargo route between Croatia and Bosnia and Herzegovina, and the north-east cargo route between Hungary, Serbia and Romania.

Vukovar is an inland waterway port that can service class 5 vessels, and is located on inland waterways navigability class VIc. Reliability of navigation on the Danube is practically ensured 365 days per year, which is why it is a priority inland port in Croatia. The installed capacities of the port enable the transhipment of up to 2,000,000 t per year.

The port area in Vukovar covers a surface of about 26 ha and is enclosed to the north by the Danube River, to the south by a public road between the centre of Vukovar and Osijek/Vinkovci, to the east by a residential zone and to the west by a commercial and industrial development area (the "Borovo" zone).

The basics of the development concept of the port of Vukovar can be summarised as follows:

- Modernization and construction of additional capacities of the port on the existing port; Area in the zone of the town of Vukovar – Priljevo («Nova luka istok»/New East Port), Phase I,

- Projects of port infrastructure in the zone of construction of the mouth of the Danube,
- Danube-Sava canal should be adapted to the construction of the additional capacities – Phase II,
- Designate the port to contribute the development of the business zones and the economy in its hinterland,
- Modernization of road and rail infrastructure at the approaches to the port, including the connection with the main traffic corridors (TEN-T core and comprehensive network –X, Vc).

4.1.2.2. The Osijek port

The Osijek Port is located in the City of Osijek which is the administrative centre of the Osječko-baranjska County. The Drava River is an international inland waterway on a section of 22 rkm from the river mouth to the City of Osijek. The Drava River is part of the Pan European corridor Vc that connects Budapest (Hungary) and the Ploče seaport (Croatia) and is one of the main transport routes between central Europe and the Mediterranean.

Osijek Port is now located on two locations. “The old port” is located in the city centre and in the immediate vicinity of the Osijek clinical hospital centre (rkm 18). Here, only the terminal for the transhipment of bulk cargo is located. It is important to emphasise that the continuation of bulk cargo transhipment and storing activities at the current location is not in line with the City of Osijek spatial planning, which designated the land where the current bulk cargo terminal is situated on for different purposes (parks, walking trails etc). Besides that, the construction of the North collector and wastewater treatment system of the City of Osijek is planned on this location and overall port activities at the “Old port” need to be stopped and the bulk cargo terminal closed.

The “new Osijek port” is located in the yet non-urbanised eastern part of the city and is about 5 river kilometres downstream from the old port. The new port of Osijek (Nova luka Osijek) is planned to be and has been partially constructed in the old river channel of the river Drava along with opening of the new river flow (cut through) and preparing the space for construction of a port with its basin. The fastest connection with the other parts of the city is the southern bypass road that is also the transit route that connects Osijek with the A5 motorway (part of the corridor Vc). The total surface of the port area is approximately 160 ha. The port of Osijek has a great opportunity to become intermodal logistics centre due to large port area and excellent potential from road and rail connections with the hinterland.

The port fascilities in the area of the “old port” must be transferred to the location of the “new port” for 5 most important reasons:

- The need for an integrated trans-shipment of cargo on one location,
- Better quality traffic routes at the location of the new port,
- Reduction of operational costs in the port and reduction of navigability maintenance costs,
- Prevention of potential environmental incidents in the city centre,
- Reduction of noise and dust in the immediate vicinity of the Osijek Clinical Hospital Centre.

4.1.2.3. The Slavonski Brod port

The port of Slavonski Brod with the determined port area is based on the left bank of the Sava River, on rkm 336+483 to rkm km 337+683, in the “Bjeliš” economic production zone. It is approximately 4 kilometres towards south-east of Slavonski Brod. On this location, the Sava River is in the form of a concave curve which ensures the access of ships to the bank. The port is connected by road and railway infrastructure with international infrastructure corridors, as well as with economic operators of Slavonski Brod, the most prominent of which are Đuro Đaković, Slavonija Drvna Industrija, INA, etc.

The international significance of the Slavonski Brod Port results from its position on the intersection of road and railway routes that connect the east and west of Europe, as well as northern Europe and the Mediterranean. The Slavonski Brod Port is located in the border area with Bosnia and Herzegovina, on the transport corridor X and in the immediate vicinity of the intersection of the transport corridors X and Vc. For this reason, the port can be developed as an intermodal intersection as well.

The regional significance of the Slavonski Brod Port is defined by its proximity to Bosnia and Herzegovina, which does not have a port on this section of the Sava River. Aside from this, the port capacities of Slavonski Brod Port can contribute to the competitiveness of the economy in the northern hinterland.

The port area of Slavonski Brod covers approximately 900.000 m^2. The concept of the Port Slavonski Brod is to have a built port with port facilities necessary for cargo transhipment and also built industrial zone which will use water, railroad and road transport for delivery of raw materials and storage and distribution of finished products.

The space, which is foreseen for an economy zone, is an area of 600,000 m^2, ideal for:

- Storage and transport of all types of fuel,
- Storage and processing of metals for construction and shipbuilding and
- Especially - container centre - because of its special position in the region, and the corridor of all transport routes from north to south and east along the Danube to the Black Sea.

The basic activities for port development of Port Slavonski Brod:

- Developing the complete port area and the business zone,
- Construction and modernization of the basic port infrastructure and systems of safety,
- Modernization of road and rail infrastructure connections,
- Construction of dangerous cargo terminal,
- Construction and modernization of passenger pier.

The development of the waterway on the river Sava and port of Slavonski Brod contributes to the enhanced traffic integration in the region between the neighbouring countries.

4.1.2.4. The Sisak port

The port area of Sisak is based on three locations: in the town on 5 rkm of the river Kupa, on location of Crnac on 579 rkm of the river Sava, and in Galdovo zone on 593 rkm of the river Sava. Low water levels and the height under the bridges on the river Kupa, in terms of today's conditions prevailing in inland waterways transport and technologies, create serious shortcomings for construction of this terminal so that it is used only in inland transport (mostly railways). The cargo transport in the port is now related with Sisak oil refinery and transport of liquid cargo solely.

The new port of Sisak is planned in the space southward from Crnac settlement. Construction of the new port of Sisak will encompass construction of port infrastructure and port superstructure.

The facilities from the port terminal on the river Kupa must be transferred to the location of the new port for several reasons:

- Need of integral transhipment of cargo at one location,
- Creating opportunities for development of tourism (public passenger port),
- Broader port area will become a distributive and logistics centre,
- Transport integration of Zagreb economy and the river Sava and waterborne transport,
- Lower operational costs of the port.

During the development of the concept for the Sisak New Port, best practice examples of port development in Western Europe were taken into consideration, and these success models were adapted to the national and regional transport policy framework. The integrated project approach foresees the following functions for the Sisak New Port: Hub for the waterborne transport chains in wider Zagreb region, within the Sisačko-moslavačka County, and Logistics Centre for local & regional industrial production & trade, which will serve as catalyst for re-industrialization of this region with the structural economic problem.

The international significance of Sisak Port results from its position on the "combined Danube basin-Adriatic Sea river-railway transport corridor" from Vukovar to Rijeka.

The Danube basin-Adriatic Sea corridor would consist of the Danube Sava canal between Vukovar and Šamac, the navigable Sava from Šamac to Sisak and the railway lines between Sisak and Rijeka.

The regional significance of the Sisak Port is defined by its proximity to Zagreb. The 30 kilometre Sisak-Zagreb motorway makes the Sisak Port the port of Zagreb. However, since Zagreb does not import significant amounts of large-scale cargo, container and RO-RO transport towards Zagreb would be much more significant. Therefore, the regional physiognomy of the Sisak Port is the following: it is a distribution centre for Zagreb.

The local significance of the Sisak Port is defined by the industry of Sisak, which has a constant transport of crude oil from Slavonski Brod.

4.1.3. Intermodal transport

Inland waterways transport accounts for a very small portion (less than 1%) of the overall freight transport in Croatia. Road and maritime transport accounted for the largest share in freight transport. In the past few years a further increase in road transport and a decrease in rail and inland waterway transport have been observed. Inland waterway transport is the most cost-efficient and environmentally friendly type of land transport and it is therefore a priority to redirect road to inland waterways transport.

In order to increase the share of inland waterways transport it is necessary to establish an intermodal transport network, especially on the Adriatic-Danube axis. The intermodal network Danube-Adriatic is linked to the Trans-European Network (TEN-T), i.e. to the Mediterranean and Rhine-Danube corridor.

Requirements for establishing an intermodal network:

- Extension and upgrade of inland waterway ports, including connections to road and railway infrastructure,
- Construction of a multipurpose Danube-Sava canal (if proved to be feasible,
- Development of the Sava waterway,
- Upgrade of the Vukovar-Vinkovci railway line,
- Modernisation (and upgrade if justified) of the Rijeka-Zagreb railway line,
- Construction of cargo storage facilities in ports areas,
- Establishment of a comprehensive ICT system for intermodal transport.

4.1.4. Organisation and management

The institutional framework for inland waterways in Croatia includes the Ministry of Maritime Affairs, Transport and Infrastructure as head authority, with port authorities located in Sisak, Slavonski Brod, Osijek and Vukovar, Harbour master`s offices and the Agency for inland waterways.

4.1.4.1. Ministry of Maritime Affairs, Transport and Infrastructure

- Puts forward inland waterways transport development policies, ensures implementation of policies in place and enforces acts and other regulations in the field of inland waterways transport, shipping, inland ports and waterways, transport and navigation,
- Puts forward and prepares draft bills and other draft regulations and measures for exploitation and management of the inland waterways system,
- Plans and monitors the implementation of transport infrastructure construction projects as well as programs for technological development and innovation in inland navigation,
- Prepares draft international and interstate agreements, treaties, conventions, resolutions and other documents,
- Analyses the condition and puts forward development plans for inland waterways, inland waterway ports, shipping and operation of inland navigation companies,
- Monitors the safety conditions in inland navigation and puts forward measures for improvement, coordinates inspection of navigation safety and orderly operation of inland waterway ports,
- Deals with vessel certification, i.e. acts as Technical supervisory body in line with the Act on Inland Navigation and Inland Ports. Manages the River Information Services system (RIS).
- Coordinates and supervises the work of inland port authorities, Harbour master`s offices and the Agency for inland waterways.

The Ministry of maritime Affairs, Transport and Infrastructure has its Harbour master`s offices units in Sisak, Slavonski Brod, Osijek and Vukovar. The Osijek Harbour master`s offices has a branch office in Varaždin. The Harbour master`s offices are responsible for maintenance of the ship registry and other administrative tasks, navigation monitoring, safety, search and rescue of human lives and property on inland waterways, inspection, determining the navigability of vessels, maintenance of the register of boats, issuance of shipping licences, determining the level of training of crew members as a requirement for shipping, technical and other expert work related to navigation safety.

4.1.4.2. The Agency for Inland waterways

The Agency for Inland Waterways is a public institution, in charge of inland waterways management.

Its activities include:

- Development of the medium-term plan for development of inland waterways,
- Construction, technical improvement, and transportation and technological modernization of inland waterways,
- Technical maintenance of inland waterways,
- Repair of inland waterways and aids to navigation damaged during natural disasters,
- Ensuring the functionality of River Information Services,
- Control and monitor the state of inland waterways.

4.1.4.3. Port Authorities

The organisational and managing model of public inland waterway ports is basically characterised by the division of management and administration, and commercial port operations. Organisational-administrative functions are allocated to port authorities while commercial port operations are allocated to commercial companies following the specific permits for the performance of port operations throughout a determined period of time.

The Port Authorities are public non-profit legal institutions established under the Act on the Inland Waterway Ports (OG no. 142/98). Founder's rights and liabilities are performed by the Ministry of Maritime Affairs, Transport and Infrastructure in accordance with the Inland Waterway Port Act.

The Port Authority manages the port area on behalf of the Republic of Croatia, which is the founder and the owner of the Port Authority.

Based on the Act on inland navigation and ports, the main activities of port authority are the following:

- Organization and supervision of vessels docking and manoeuvring in port,
- Maintenance of common ports infrastructure in the port area,
- Maintaining order in the port, a high degree of safety and environmental protection in the port,
- Construction and modernization of port infrastructure on behalf of the Republic of Croatia,
- Supervision of port operators and port users who perform port activities, in accordance with the commitments.

There are four Port Authorities established for the inland waterways in Croatia: in Vukovar for the public port and dock on the Danube River, in Osijek for the ports and docks on the Drava River, while the responsibility for the ports and docks on the Sava River is shared between Sisak Port Authority and Slavonski Brod Port Authority. County ports and piers/landing structures are also part of the responsibilities of the abovementioned port authorities.

4.1.5. Shipping

The Commercial fleet in Croatia consists of 57 ships with total capacity of just over 44.000 tons participating in international cargo transport, with average age of 40 years. This capacity is not sufficient to satisfy the current transport demand to and from Croatian inland waterway ports. This results in domestic operators participating in cargo transport with just 20%, while foreign operators account for the remaining part. There are 67 shipping companies and 11 of them are international shipping companies

Two shipping companies operate at the moment on inland waterways - Dunavski Lloyd d.o.o. from Sisak and Vodogradnja d.d. from Osijek. The fleet of these companies is by European standards rather outdated.

4.1.6. Safety of navigation and environmental protection

Although the number of accidents in Croatia has not been large during the last five years, the expected growth in traffic, and the consequent increased risk of accidents and the impact of potential incidents on the water require the existing safety level to be brought up on a higher level.

In order to achieve this in Croatia, besides the implementation of the River Information Services and the availability of timely and accurate information regarding the movement of vessels, it is important to establish clear procedures regarding the actions which are to be taken in cases of incidents, as well as to upgrade the existing systems of marking and monitoring of the inland waterways navigability.

River Information Services system (RIS) has been designed to operate within the European network of information services in the inland navigation. Croatia has placed the project of the River Information Services development at the top of its priorities in inland waterways transport. In the Republic of Croatia, it is called CRORIS and it is compatible with service systems available in other countries of the Danube river basin. This service ensures reliable, accurate and comprehensive information on a certain inland waterway, dangers or restrictions for navigation, contributing to accident risk minimization.

RIS concept in Croatia is based on the fairway and vessel information and their interconnection with the cargo information within intermodal transport chain. This concept is based on the following components:

- Electronic navigational charts that are in compliance with the Inland ECDIS standard, for the display of fairway and ship position information,
- Automatic identification system (AIS) for automatic vessel positioning and its corresponding,
- Shore and on-board ICT infrastructure,
- Notices to Skippers (NtS) standard in a form of a web application on the internet,
- Electronic ship reporting system.

Calamity abatement service provides support in the form of minimizing losses and hazards in the cases of distress or other accidents on vessels or other objects on inland waterways. This type of service relates to the procedures that have to be undertaken after the accident in order to minimize the effects as much as possible. In the case of the accident RIS control centre delivers data, in accordance with the protocol.

The CRORIS service is available for the Danube and international Drava section up to Osijek and covers 159.6 km of inland waterways. A prototype version has been developed for the Sava River. The service has so far not been put to commercial use, since regulations in Croatia as well as in neighbouring countries need to be amended and a National control centre needs to be established.

It is necessary to define more clearly and completely the legal framework for the implementation of the RIS, the powers of competent authorities, and to strengthen the administrative capacity of

the system users. The next step is to establish the national head office for the RIS as an independent organisational unit which will be the national coordinator and international centre for the exchange of information. Moreover, it is necessary to define the organisational and hierarchical structure of the RIS in Croatia.

Countries of the Danube and Sava river basin are making efforts to harmonize and improve environmental protection laws in the field of inland navigation. The International Commission for the Sava river (The Sava Commission) has developed a Protocol on Prevention of Water Pollution caused by Navigation with the aim of preventing, controlling and reducing pollution from vessels, establishing technical requirements for the equipment of port and other reception facilities, defining measures in case of spillage, and establishing a water quality monitoring and information system.

In accordance with the ADN, the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways, the duty of port authorities to ensure separate warehousing, processing and disposal of hazardless and dangerous waste in ports, as well as reception of waste from ships, have been included in the preventive measures for the protection from the pollution from ships. Every ship is required to keep an Oil Book, where all the notes regarding the waste disposal in admission stations authorized by the competent body are to be entered. Any release of used oils or lubricants and mud or faecal waters from ships into the water is strictly prohibited.

4.2. List of hypothesis

Below is presented the list of hypothesis already defined as part of the methodological procedure employed in the Croatian Transport Development Strategy definition, because of the existing lack of accurate data and/or information. In order to proceed with the objectives definition these establish concepts of reflection and analysis.

CONCEPT	HYPOTHESIS
1. Croatian membership in the European Union	1. Croatian membership in the European Union: increased traffic demand on inland waterways in the Republic of Croatia.
2. Inland waterways network - integration and navigability	2. Inland waterways network in Croatia is divided into two separate sub-systems without connection through the territory of the Republic of Croatia. 3. Insufficient level of maintenance on entire inland waterways network in Croatia.
a. Inland waterways port system	4. Unbalanced market demand for cargo shipping on the Sava and Danube rivers. 5. Insufficient port infrastructure. 6. Lack of advanced technical equipment and specialized terminals for handling with specific types of freight cargo, especially container goods which is now not presented, although the Adriatic ports are mostly developing as container ports.
b. Organisation and administrative improvement	7. Additional trained end educated administrative capacities are necessary.
c. Shipping – fleet modernisation and education	8. The capacity of Croatian fleet is not sufficient to satisfy the current transport demand, and the average age of ships is 40 years. 9. The decrease in the interest for shipping professions represents a limitation for the further sector development.
d. Safety of navigation and environmental protection	10. Growth in traffic increases the risk of accidents. 11. The RIS system has been implemented, but not completed.

10 Table List of hypothesis Inland waterways sector

4.3. SWOT - Inland Waterways sector

STRENGTHS	WEAKNESSES
• Favourable geographical location of the Croatian inland waterways in the heart of Europe • Low-cost transport compared to other types of transport • Safe – very few incidents and accidents compared to other transport modes • Great quantities of cargo can be transported simultaneously • Low maintenance costs • Environmentally friendly transport mode, low pollutant emissions • Longer lifespan of ships compared to road vehicles	• Existing infrastructure (inland waterways, ports, terminals) • Relatively slow transport • Dependent of water–level • Intended for specific types of cargo, there is yet no container transport • Insufficient administrative capacities in the sector • Transhipment from/to other types of transport is necessary • Accessibility and availability of inland waterways in Croatia – a limited number of routes is available • Inflexibility – system based on the existing river routes, any displacement would require significant investments

• Planed infrastructure investments (inland waterways and inland waterways ports) • Using of natural rivers flows with some upgrades	• Inefficiency • Need for significant infrastructure investments • Lack of recognizable image and very limited promotion • Staff training system has only just begun • Poor condition of the Croatian inland waterways fleet • Dependent on meteorological/hydrological/morphological factors • Incompatibility of the interests of inland waterways navigation and environmental protection on rivers
OPPORTUNITIES	**THREATS**
• Innovations (modernisation of fleet and development of intelligent technologies in water transport) • Low energy costs and great amounts of cargo – advantage in the time of the economic crisis • Development of container transport • Cooperation with other transport modes – intermodal transport • Limitless capacity • Strong political support • More promotion for the purpose of creating a positive image • Solution for the congestion of road routes	• Slow investments in infrastructure due to economic crisis in Croatia • Problems in the maintenance of inland waterways (bilateral agreements with Serbia and Bosnia and Herzegovina – dual maintenance, which is not always practical) • Competition of other transport modes (railway and road transport have a strong lobby) • Croatian navigable rivers – border areas with Serbia and Bosnia and Herzegovina • Competition from nearby Danube ports from other countries • Dams are built for water power plants, which may be bottlenecks, dam sizes limiting the maximum size of vessels, and the passage through dams is lengthy

11 Table SWOT Inland waterways sector

5. MARITIME SECTOR

5.1. Analysis

5.1.1. Shipping

The Croatian fleet comprises 1,245 ships of 1,274,833.36 GT, of which 10% operate in the international shipping. The majority of these ships sail under the Croatian flag and a small number (27 ships) sail under foreign flags. Croatian shippers involved in international maritime shipping are organized in the Croatian Ship owners Association "Mare Nostrum". The average age of the ships of "Mare Nostrum" members amounted to 9.33 years in 2011, and to 10.2 years in 2012. In contrast, the average age of the fleet in national navigation is 46.2 years, and as a result the total average age of the Croatian fleet is 45.1 years. It is to be noted that the high age of traditional wooden ships also impacts the average age of ships in national navigation. The fleet currently carries 100% of public maritime passenger traffic, and only 27% of Croatia's sea-bound cargo traffic.

The Croatian fleet–has a low capacity due to the size and age of the vessels. The fleet is diminishing in size, and some of the shipping companies went out of business. According to the "Mare Nostrum" Association 12 Croatian shipping companies operated in 2012 with 154 ships, and 10 Croatian shipping companies operated in 2013 with 142 ships[3].

Passenger and bulk carriers dominate the structure of the fleet, which noticeably does not include container, reefer, or LNG/LPG ships[4].

It is considered necessary to adopt measures ensuring the survival and modernisation of the Croatian fleet being competitive in the global market. Moreover, taking into account the tradition and the existing *know-how* as basic preconditions for success, Croatia has to look after this industry branch.

A key segment of Croatian shipping is the Public Transport in the "coastal line passenger transport". This sector provides scheduled and regulated services between Croatian islands (73 island ports) and the mainland coast (22 mainland ports). Jadrolinija, a state owned company, is Croatia's largest shipping line for the maritime transport of passengers and vehicles.

[3] See Annex 1 of the TDS, Data Analysis
[4] Ibid

By “Decision on establishing national lines in public transport in coastal liner shipping” 56 national lines have been established, including 27 ferry lines, 16 speed boat lines and 13 ship lines. Operating as concessionaires on national lines are domestic shipping companies, the most important of which is Jadrolinija which has concession over 23 ferry lines, 8 speed boat lines and 3 standard ship lines. Most of the lines are unprofitable and are maintained through state subsidies.

The public transport service in coastal line passenger transport is characterized by a non-profitable business activity, and being subsidized whenever the shipping company cannot cover the current costs with the incomes on the specific line.
The most significant challenges that shipping companies are encountering in the regular maritime transport service are the none favourable age structure of the fleet, the result of the high share of the fuel price in the total costs of transport, as well as the significant season oscillations.

Apart from national lines, Croatia has international passenger lines with Italy: Zadar-Ancona, Split-Ancona, Dubrovnik-Bari and Istria-Venice/Trieste. Only Split-Ancona is an all-year line, while others are seasonal. The national shipping company *Jadrolinija* on lines Split-Ancona, Zadar-Ancona and Dubrovnik-Bari and the *Panamanian company Blue Line International* on line Split-Ancona accounted for the major share in liner traffic.

5.1.2. Seafarers

Croatia is a seafaring nation supplying both national and foreign vessels with qualified seafarers. Today Croatia has a total number of 22,000 seafarers; 14,500 work in the international traffic (under Croatian and foreign flags). This significant number of people involved constitutes a sufficient reason to ensure highly educated maritime personnel.

The maritime education and training (MET) system in Croatia is currently comprised of 22 institutions: four maritime faculties part of the university system (higher education), eight nautical schools (secondary/ vocational education) and eighteen maritime training centres (mostly private entities). Those are institutions which deliver educational programme relevant to certification of seafarers according to the STCW Convention and of which an authorization is granted by the Ministry of Maritime Affairs, Transport and Infrastructure.

The decline of interest in seafaring and the increased attractiveness of shore-based careers may be attributable to the structure and functioning of the MET system in Croatia as well as the lack of a proper strategy in this sector.

On the one hand, the MET system lacks concentration, is less adaptable to the requirements of the owners and even less responsive to the operational and technological changes in the industry.

For instance, most MET STCW type courses are delivered in Croatian (rather than English) while programmes on new shipping technology and operations, as well as on associated industries (ship design, offshore technology, marine surveying, port operations, etc.) are scant or non-existent. The MET system in Croatia is not in some parts commercially oriented and the number of foreign (including EU) students is very limited.

5.1.3. Port system

Seaports in the Republic of Croatia are divided by their intended use and importance, according to the Act on Sea Ports.

- **Ports open for public traffic:**
  - Ports of (special) international economic interest for the country,
  - Ports of county importance,
  - Ports of local importance.
- **Special purpose ports** (military ports, nautical tourism ports, industrial ports, sports ports, fishermen' ports, shipbuilding ports):
  - Special purpose ports of interest for the country,
  - Special purpose ports of county interest.

A port open to public traffic is a seaport that, on equal terms, could be used by any natural and legal person in accordance with its purpose and within the scope of available capacities.

Croatia's port open to public traffic system is made of six (6) national ports of "special international economic interest", 42 county ports, and 285 local ports.

On the other hand, depending on activities carried out, special purpose ports are classified as follows:

- **Military ports** are ports intended for the reception and accommodation of military vessels, equipped with appropriate facilities and equipment, as defined by special regulation,
- **Nautical tourism ports** are ports for the reception and accommodation of vessels, equipped to provide services to passengers and vessels,
- **Industrial ports** are ports for the mooring of vessels and unloading/loading of cargo intended for the production process of the concessionaire,
- **Sport ports** are ports for the mooring of boats registered in the Croatian register of vessels for sport and recreational purposes, owned by members of an association or the association itself which has a concession for the port,

- **Shipbuilding ports** are ports used for the construction and/or repair of vessels,
- **Fishing ports** are ports used for the reception and accommodation of fishing vessels, equipped with devices and equipment for loading/unloading of fishing vessels, space for handling the catch and the supply of fishing vessels.

Port area is maritime domain of community interest and may not be private property. Maritime domain and its exploitation is property of the country operating the maritime domain. Management, maintenance and construction of ports open for public traffic are conducted through port authorities, while management of a special purpose port is entrusted to the holder of concession for a special purpose port.

5.1.4. Organization structure

The Ministry of Maritime Affairs, Transport and Infrastructure (MMATI) is the entity responsible for the elaboration of transport policies (including maritime) and the monitoring of their implementation.

The provision, operations and management of transport services and related activities are carried out by affiliated agencies.

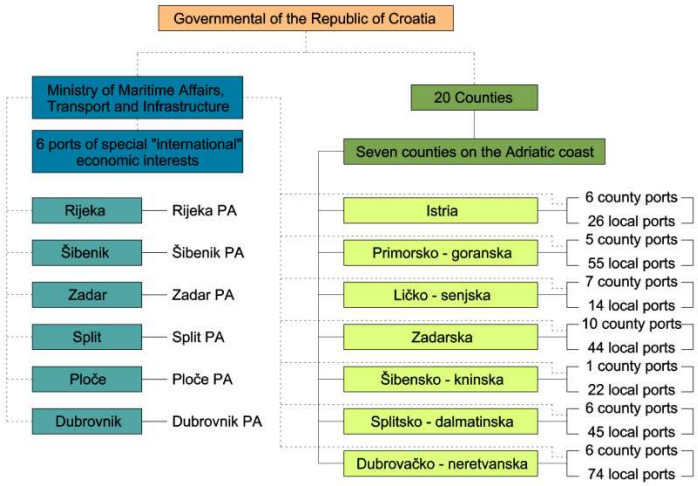
Harbour-master offices are administrative units within the MMATI. Currently, the system is organised in terms of eight (8) regional offices in Pula, Rijeka, Senj, Zadar, Šibenik, Split, Ploče, and Dubrovnik. The main tasks of the harbour-masters' offices reside in controlling navigation in the internal sea waters and territorial sea of the Republic of Croatia, and carrying out relevant inspection of navigation safety.

Maritime Rescue Coordination Centre Rijeka (MRCC Rijeka) coordinates search and rescue (SAR) missions where required and as part of the RoC's responsibilities as a signatory of the International Convention on Maritime Search and Rescue (SAR 1979).

The Croatia Vessel Traffic Monitoring and Information System (CVTMIS) is a technical, legal and institutional setup with the tasks of collecting, analysing and sharing maritime traffic data and information for the purpose of facilitating and monitoring vessel movements in the Croatian part of the Adriatic Sea.

National port authorities, which are established by the Government of the Republic of Croatia, are responsible for the economic development of port and terminal facilities within the areas assigned to them. National port authorities are members of several international port

associations. County port authorities, established by the counties, are responsible for managing county and local ports within the county borders.

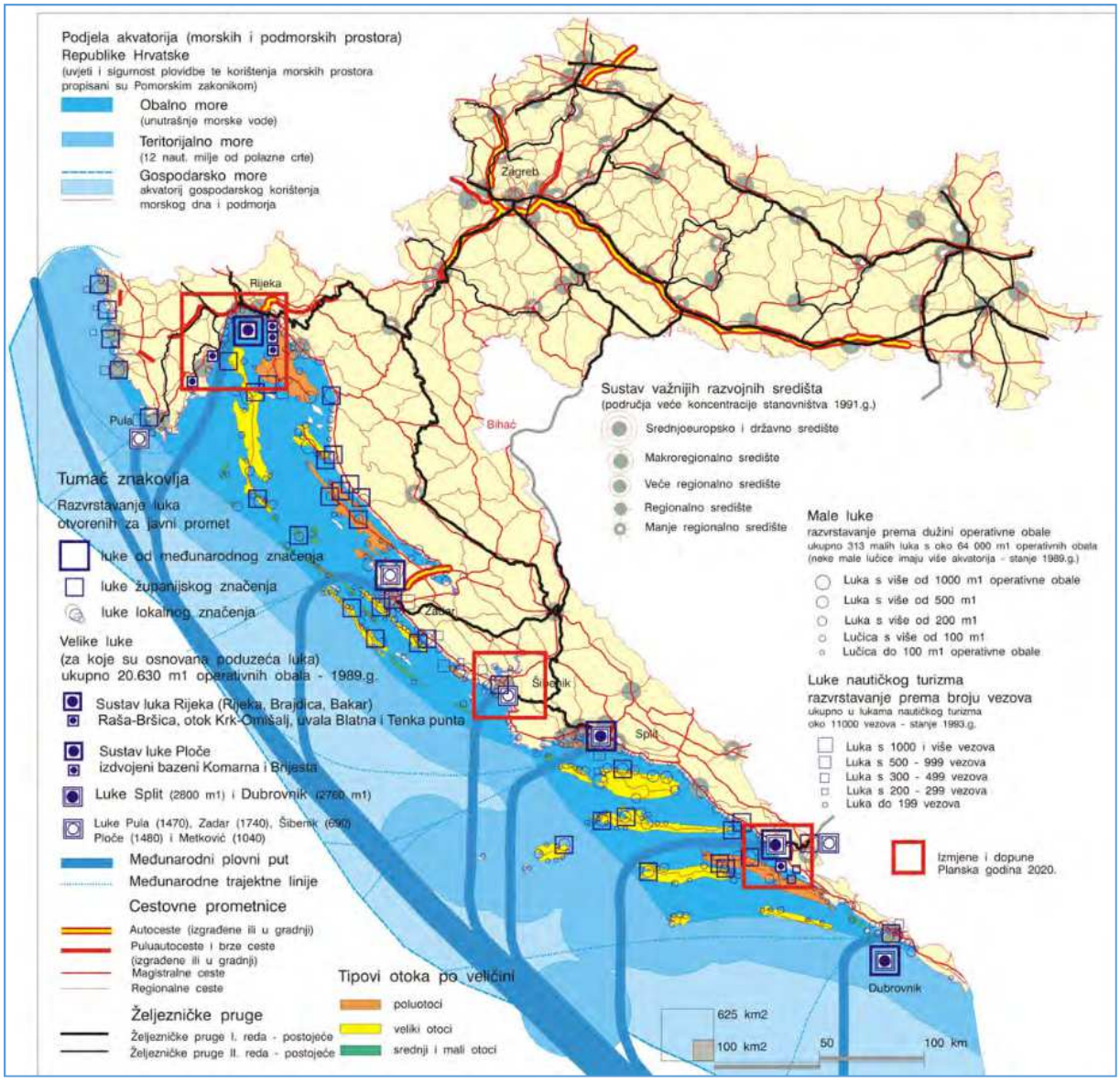


15 Figure Organisational structure of the port system in Croatia

The conclusion based on the scheme above is that the ports of special international economic interest are managed by the Government through its bodies (port authorities), while the ports of county importance are managed by the counties which formed their county port authorities. Some counties have more than one county port authority. The main drawback of this organisation of the management of main ports is the fact that it is often too bureaucratic and inflexible and not in compliance with the contemporary requirements of cost-rational and cost-efficient operations. The advantage is the fact that such an organisation may also harmonize development of other infrastructures (roads and railroads), which is not primarily motivated by profit and ensures liberty in the selection of the location for the construction of a new port. It is necessary to review the method of management of the ports of county and local importance. There are too many county port authorities and their operations are often not harmonized and coordinated, and different levels of development of ports not in compliance with the actual needs are also present.

5.1.5. Ports open to public traffic of special (international) economic interest for the Republic of Croatia

Major ports (Rijeka, Šibenik, Zadar, Split, Ploče and Dubrovnik) are declared as national ports or ports of special international economic interest.



16 Figure Maritime transport - Ports open to public traffic, Source: "Physical Planning Strategy of the Republic of Croatia", 2013

Croatian seaports have an economic potential based primarily on a favourable geographic position. The Adriatic reaches far inland into the continent which ensures the shortest and cheapest transport connection for countries located behind Croatia to the east Mediterranean, and via the Suez Canal to Asian and east-African countries.

The majority of cargo transport in Croatian ports is carried out in the Rijeka and Ploče ports, totalling close to 90% of the total cargo transport of all Croatian ports. The Ports of Rijeka and Ploče have the highest market potential for cargo transhipment. Port of Rijeka is a core port (TEN-T), part of Mediterranean Corridor: Ljubljana/Rijeka – Zagreb – Budapest – UA border. On

the other hand, the majority of passenger transport is carried out in the Split and Zadar ports, and Dubrovnik is the port with the majority of traffic of cruising vessels.

Cargo transport in the past few years clearly shows that specialised terminals are competitive with other ports in the region, while those who are not as specialised in terms of cargo are in a gradual decline. Therefore the national direction in the future will be port specialization in order to ensure further development.

Port of Rijeka

The port of Rijeka is located on the coast of the protected Rijeka bay. The area of the Rijeka port is located on 5 locations. The central location is the Rijeka basin and Sušak basin, and is part of the urban unit of the City of Rijeka. Separate parts of the Rijeka port are Bakar basin, Omišalj-Krk basin and Raša basin.

In addition to the road infrastructure, all locations (except for Omišalj) also have the railroad infrastructure. However, it does not fulfil the requirements (its technical characteristics and capacities are bad).

The port of Rijeka is the largest port in Croatia and benefits from the deepest natural channel in the Adriatic. Much of the port's traffic is transit cargo to/from its wider hinterland in Central Europe, and is dominated in volume terms by liquid and dry bulk cargo followed by container and general cargoes. Total port's throughput has almost doubled from 6.85 to 12.4 million tonnes in the period 2000- 2008, with container traffic registering an increase of 1,600% in the same period (from 7,222 TEU in 2000 to 168,761 TEU in 2008). The impact of the economic crisis was evident and traffic has decreased accordingly with both total and container throughputs in 2011 still below their 2008 levels.[5]

Construction of an additional part of the container terminal has been completed ("Brajdica", Phase 2), with a new quay of 330 metres, a terminal area of 3 hectares and a capacity increase of 250,000 TEU. Current and planned developments are part of the "Rijeka Gateway" project and include a new container terminal with an area of 22 hectares, a draft of 20 metre, and a total capacity of 600,000 TEU; and the urban redevelopment of the port facilities located in the Rijeka city centre. Future expansion of the container facilities of the Port of Rijeka will have to be found outside the Rijeka Basin. An increase in the Omišalj liquid cargo capacity is planned. Apart from bulk cargo, the Bakar basin is adequate for development of a RO-RO terminal, especially considering the near-by industrial zone Kukuljanovo.

The further development of Rijeka port is focused on container and liquid cargo transport.

[5] See Annex 1 of the TDS, Data analysis

Port of Zadar

The port of Zadar is located at the central part of the Adriatic coast and is the second Croatian port for passengers. The port currently operates in two locations: city port for passengers and Gaženica port for cargo. The existing ferry terminal of Zadar is the main access to Croatian islands nearby the city of Zadar. It ranks second per number of passengers on the Adriatic, after the Port of Split. Passenger traffic was 2.4 million passengers and around 350,000 vehicles in 2011, an increase of 65% from to 2001.

Cargo traffic remains limited due to physical constraints and proximity to Rijeka. In 2012, total cargo transport amounted to 252,583.40 tons, with liquid cargo accounting for the largest share (70%).

The Gaženica port is well connected to the road infrastructure and is also connected to the railroad. The railroad from Zadar to Zagreb has however bad technical characteristics.

Planned developments include the relocation of the ferry port from the historical city harbour to the Gaženica area. The construction of new passenger port in Gaženica is in progress. It should be operational in the year 2014 or 2015. The new port will provide an extended berthing capacity for larger international ferries and modern cruise ships ("home port") and international standard on-shore facilities for passengers and vehicles.

The Zadar port development is focused on RO-RO, passenger and cruising transport.

Port of Split

The port of Split, also called gateway to the islands, is the largest passenger port in Croatia with over 4.2 million passengers and more than 640.000 vehicles in 2011, which places the port as the third most important passenger port in the Mediterranean (after Naples and Piraeus). The north port of Split specialises in cargo handling, although in small amounts.

Planned developments focus on the construction of new berths for ferry, RO-RO and cruise vessels including the extension of the passenger wharves on the outer side of the main breakwater in the City port of Split.

Port of Šibenik

The port of Šibenik is located on 430 ha of the Krka River estuary. The port specializes in bulk, timber, and mineral traffic notably phosphates transhipment. Cargo throughput was just below 600,000 tonnes in 2009. Šibenik also handles passenger traffic with an average of 550,000 passengers per year.

Planned developments include the construction of a new RO-RO terminal, the completion of the new passenger terminal (currently under construction) and the modernisation of equipment and storage facilities at the bulk, general cargo, and timber terminals.

The further development of Šibenik port is focused on passenger traffic, as a port for exclusive cruising vessels of smaller capacities (boutique vessels) and super-yachts.

Port of Ploče

The port of Ploče is located in the southern part of Adriatic coast and consists of two locations: Ploče and Metković that occupies more than 230 hectares of land. Around 90% of the Ploče activity is transit traffic since the port is the main maritime gateway to Bosnia-Herzegovina, Serbia and Montenegro, and it features as the endpoint of the Pan-European corridor Vc (TEN-T comprehensive port). Dry bulk and general cargo dominate Ploče traffic with the 2011 throughputs of 3.56 and 0.43 million tonnes, respectively, still below the 2008 levels.

Planned developments are based on the investments in port infrastructure in order to develop additional port capacities. The new Dry Bulk cargo Terminal (Phase I) with annual capacity of 4.6 million tons and sea depth of 20 metres will be operational from 2015.

The Ploče port will be specialised in container and bulk cargo transport.

Port of Dubrovnik

The port of Dubrovnik, located at the far south of the Croatian coastline, has become in recent years one of the most popular destinations for cruise voyages in Europe. The main port of Gruž, which is managed by Dubrovnik port authority, currently handles over 1.2 million passengers and 20.000 vehicles annually, of which 700.000 are cruise ship passengers. On the other hand, the old town anchorage in the city of Dubrovnik is currently managed by Dubrovnik's county port authority. The anchorage received 220 calls and handled around 200.000 passengers in 2012.

Planned developments include the modernisation and reconstruction of the passenger terminal and the expansion of ferry and cargo traffic facilities with a planned quay length of 426 metres putting the total new and existing area to 2.2 hectares.

Development of Dubrovnik port is focused on cruising passenger transport.

5.1.6. Ports of county (regional) and local importance

Criteria for the classification of ports open to public traffic as ports of county importance include:

- An average throughput of over 50.000 tonnes per year and an average of over 100.000 passengers per year for ports only for passenger traffic,
- Adequate road links with the hinterland,
- Installed port capacity for a throughput of 50.000 tonnes of cargo, i.e. piers and docks for ships up to 80 m in length with a draft up to 4 m and
- At least three lines per month in domestic traffic for passenger only ports.

Local ports are all ports for public use with piers for safe mooring.

Croatia has a total of 42 ports of county importance and 285 ports of local importance.

When it comes to ports open for public transport, which are of county importance, they are primarily ferry piers for connections of islands with the mainland i.e. public passenger transport. The coastal line passenger transport is a key segment of Croatian shipping. This sector provides scheduled and regulated services between Croatian islands and the mainland coast.

The existing major ferry ports need additional construction works, in order to make possible the acceptance of RO-RO ships of large capacity. Better connections between the islands are necessary, as they are now almost non-existent.

Some of the ports of county importance accept international cruise ships. It is necessary to perform additional construction works on the existing ports which are potentially interesting locations for acceptance of tourist cruisers.

The existing ports open for public traffic, which are of county or local importance, but have great potentials for development of nautical tourism, need additional construction works to ensure better safety of ships on berth and to increase the number of berths.

5.1.7. Nautical maritime market and cruising tourism

Due to its geographic position and boasting one of the most indented coastlines in the world, a pleasant climate and favourable winds, Croatia has a lot of potential in nautical tourism. This is confirmed by the increasing business in nautical tourism. However in spite of this, yachting tourism in Croatia has over the last couple of years experienced stagnation in the development of new berths in marinas.

Looking at the number of nautical ships permanently moored at nautical berths, one can observe a growing trend of ship's size. This has not been matched by an increase in berth length.

The Croatian Nautical Tourism Development Strategy for the period 2009-2019 suggests a moderate development scenario of nautical tourism with an additional 15,000 vessels in the next 10 years, which would require 15,000 nautical berths.

The sustainable growth with a moderate development scenario of constructing new moorings remains the basic strategic orientation, but the potential for further growth is seen in leaving the current operating principles that could be referred as “the parking economy”. On the other hand, aiming for a broader spectrum of services in nautical tourism, their availability all year long and constant improvement of their quality, leads to increasing income and a generally higher economic utilisation of the existing spatial capacities.

The most financially significant segment of Croatian nautical tourism is charter. The potential to further develop chartering lies in improving the service quality, as well as expanding the offer of luxury vessels, that are not adequately represented.

When considering potentials of Croatian tourism, cruising tourism must be mentioned.

Cruising tourism has experienced an increasing number of arrivals of cruisers. According to Croatian Bureau of Statistics, the number of cruises in 2013 has increased by 3.0% and the number of passengers entering the Republic of Croatia, increased by 7.0%. The total number of passengers’ sojourns in Croatia was by 10.5% higher.

Approximately 20 Croatian ports open for public traffic with varying traffic intensity offer international cruising services, including the largest ports of special (international) economic interest such as Dubrovnik, Split, Zadar, Šibenik, ports of county importance such as Pula, Korčula, Mali Lošinj etc. as well as minor local ports such as ports on the island of Lopud, Mljet, Šipan etc.

Large ships with 1,000 or more passengers mostly visit Dubrovnik, accounting for 47% of all berthings in Dubrovnik. Berthing of large ships is also recorded in Korčula, Split and Rovinj, but in a much larger scale. All other destinations mostly accommodate ships with a capacity of up to 500 passengers.

In Croatia most cruising ports are transitory, as opposed to other cities/ports where passengers in transit account for e.g. 16% in Venice, which is one of the largest cruise home ports in the Mediterranean. The development of the new passenger port Zadar (Gaženica) is planned as a cruise home port due to its good links with the mainland infrastructure.

Plans for development of infrastructure for the accommodation of cruise ships mostly involve the most important and most popular tourist destinations in Croatia having the potential for development of international cruising in Croatia in the future.

5.1.8. Navigation safety and security of the maritime ships and ports

The dynamics of human activities at sea and in the coastal area records continuous growth. Only in Croatian ports about 500,000 ships per year have been recorded entering and leaving port in domestic and international traffic where 41% of the annual traffic takes place in three summer months of intense passenger and ferry traffic. In the segment of maritime traffic of recreational vessels, alongside 120,000 boats and yachts with Croatian flags, another 60,000 foreign boats and yachts participate in the maritime traffic each year.

In 2012, in the maritime area of the Republic of Croatia, 1,354 maritime accidents were registered, while every year 413 search and rescue operations to save human lives and assets at sea are performed (yearly average in the period between 2008 - 2012).

The improvement of ships' quality in international shipping which navigate under the Croatian flag, has been accomplished. The Croatian fleet has continuously been on the "Whitelist" of the Paris memorandum. The structure and age of the Croatian fleet in domestic voyages is the area which particularly requires further safety development efforts, which should be oriented towards early discovery and control of each potential accident or maritime disaster.

In the field of marine accident prevention and development of safety navigation culture, significant steps forward were made in the recent years with regard to the regulating mechanisms, as well as with regard to public services for safe navigation.

Along with the improvement and technological development in hydrographic activities, the maintenance and construction of waterways and navigational safety objects, the organizational and technological bases of the Vessel Traffic Monitoring and Information System Service (VTMIS Croatia) had been formed, which in the year 2012 began full monitoring of navigation in internal waters, territorial sea and protected ecological and fishing zone of Croatia as the "*naval operational service*". Further steps in the evolution of these services will be linked to the development and modernization of the system of mandatory ship reporting and the Traffic Separation Scheme, as well as improving the quality of information services for the maritime industry in line with the international and European initiatives.

In the field of safe navigation public services, a service for search and rescue of human life at sea in accordance with the International Convention on Maritime Search and Rescue (SAR Convention) has been operating in a structured manner since 1998, taking care of helping the participants of maritime accidents and providing support services (Maritime Assistance Service), as well as actions in other emergencies at sea, including marine pollution. In the upcoming period,

raising the quality and availability of sea rescue is a national priority that must be accessed through the integrated operational solutions and modern technical resources.

The maritime industry has to be developed in a safe and sustainable manner. Efforts to create a strong growth potential for the maritime industry should comply with the safety requirements and be coordinated with the development of navigation safety public services.

5.1.9. Protection of the marine environment

The Adriatic Region of Croatia with its coastal mainland and islands, almost 6,000 kilometres long, is among the most valuable parts of its national territory. At the same time, it counts among the most sensitive natural systems of Croatia. The region is also important for its economy, and rich cultural and social life. In that sense, the use and preservation of the Adriatic Sea and its coastal region in Croatia should get special attention.

The intense maritime traffic in the Adriatic Sea basin entails a significant risk of accidents, and thereby the potential strong impact on the marine environment. Regarding the geomorphologic characteristics of the Adriatic, which is a semi-closed sea basin, the impact of one single accident can be dangerous for the Croatian economy, which is mostly oriented towards the activity in the coastal area and at sea. For this reason, the obligation of the Republic of Croatia as a coastal country of the Adriatic is to dedicate special attention to the protection of the Adriatic Sea, both independently and in cooperation with other countries, and both within the meaning of its use and its preservation.

Significant negative impacts of maritime traffic on the marine environment are those causing sudden and operational pollutions of the sea from floating structures, especially accidents during the transport of oil and oil products, as well as the disposal of ship waste and cargo residue into the sea. Recently, significant pressure on the marine environment and damage to its quality occurs not just as a result of classic shipping, but also due to increased nautical tourism development, which has negative impacts which manifest themselves especially through the amount of waste and faecal waters, and thus it is necessary to develop technical, technological and organisational measures to establish an effective system for acceptance of waste from ships and improve the conditions for the effective management of ship and sea waste.

Setting the high criteria by the Ordinance on Ballast Water Management and Control, Croatia prohibited the ballast water exchange in the Adriatic.

Safety measures are necessary concerning navigation safety and protection of marine waters from pollution, as well as the application of solutions and systems in order to reduce accidents at

sea and pollutions of the environment in order to achieve goals concerning safety and climate change.

There are continuous efforts on the draft proposal for the declaration of the Adriatic Sea as a Particularly Sensitive Sea Area (PSSA). This institute of the MARPOL Convention is considered by the Republic of Croatia as the priority tool for the effective protection of the marine environment

5.2. List of hypothesis

Below is presented the list of hypothesis already defined as part of the methodological procedure employed in the Croatian Transport Development Strategy definition, because of the existing lack of accurate data and/or information. In order to proceed with the objectives definition these establish concepts of reflection and analysis.

CONCEPT	HYPOTHESIS
1. Croatian membership in the European Union	1. Croatian membership in the European Union opens the possibilities to increased traffic demand in the Republic of Croatia.
2. Shipping	2. Undesirable modal split, which is currently dominated by road transport. 3. The Croatian fleet has a low capacity due to the size and age of the ships. 4. Need for improvement of coastal liner shipping, especially between islands.
3. Seafarers	5. There is a decline of interest in seafaring and the increased attractiveness of shore-based careers. 6. The MET system in Croatia is not in some parts commercially oriented.
4. Port system • Organization structure • Ports open to public traffic of special (international) economic interest for the Republic of Croatia • Ports of county (regional) and local importance • Special purpose ports	7. Bad coordination and harmonisation between port authorities in terms of development planning. 8. The port management system on county level has to be more efficient. 9. Insufficient port infrastructure. 10. Bad coordination of the development of ports with the development of land infrastructure (primarily railroads). 11. The expensive port infrastructure is in most cases founded by the Government. 12. Existing county and local ports have a great potential. 13. Cruising traffic is growing and it is an opportunity for Croatian tourism. 14. The concession awarding procedure for a port or parts is lengthy and demanding. 15. Certain special purpose ports are abandoned and unused (industrial and military).
5. Nautical maritime market	16. Lack of nautical berths. 17. Lack in the number of seasonal berths for large vessels (exceeding 20 m length).
6. Maritime safety, security and protection of the marine environment and the coastal zone	18. Due to increased maritime traffic particularly in passenger and cruise traffic, the growth of nautical tourism, as well as increased volumes of mineral oils and other dangerous and harmful substances carried by ships there is increased probability of maritime accidents.

12 Table List of hypothesis Maritime sector

5.3. SWOT – Maritime sector

STRENGTHS	WEAKNESSES
• Geographical location: Strategic location and wide hinterland and foreland extensions • Preserved maritime environment • Maritime heritage and established maritime industry • Know-how and tradition in shipping, both on the level of seafarers and at the management in shipping companies • Established education and training system for seafarers in accordance with the highest world standards • Strong nautical and tourism offer of a wide range of maritime activities and services • Generally good terminal infrastructure • Good port network and availability of deep sea ports • Good reputation of the ports with regard to the social and environment; relatively good service at a reasonable price, no congestion, no labour disputes, no record of excessive loss, pilferage damages • Increasing trend for passenger and cruise traffic • Good safety performance to comparator and neighbouring countries • Flag on the white list of the Paris Memorandum of Understanding • Safe, energy-efficient and environmentally friendly mode of transport • Importance of the maritime sector with respect to the core and comprehensive network	• Small share of maritime transport in the overall transport of the Republic of Croatia • The scope and economic contribution of the entire maritime sector to the economy of the Republic of Croatia has not been determined • Weak economic growth in the short and medium runs • Absence of financial market for shipping in the Republic of Croatia • Multimodal transport is underdeveloped • Low media representation of the maritime economy • Apart from few exceptions, maritime sector is dominated by small companies • The age structure of the fleet in national navigation • Absence of a cluster of science, the shipbuilding industry and shipping • The Republic of Croatia is increasingly becoming a nautical tourism country, rather than a maritime country • Lack of specialised workforce in some maritime segments, e.g. leisure boatbuilding • The criteria for determining the justifiability, priority and approval of large infrastructure and other development projects have not been defined • Revenues per square metre of concession areas • Inefficiency of public services • Fragmentation and overlapping of the authority of the public sector • Administrative burden of maritime economy • Insufficient capacities of particular ports • Capacity constraints on port inland expansion and issues with port-city interface • Low terminal and port productivity • Insufficient number of top class marinas and berths • Fragmented shipping and logistics services • Lack of long-term and strategic plans • Fragmentation of the maritime sector • Incapacity for proper reaction in case of greater pollution and other large-scale emergency incidents

OPPORTUNITIES	THREATS
• EU membership and enlargement of the EU to neighbouring countries • Opportunities of funding from EU funds • Regulated system of social welfare rights of seafarers • Stimulating taxation policy for shippers and seafarers • Attractive location for residence • The possibility of a significant efficiency increase by using simple organisational and administrative measures • Unused capacities of maritime sector development • Provision of ship management services to foreign shippers • Design and application of modern technologies • Modernisation and development of seaports with a view to further develop the national economy as a whole • Construction and modernization of land based infrastructure • Opportunities for direct SSS to ports in the Adriatic and Mediterranean region (Motorways of seas) • Strong demand for nautical tourism and related activities • Increased interest in linking some Croatian ports to Mediterranean cruise networks • Opportunities for MET institutions to offer programmes to EU and international students • Connection of activities with the coastal culture • Environmental friendly solutions of maritime transport and maritime transport infrastructure • Ferry port Split is the third biggest port at Mediterranean sea in terms of passenger and car transportation	• Increase in number of seafarers from countries with a lower living standard • Weak economic growth in the Euro zone area • Competition from single market • Strong competition from North Europe gateway and Med hub transhipment ports • Dependency on tourism traffic • Population aging of island population • Strong impact of possible pollutions of the sea on the economic development and sustainability • Risk of increase in maritime accidents with negative environmental effects • Decline in the capacity of maritime administration in the provision of public services • Potential extinguishing of shipbuilding as an economic sector • Great crisis in the shipping industry • Technical and economic lag of classic ships • Continuous increase of human activity at sea and in the coastal area • Limited capacity and flow of railway transport

13 Table SWOT Maritime sector

6. URBAN, SUBURBAN AND REGIONAL SECTOR

6.1. Analysis

The analysis of the Urban, Suburban and Regional Sector is quite specific because of its dependence on the proper functional regional analysis based on all relevant data. As stated in the main document of the Croatian Transport Development Strategy (chapter 2.1), the functional regional analysis in this stage of the TDS development is based on the existing data available. However, only the existence of the National Traffic Model and the data gap analysis and all relevant data collection (e.g. transport flows, Origin-Destination matrixes) which is to be performed as a follow up of this TDS, will enable a full and a deep analysis of the Urban, Suburban and Regional sector. This analysis will be performed in the next stage of the TDS development, in 2016.

Annex 1, chapter 6 presents a deep description of the general sector in the country, highlighting the related infrastructure and services of the main urban locations. This section addresses the main conclusions of this field, which presents a list of hypotheses that have been defined, but which are assessed as assumptions, conclusions or and at this stage, the main result of the analysis.

Some of them come from the relevant EU and national policies, some from existing strategies, some from expert workshops held in Croatia, and some of them directly from the available data analysis.

Moreover, the basis for supporting these conclusions is aligned with the regional, national and EU-wide policies on transport, environment and economic development and allows stating what is to achieve a modern transport network, and what broad direction is expected from future policies.

Based on different criteria, the results of the analysis have been divided into "*general*" and "*specific*", and based on the field to which they refer, into *"infrastructural"*, *"organisational"*, *"infrastructural/organisational"* and *"other"*. Each conclusion has been provided with a reference number in order to facilitate its identification with respect to the objectives and measures which it supports.

The **general conclusions** (A) are founded on problems which must be solved in order for the Republic of Croatia to be able to fulfil the objectives stated in the strategic documents of the EU, especially in the Transport White Paper (WHITE PAPER- Roadmap to a Single European Transport Area – Towards a competitive and resource-efficient transport system - EC Brussels, 28th March 2011) and the document entitled "A sustainable future for transport", EC Brussels, 2009, as well as on specific problems connected to them (e.g. the issue of the ownership of land on which a particular transport infrastructure has been built etc.).

The **specific conclusions** (B) refer to the recognized problems in particular areas in Croatia.

The division *into infrastructural, organisational, infrastructural/organisational* and *other* has been determined in order to define more effectively the measures in each of these areas.

- Conclusions classified as **infrastructural** (1) refer to the recognized need for the adaptation of the existing infrastructure and the building of a new one.
- Conclusions classified as **organisational** (2) refer to the recognized potential of technological and technical improvement of the system.
- Conclusions classified as **other** (3) refer to the recognized general problems which are either the cause or the result of the as-is state of urban, suburban and regional mobility.
- Conclusions classified as **infrastructural/organisational** (4) are those on the basis of which it cannot, at this stage, be determined whether the problem can be solved by the adaptation of the existing infrastructure, the construction of a new one, different organisation or the combination of the infrastructural and organisational measures.

The following list shows the different conclusions with the code: Ai Xj Yz.

On criteria (Ai):
A: General
B: Specific
On areas/field (Xj)
Infrastructural (1)
Organizational (2)
Others (3)
Infrastructural/organizational (4)
Number (Yz)

6.2. List of hypothesis/conclusion/assumptions

CODE	HYPOTHESIS
A 1 1	There is a potential for building a network of bottlers at all intermodal points (filling stations for charging electric cars).
A 1 2	There is a need for defining and constructing the stations/terminals for transfer between different modes of transport (airport, port, rail, bus).
A 1 3	There is a need for adjustment of the railway infrastructure in the inter-state, inter-city, regional, urban and suburban transport.
A 1 4	There is great potential for the introduction of bicycle paths (routes) in order to improve the mobility of citizens (i.e. in Zagreb).
A 1 5	There is a great need for a regulation (update) on stops and stations of the Public Transport System.
A 2 6	There is a need for the introduction of a single ticket for the different transport modes (train, tram, bus, etc.) in the main cities of Croatia, which includes a unified faring scheme.
A 2 7	There is a need for the introduction of “e –ticketing” that will allow to pay without cash.
A 2 8	There is a problem due to lack of administrative bodies at national level, for urban, suburban and regional transport.
A 2 9	There is a need for the introduction of passenger information systems (all types of traffic).
A 2 10	There is a need for harmonization of timetables.
A 2 11	There is a problem of financing, management and coordination of regional transportation.
A 2 12	There is great potential for harmonization of rail and bus transport services.
A 2 13	There is great potential for the introduction of unique zoning schemes (tariffing).
A 2 14	There is a potential for “tourist tickets” to be integrated into the tourist offer.
A 2 15	There is a need for a centralized control system of traffic lights.
A 2 16	There is a potential of introducing car sharing service.
A 2 17	There is potential for the introduction of measures to prioritize the Public Transport (ITS solutions).
A 2 18	There is a potential for managing the delivery and support services in the peak period.
A 2 19	There is a potential for better management of vehicles in the Public Transport system (fleet management).
A 3 20	There is a problem of ticket prices.
A 3 21	There is a need for developing studies for sustainable mobility of citizens.
A 3 22	There is a concern about potential rises of the energy price.
A 3 23	There is a need to address the concession for taxis.
A 3 24	There is a problem of lack of legislation that clearly defines the urban, suburban and regional transport.
A 3 26	There is a need for harmonization of strategic documents (Transport Development Strategy with the Physical Planning Strategy, Regional Development Strategy, Environmental Protection Strategy of the RoC, Economic Development Strategy).
A 3 28	There is a potential to increase the public transport by purchasing new rolling stock, user adjusted (air conditioned, etc.)
A 3 30	There is a problem of property issues that may hinder the development of a project.
A 3 31	There is great potential for educating citizens and target groups about the benefits and methods of using

CODE	HYPOTHESIS
	Public Transport.
A 3 32	There is a need for technical and administrative preparation of projects in public transport.
A 3 33	There is a great potential for education of Public Transport carrier - in drivers, controllers, maintenance personnel on economical and safe driving and communication with passengers.
A 4 34	There is a need to upgrade the road network in accordance with the planning documents and the need to develop municipal transport.
A 4 36	There is a need for the introduction of the dedicated lanes for public transport vehicles.
A 4 37	There is great potential for the reorganization of the parking system/introduction of Park and Ride (P&R) system that is integrated into Public transport (mainly in big cities, i.e. Zagreb, Split).
A 4 38	There is a great need to increase the safety of rail-road crossings throughout Croatia.
A 4 39	There is great potential for the expansion of the city's Public transport system on the regions.
A 4 40	There is a potential for integrating river (Sava, Drava) and coastal transport (Istria, Kvarner etc.) in the Public transport system.
A 4 41	There is great potential for regional centralization of traffic management and passenger information.
A 4 42	There is a great potential for achieving 0 emissions using green technologies (new public transport vehicles with low CO2).
A 4 43	There is a need for improving the accessibility of key destinations (airports, railway stations, bus stations, city centre etc.).
A 4 44	There is great potential for improvement and construction of new footpaths that connect households with stations for public transport, railway stations and intermodal terminals.
A 4 45	There is great potential for rail transport to be the holder of traffic load (Public Transport backbone systems).
A 4 46	There is a problem of bottlenecks in urban areas.
A 4 47	There is a need to adapt public transport for people with disabilities.
B 4 48	There is a need to increase the safety and security using video surveillance in public transport and on the streets.
B 1 49	There is a problem of the lack of terminals and mutual not meeting internal traffic of Osijek and regional transport
B 1 50	There is a need for rail and road connections with Rijeka, main Croatian port.
B 1 51	There is a need to extend the tram lines and tram network in Zagreb and Osijek.
B 1 52	There is an option for the development of rapid rail system (like the subway or Light Rail/Tramway with over ground and underground sections, where the existing tram systems at the edge of its capacity and in the areas outside the zone of suburban mobility in Zagreb.
B 1 53	There is a need to adapt road infrastructure, particularly platforms (height and distance to the tram tracks) by new low-floor trams and buses in the city of Zagreb.
B 1 54	There is a potential for the construction, rehabilitation and modernisation of the Public Transport infrastructure: tramways, tram electric energy systems, tram depots, bus garages, funicular, bus stations, PT terminals, gas filling stations as well as the procurement of special vehicles for intervention and maintenance of tram and bus system in the city of Zagreb.
B 2 55	There is a potential for the development of intensive maritime connections to islands Cres and Lošinj from Rijeka.
B 2 56	There is a potential for passenger traffic along the coast.

CODE	HYPOTHESIS
B 2 57	There is a need to intensify the connections through waterways and maritime transport.
B 2 58	There is a need for the introduction of unified transport information regarding data gathering and the coordination between services and route planning.
B 2 59	There is great potential for "on demand" services in the less populated areas.
B 2 60	There is potential to increase seasonal activities of using Public transport system (number of lines, tourist tickets etc.).
B 2 61	There is a potential for seasonal reorganization in road transport.
B 2 62	There is a general problem of the decreasing population in certain areas of Croatia (e.g. Slavonia and Baranja), and thus the problem of proving the justification of investments in transport.
B 3 63	There is a potential for the development of the city of Osijek in terms of transport and logistics centre.
B 3 64	There is a need to conduct studies to connect sparsely populated mountainous areas in terms of increase in the price of fossil fuels (e.g., Gorski Kotar , Ličko-senjaska county).
B 4 65	There is a need for separating freight from passenger rail transport in Zagreb i.e. freight should be moved out of city.

14 Table List of hypothesis Urban, suburban and regional sector

6.3. SWOT Urban, suburban and regional sector

STRENGTHS	WEAKNESSES
• Increased population mobility • Labour mobility • Safety • An affordable price of transport in comparison to transport by passenger cars • Diversity of tariff offer • Eco-friendliness of public transport • Energy efficiency • Sustainable development • Added value of real estates and the economy	• Inadequate uniform legal regulation concerning public transport • Absence of market orientation of state-owned carriers • Non-existence of market research • Non-existence of complete statistical data required for transport planning (no data collection) • Poor condition of transport infrastructure (roads, railway stations, stations etc.) • Poor organization of transport service • Lack of coordination between modes of transport (absence of integrated transport) • Modern systems for the sale of transport tickets are not being used • All possible channels for the sale and advertising of services are not being used • Users are not informed about the services and advantages of public transport • Unfavourable expenses to revenue ratio • Lack of corresponding service facilities (cleaning facilities for the means of public transport etc.) • Inadequate structure of the vehicle fleet.

OPPORTUNITIES	THREATS
• Amendments to the legislation (availability of public transport to all citizens) • Integration of modes of transport (joint timetables and tickets) • Conformity with the EU strategies (the White Paper, etc.) • Introduction of innovative services into the transport offer development of the environmental awareness of the population • Implementation of new technologies in business operations (ITS) • Modernization of fixed and mobile facilities • Conclusion of long-term PSOs (Public Service Obligations – contracts of public importance) • Setting up of a system of continuous collection of all relevant statistically adequate data • Continuous growth of the price of motor fuels (more expensive individual transport)	• Lack of adequate legislation • Non-cooperation between carriers operating in different modes of transport • Lack of investment in transport infrastructure • Lack of investment in mobile facilities (vehicle fleet) • Unregulated public transport market (unfair competition) • Inadequate coverage of the revenue/expenses ratio (insufficient subsidies)

15 Table SWOT Urban, suburban and regional sector