LAPPEENRANTA UNIVERSITY OF TECHNOLOGY
Faculty of Technology Management
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PUBLIC AND PRIVATE SECTOR DECISION MAKERS WITHIN THE RAIL BALTICA GROWTH CORRIDOR

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Savonlinna, October 23, 2012
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ABSTRACT

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Title: Public and Private Sector Decision Makers Within the Rail Baltica Growth Corridor

Department: Industrial Management

Year: 2012 **Place:** Savonlinna

Master's Thesis. Lappeenranta University of Technology.
116 pages, 23 figures, 40 tables and 4 appendices.
Supervisors: Professor Olli-Pekka Hilmola
Doctoral student, M.Sc. (Econ.) Milla Laisi

Keywords: Rail Baltica Growth Corridor, Intermodal transportation, Railway transport, Tourism in Baltic States

Transport volumes have increased and will continue to increase in European Union. Even though the growth has not been equal between different transport modes. Most of the growth has been faced on road transport. European Union aims to balance the unbalanced market shares between the modes by gaining and supporting the competitiveness of railway and waterway transport. In EU railway transportation is seen as solution to increase safety in traffic and decrease the environmental impacts of transportation.

The aim of this research is to figure out how it is possible to decrease the environmental impacts by the technology already in use. Main focus of this research is in intermodality and combining the road and railway transportation. This study aims also to figure out demands and expectations towards new Rail Baltica railway route connecting Tallinn and Berlin.

The research is conducted by performing a literature review about decreasing environmental impacts and combining road and rail transport. Another viewpoint is taken from the possible effects of tourism to the passenger transport on rails. Knowledge gained by literature review is deepened by additional internet questionnaire study and expert interview study.

In decreasing the environmental impacts of transportation electric trains are definitely the best option providing that the electricity is generated from renewable or carbon dioxide free sources. Decrease of environmental impacts has been reached also with acceptance of larger road transport vehicles. According to interviewed passenger transport experts, the whole route from Tallinn to Berlin may not be convenient to be used in passenger transport, just because the route is too long.. In EU freight is transported mainly with semi-trailer combinations, and that is why it could be logical if huckepack trains would be used on Rail Baltica. Huckepack train allows semi-trailers to be transported on rails with time efficient loading-unloading process. Overall, Rail Baltica project is experienced as a future-oriented one and new railway alignment is seen as great alternative option for transport modes using fossil fuels.

TIIVISTELMÄ

Tekijä: Juho Teemu Tuomas Terävä
Työn nimi: Julkisen ja yksityisen sektorin päätöksentekijät Rail Baltica Growth Corridor:n alueella.

Osasto: Tuotantotalous

Vuosi: 2012 **Paikka:** Savonlinna

Diplomityö. Lappeenrannan teknillinen yliopisto.
116 sivua, 23 kuvaa, 40 taulukkoa ja 4 liitettä.
Tarkastajat: Professori Olli-Pekka Hilmola
Tutkija, KTM Milla Laisi

Hakusanat: Rail Baltica Growth Corridor, Intermodaaliset kuljetukset, Rautatiekuljetus, Turismi Baltian maissa

Kuljetusmäärät ovat kasvaneet ja tulevat kasvamaan Euroopan Unionin alueella. Kasvu ei kuitenkaan ole ollut tasaista eri kuljetusmuotojen välillä, vaan suuriosa siitä on suuntautunut maantiepuolelle. Euroopan Unionin tavoitteena on tasata kuljetusmuotojen välisiä markkinaosuuksia ja parantaa rautatie- ja vesikuljetusten asemaa ja kilpailukykyä muihin kuljetusmuotoihin verrattuna. EU näkee rautatiekuljetukset ja niiden kehittämisen keinona parantaa liikenneturvallisuutta ja ennen kaikkea vähentää liikenteen aiheuttamia ympäristöhaittoja.

Tämän tutkimuksen tavoite on selvittää kuinka kuljetusten ympäristöhaittoja voidaan pienentää käytössä olevilla tekniikoilla. Pääpaino tutkimuksessa on intermodaalisuudessa ja eritoten maantie- ja rautatiekuljetusten yhdistämisessä. Tavoitteena on myös selvittää vaatimuksia ja yleisiä odotuksia uudelle Rail Baltica -rautatielinjalle joka kulkee Tallinnasta Berliiniin.

Tutkimus on suoritettu tekemällä kirjallisuustutkimus koskien kuljetusten aiheuttamien ympäristöhaittojen pienentämistä sekä maantie- ja rautatiekuljetusten yhdistämistä. Toisena näkökantana on huomioitu turismin mahdolliset vaikutukset rautatien henkilöliikenteeseen. Lisätutkimusta Rail Baltican vaatimuksista ja odotuksista on tehty internetkyselyllä sekä suorittamalla asiantuntijahaastatteluja.

Kuljetusten ympäristöhaittojen pienentämisessä sähköjunat ovat ehdottomasti paras vaihtoehto, edellyttäen että sähkö on tuotettu uusiutuvilla tai hiilidioksidittomilla energialähteillä. Ympäristöhaittoja on tosin pystytty alentamaan huomattavasti myös maantieliikenteessä ajoneuvoyksikköjen kokoa suurentamalla. Haastateltujen henkilöliikenteen asiantuntijoiden mukaan rautatielinja Tallinnasta Berliiniin on liian pitkä, eikä junaa ole mielekästä käyttää koko välillä. EU:N sisällä liikkuva rahti kulkee nykyisin pääasiassa puoliperävaunuyhdistelmillä ja tästä johtuen olisi loogista että Rail Baltica:lla otettaisiin käyttöön huckepack-junat, jotka mahdollistavat ajoneuvojen ja perävaunujen kuljettamisen junalla. Huckepack:n etuna on sen helppo ja nopea lastaaminen ja purkaminen. Ylipäätään Rail Baltica nähdään tulevaisuuteen tähtäävänä projektina ja hyvänä vaihtoehtona fossiilisia polttoaineita käyttäville kuljetusmuodoille.

ACKNOWLEDGEMENTS

This Master's Thesis was accomplished at Lappeenranta University of Technology, Kouvola Research Unit. This study is part of European Commission's Trans-European Network priority project Rail Baltica Growth Corridor. With this project I have been able to come out from my comfort zone, it have been a challenging task but it have taught me a lot. It has been great experience for me to be a part of this project.

I would like to express my gratitude to my instructor and supervisor, Professor Olli-Pekka Hilmola, for giving me an opportunity to take a part to this study. In addition, I would like to thank my supervisor Doctoral Student, M.Sc. (Econ.) Milla Laisi for her guidance and valuable advices during the study. I also want to thank Doctoral Student Ville Henttu for helping me a lot. I want to thank also the rest of LUT Kouvola team for giving me help and support during this project.

After all, I want to especially thank my family and friends to giving me motivation and support during this project.

Savonlinna, 23.11.2012

Teemu Terävä

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ABBREVIATIONS

3PL	Third Party Logistic service provider
BIC	Bureau International de Containers
EIA	European Intermodal Association
ETT	En Trave Till (One More Stack)
FEU	Forty foot Equivalent Unit
ILU	Intermodal Loading Unit
LHV	Longer Heavier Vehicle
LOLO	Lift-on/Lift-off
RBGC	Rail Baltica Growth Corridor
ROLA	Rollenden Landstraße
RORO	Roll-on/Roll-off
TEU	Twenty foot Equivalent Unit
UK	United Kingdom
UNECE	United Nations Economic Commission for Europe
UP	Union Pacific Corporation

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1 INTRODUCTION

This study is concentrated on examining expectations and demands for transportation of people and freight in Rail Baltica Growth Corridor (RBGC) area. RBGC area includes Eastern European Countries from Finland through Baltic States (Estonia, Latvia and Lithuania), Poland and ending up to Germany. Data for this study is gathered with internet questionnaire and expert interviews. Literature review is focused on finding options for intermodal transportation as the operating method on Rail Baltica. Another viewpoint in literature review is tourism in Baltic States; movement of tourists are tried to understand. Especial interest is given for options to combine road and rail transport. This master's thesis is executed in Lappeenranta University of Technology, Kouvola Research Unit and it is partly used in research reports for the Rail Baltica Growth Corridor project work packages three (WP3: Accessibility of the City Regions) and four (WP4: Travel and Logistics Service Development and Demand) (Enhancing Accessibility of Rail Baltica Influence Area: Standpoints of Public Sector and Private Transport Market Stakeholders in the Area of Rail Baltica).

1.1 Background of the Research

In "White Paper: European transport policy for 2010", European Union (2001) states development steps aiming to balance imbalanced market shares between modes of transport to fit in with the strategy of sustainable development. The main aims are revitalize railway transport, promote waterway transport in both, sea and inland waterways and control the growth in air transport. In the beginning of this millennium European Commission's first White Paper on transport policy, published in 1992, had reached its targets. The transport market had been opened when road cabotage had become a reality, safety standards on air transport had become the best in the world in European Union and personal mobility had increased up to 35 km a day in 1998 from 17 km in 1970. (EU, 2001)

After opening the transport market, different transport modes have grown unequally. In 2001 European Union was in situation where road took 44 per cent of the freight transport market compared with eight per cent for rail and four per cent for inland waterways. On passenger transport market the inequality was even larger while road took 79 per cent, rail six per cent and air five per cent for the market. Unequal growth brought also congestions on the main rail and road routes in cities and at certain airports. And because of congestion harmful effects on the public health and environment and poor road safety began to emerge. European Union estimated that economic development combined with enlargement of the Union could even exacerbate these trends. (EU, 2001)

To follow up the strategy of sustainable development, European Union is aiming to reduce transport caused pollution on road traffic by directive 2007/46/EC, whereas part was introduced also the EURO-standards to vehicle engines for the CO_2-emissions and fuel efficiency. (EU, 2007) EU aims also to decrease pollution caused by sea transport by approving so called sulfur directive (2005/33/EC) in use which is identical with the IMO Marpol regulation. (EU, 2005) The IMO Marpol 73/78 Annex VI regulations aim to reduce nitrogen oxide (NO_x) emissions and prevent sulfur oxide (SO_x) and particular matter emissions from ships. These emissions will, in general, be controlled by limiting on the sulfur content of marine fuel oils. In SO_x Emission Control Area (SO_x ECA or SECA), the sulfur content of fuel oil used on board ships shall not exceed 0.10 per cent (m/m) after January 2015. (Det Norske Veritas AS, 2009, p. 14-15)

European Union sees railways as a solution for green transport and aims to increase railways share on European transport market (European Union, 2011). At the moment European Commission's mobility and transport development network, known as trans-European network (TEN-T), has 30 ongoing priority projects, and in 22 projects the focus is on railways. One of the priority projects is called Rail Baltica Growth Corridor. (European Union, 2012)

The Rail Baltica Growth Corridor -project aims to improve competitiveness and accessibility of cities and regions in the Eastern Baltic Sea Region. RBGC creates a cooperation and transport service platform that observes the needs of both transport sector and customers in line with the green growth corridor principles.

Rail Baltica is a railway that will connect the Eastern Baltic Sea Region from north to south branching from St. Petersburg, Tallinn, Riga, Kaunas and Warsaw to Berlin (see Figure 1 below). In the project there are total of 21 different partners including city municipalities, regional authorities, research institutes and universities and transport authorities from six different countries.

(Rail Baltica Growth Corridor, 2012a)

Figure 1. Map of Rail Baltica (Rail Baltica Growth Corridor, 2012b).

The RBGC-project consists of seven work packages:

- First and second represents administrative work; management and communication.

- Third is empirical part investigating public sector stakeholders and it is named as Accessibility of the City Regions.
- Fourth is like the same, but on the private sector side and it is named as Travel and Logistics Service Development and Demand.
- Fifth and sixth packages are connectivity and logistics pilots
- Seventh package is about creating strategy and recommendations for further acts. (Rail Baltica Growth Corridor, 2012a)

1.2 Objectives of the Research and Research Limitations

The research mainly concerns Rail Baltica route through examining intermodal transportation, tourism and opinions from both, public and private sector. All the results are based on opinions of different actors from rather small group. The amount of respondents makes the analysis quite difficult. Limited amount of data gives only a little hard facts, but still it gives great overall opinions about the Rail Baltica and shows the way where the main project should be taken.

The objective of this study is to examine the demands and expectations for the new railway route through Baltic States. The main research question is as follows:

- What are the demands and expectations for new Rail Baltica route?

Main research question can be divided into smaller sub-questions concerning intermodal transportation, freight and passenger transport, tourism and tourist movements and logistical infrastructure development needs. Questionnaire form for public sector actors (see Appendix 1) and interview frameworks for different private sector actors (see Appendices 2, 3 and 4) could be thought as sub-questions. Main ideas behind the sub-questions can be listed as follows:

- Is the new Rail Baltica route needed and desired investment?
- Is there enough volume to provide profitable train traffic?
- What should be the main focus on Rail Baltica, freight or passenger?
- What should be the main operating method for freight trains?

Study is limited to small target group and rather small geographical area. All in all, 101 people around the whole RBGC area and near the possible alignments of the railway were invited to respond the questionnaire for public sector. Answer rate was approximately 14 per cent. The interview study was targeted to Finnish and Estonian companies, which could have interest towards new transport corridor. Total of eight Estonian companies and seven Finnish companies were interviewed for the study. The companies represented three types of operating sectors: Mainly the interviewed companies were logistics service providers or clients of freight transport, six from both sectors. In addition also two passenger transport operators were interviewed. Even though the amount of interviewed companies was not so high, few of those companies have so high volumes that they could provide profitable train traffic only by themselves.

1.3 Structure of the Research

This Master's Thesis is structured as follows: In Chapter 2 the literature review about intermodal transportation will be presented. In following Chapter 3 there is presented the literature review concerning tourism. In Chapter 4 is presented the research methodology for public and private sector studies. In Chapter 5 is presented the empirical part of the questionnaire study for public sector. Chapter 6 presents the empirical part of the interview study for private sector. Chapter 7 compares the empirical results and literature review. In final Chapter 8 is presented the conclusions and recommendations for further research.

2 INTERMODAL TRANSPORTATION

Transportation, according to Hayuth (1987), may be regarded as a technological and organizational system whose goal is to transfer goods and people from one place to another in order to balance the economic and spatial gap between demand and supply centers. The transportation modes are the means by which freight or people are transferred to the destination. There are five different modes of transport with different characteristic economic structures and rationales. Five transport modes are:

- motor-vehicle transport
- rail transport
- water transport
- air transport
- pipelines

Common analysis of transport modes treats each mode individually. That is reasonable because every mode has its own cost structure and purpose. Even though there have been existing competition among the various transport modes, but it has been particularly fierce within the modes themselves. Intermodal transport is a certain form of cooperation. The evaluation about degree of cooperation between or among different modes is done rarely while analysis undertaken in transportation research is referred to divide shares of each mode in total trade. Cooperation between different transport modes have existed since the end of World War II, when rail-steamship operated in Europe and USA. For example, road-rail cooperation has been growing since the late 1960's in USA because of the containerization and "piggyback" trains. (Hayuth, 1987) According to White Paper of European Union (2001), intermodal transportation is seen as a solution to greener transportation when the main haulage is executed by railway or waterway. EU is aiming to balance the unbalanced market shares by regulating competition on transportation market to increase railway, short sea and inland waterway usage and to decrease road transportation. The aim is increase

the quality of road transportation and decrease emissions and traffic jams. (EU, 2011; Hayuth, 1987)

2.1 Definition and Practice

Intermodality or intermodal transportation is defined by multiple authors (e.g. Hayuth, 1987; Rutten, 1998; Slack, 1996; Woxenius, 1998) and organizations (e.g. Eurostat, ITF & UNECE, 2009; UIRR, 2010). According to Eurostat, ITF & UNECE (2009, p. 157) intermodal transport, multimodal transport and combined transport means more or less the same and that's why they can be understood as synonyms. Intermodal transport and intermodality is defined as follows:

- Eurostat et al.: "*Multimodal transport of goods, in one and the same intermodal transport unit by successive modes of transport without handling of the goods themselves when changing modes.*" (Eurostat et al., 2009, p. 157)
- International Union of combined Road-Rail transport companies (UIRR): "*Intermodal transport - The movement of goods in one and the same loading unit or road vehicle, which uses successively two or move modes of transport without handling of the goods themselves in changing modes.*" (UIRR, 2010, p.2)
- Yehuda Hayuth: "*Intermodality, thus, is simply defined as the movement of cargo from shipper to consignee by at least two different modes of transport under a single rate, through-billing, and through-liability.*" (Hayuth, 1987, p.15)

Intermodality in transport chain can be defined as the movement of goods from origin to destination in one and the same loading unit, by at least two different transport modes under single rate, through-billing and through-liability. The aim of intermodal transport is to transfer cargo from shipper to consignee as a

continuous flow through entire transport chain in the most time- and cost-effective way. The effectiveness is ensured by capitalizing the relative advantages of different transport modes in every leg of the journey. One of the most important parts of the intermodal transport service is the carrier's ability to provide the customer a single rate and through-billing for entire journey. In this manner companies with serving intermodal transportation simplifies the usual multi-rate and -billing structure that is usually prevailed. In Figure 2 below, there is demonstrated the complexity of an intermodal transport chain in a schematic through flow of cargo from shipper to consignee. Intermodal transport chain may contain multiple transport mode changes before goods are delivered to consignee. Schematic through flow chart demonstrates how many different legs the whole transport chain can be divided. Example shown in Figure 2 suggests, that the main leg is executed via water way or airline and pre- and post-haulage may be executed by trains, trucks or vessels. Whole transport chain, in this example, contains two mode changes. Though, the intermodal transport chain can be significantly shorter, involving only one mode change or in turn, chain can be even more complicated with more than two mode changes. For instance, the transport chain could be an example intermodal transport chain for goods from Asia to Western Europe. (EIA, n.d.; Hayuth, 1987; UIRR, 2010)

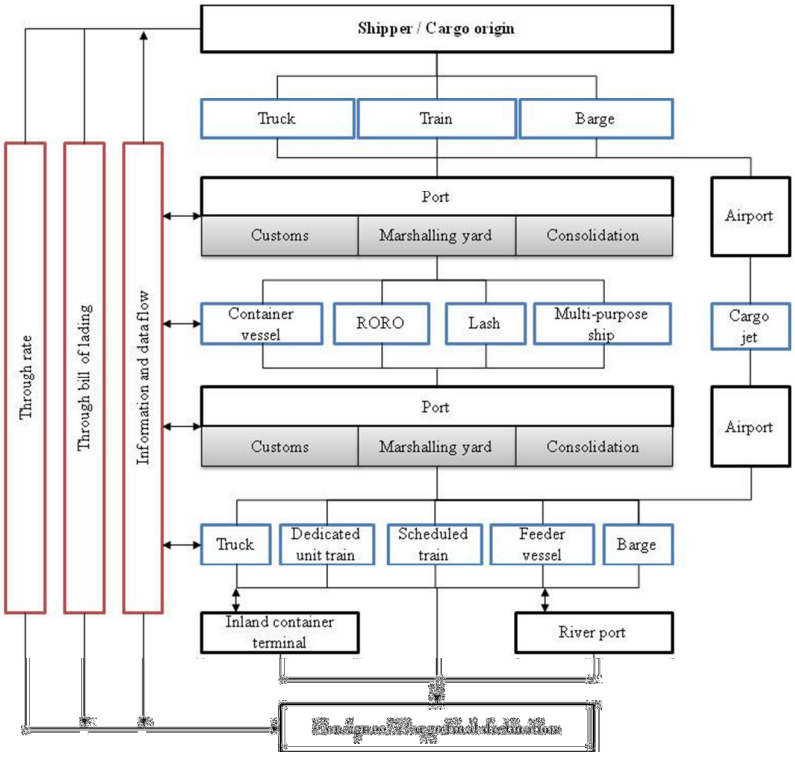

Figure 2. A schematic through flow of cargo from shipper to consignee. (Adopted from Hayuth, 1987, p 16.)

The development of intermodal transport companies, Hayuth (1987) conjectured in 1980's, that the containerization might cause the establishment of large multimodal companies. Comparing Hayuth's guesses with present day situation, it can be ensured that he was right, partially at least. In Europe, e.g. globally operating third party logistic service providing (3PL) companies DHL and DB Schenker provides intermodal transportation to their customers as a part of whole transport chain with their own rolling stock (DB Schenker, 2010; DHL Freight, 2012). Other intermodal service providing companies, e.g. Kombiverkehr, Hupac Group, Cemat, Ökombi and IFB, which are focused to provide road-rail transport services to logistic companies e.g. shipping lines, forwarders and trucking companies in Europe (Cemat, 2012; Hupac Group, 2012; Kombiverkehr, 2012; Ökombi, 2012). These companies operate mainly on rails with only intermodal rolling stock. The 3PL companies' operations differ from that they provide whole

transport chain, “door-to-door” service for their customers with outsourced logistics (Hertz and Alfredsson, 2003).

In North America, road-rail intermodal service providers provide also conventional freight train services and intermodal service is only a part of their operations. As can be seen in Table 1, in North American companies the revenue of intermodal transport operations, and also performance in tonne-kilometer, are on their own level if compared to European ones. For example, Union Pacific Corporation’s (UP) performance is over ten times more than best European company, Kombiverkehr. If comparing the amount of units transported, UP’s performance is approximately triple the Kombiverkehr’s performance. There is also a huge gap between revenues of intermodal actions. Genesee & Wyoming Inc. generates almost thirty times larger revenue than Kombiverkehr while transporting less than one tenth of Kombiverkehr’s total transported units. The gap in revenue of intermodal transport operations can be explained with the difference in length of haulage. In North America the average length of haulage performed on rails is longer than in Europe. Notable is also that the average train velocity in North America is over 20 mph (approximately 34 km/h) (Union Pacific Corporation, 2011), whereas it is in Europe approximately only 18 km/h (EU, 2003a). (Canadian National Railway Company, 2011; Canadian Pacific Railway Limited, 2011; Cemat, 2012; CSX Corporation, 2011; Genesee & Wyoming Inc., 2011; Hupac Group, 2011; Kansas City Southern, 2012; Kombiverkehr, 2011; Norfolk Southern Corporation, 2011; UIRR, 2011)

Table 1. Comparison of European and North American railway companies offering road-rail intermodal transportation, statistical data, year 2010. (Canadian National Railway Company, 2011; Canadian Pacific Railway Limited, 2011; Cemat, 2012; CSX Corporation, 2011; Genesee & Wyoming Inc., 2011; Hupac Group, 2011; Kansas City Southern, 2012; Kombiverkehr, 2011; Norfolk Southern Corporation, 2011; UIRR, 2011)

Company	Continen	Revenue of Intermoda Transport Operations (Thousand €)	Tonne-Kilometers (1000 tkm)	Share of Total Revenue	Total of Units Transported (pcs)
Union Pacific Corporation	North America	2 431 978	127 875 256	20 %	3 313 000
Norfolk Southern Corp.	North America	1 353 527	n/a	19 %	2 927 100
Canadian National Railway	North America	1 187 728	57 619 343	19 %	n/a
Canadian Pacific Railway	North America	1 015 824	41 622 464	27 %	1 070 100
CSX Corporation	North America	972 942	n/a	12 %	2 223 000
Kansas City Southern	North America	146 356	134 150 088	11 %	678 400
Genesee & Wyoming Inc.	North America	5 917	n/a	2 %	73 513
Kombiverkher	Europe	384	12 243 952	99 %	933 039
Hupac	Europe	367	8 323 521	84 %	690 251
Cemat	Europe	173	5 622 587	n/a	617 649
IFB	Europe	n/a	3 030 729	n/a	429 747
Novatrans	Europe	n/a	2 460 329	n/a	152 873
ICA	Europe	n/a	2 206 868	n/a	170 963
Ökombi	Europe	n/a	2 125 493	n/a	300 529

2.2 Intermodality in Transport Chain

As was said above, the aim of transportation is to move goods from point a to point b. With intermodal transportation it is possible to decrease the environmental impact, costs and lead time. Companies providing road-rail intermodal service are marketing their product as an environmental friendly. Main focus is in the cutting down carbon dioxide (CO_2) emissions. Great example is CSX Corporation from North America, which have measured to be capable to move a ton of freight nearly 500 miles per a gallon of diesel fuel. (CSX Corporation, 2012) That equals a ton, if freight moved over 210 kilometers with one liter of diesel fuel. Of course whole CO_2- emissions can be cut off with electronic locomotives with renewable energy, but the fact is, that it is difficult to archive even in Europe, where diesel locomotives are driven especially in freight traffic. For instance, in Finland the share of diesel driven locomotives is

approximately 15 per cent from the total driven locomotive distance (Liikennevirasto, 2011). Share of renewable energy produced in EU-27 in 2008 was approximately 18 per cent from the total energy production (EU, 2011).

Intermodal transport is usually divided in two parts, accompanied and unaccompanied transport. Both of the types of intermodal transport are in use in combining road transport with rail and water. By accompanied transport it is meant that there is complete road vehicle on the carrier, train or ship. Accompanied rail applications are usually called as Rolling Motorway, Rolling Road, Rolling Highway or ROLA (Rollenden Landstraße). In waterway transport, the ships are called Roll-on Roll-off (RORO) vessels. Unaccompanied intermodal transport on water is also performed with RORO vessels. In railway traffic, a train capable to carry intermodal loading units is called usually as “piggyback” or “huckepack” train. A train carrying only containers is called “bloc train”. The difference between accompanied and unaccompanied transport is demonstrated in Figure 3. (Eurostat et al., 2009; UIRR, 2010; Ökombi, 2012b)

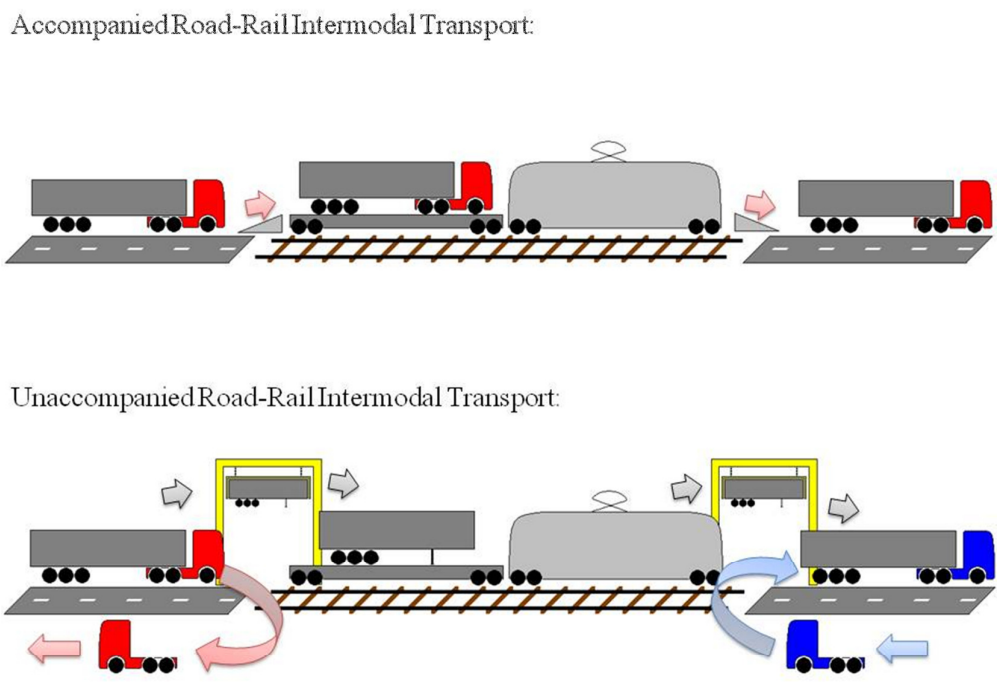

Figure 3. Demonstration of the difference between accompanied and unaccompanied road-rail intermodal transport. (Adopted from: UIRR, 2011, p. 2)

One crucial part of intermodal network is intermodal terminals. The terminal is a place, which is equipped to transship and store intermodal loading and transport units. Usually these kinds of terminals are conceived as ports, dry ports and road-rail terminals. Port is conceived as conventional seaport with ability to handle Lift-on/Lift-off (LOLO) and RORO traffic. Dry port is an inland intermodal terminal directly connected by rail to sea port (Roso, 2009). Intermodal rail transport terminals are places, which are equipped for store and transship intermodal loading units on and off the train (Eurostat et al., 2009). For accompanied intermodal transport or RORO traffic, the requirements are minimal, all what is needed is a ramp, which can be driven on while loading and unloading the train or RORO vessel. Maritime containers need reach stackers, ship-to-shore cranes and possibly straddle carries, especially in ports. For unaccompanied

intermodal transport units in ports, dry ports road-rail terminals reach stackers, straddle carriers and yard cranes are needed. Also terminal tractors are needed while handling unaccompanied semi-trailers. (Cargotec, 2012; Eurostat et al., 2009)

According to European Intermodal Association (n.d.), it is more inexpensive to transport short distances, less than approximately 650 km's, with unimodal road transport unit than intermodal transport unit, because the handling of ILU costs in terminals. But the situation is another in longer distances because so called "extra distance" is cheaper to transport on rails. The break-even point of costs per distance between unimodal road transport and intermodal transport is shown in Figure 4. The gap between costs of transport modes in distances less than 650 km's can be explained by terminal costs. Terminal costs consists mainly because of handling while modal change. An example of cost structure of intermodal transport is shown in Figure 5.

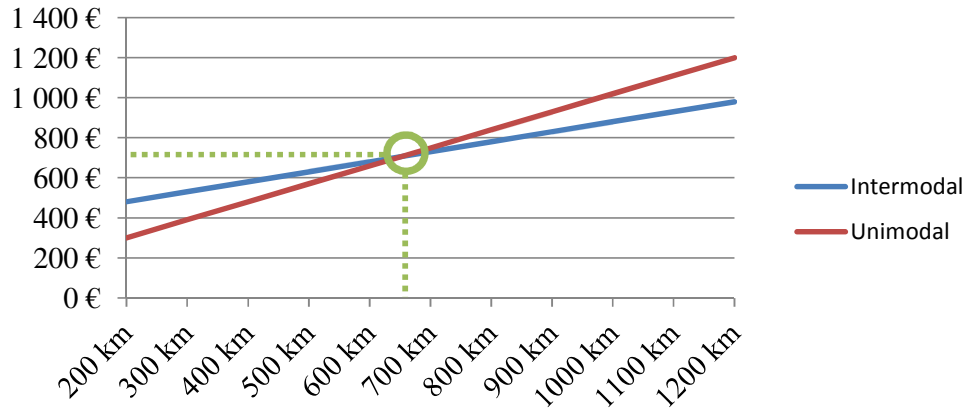

Figure 4. Break-even point of costs of intermodal and unimodal road transport. (Adopted from: EIA, n.d., p.30)

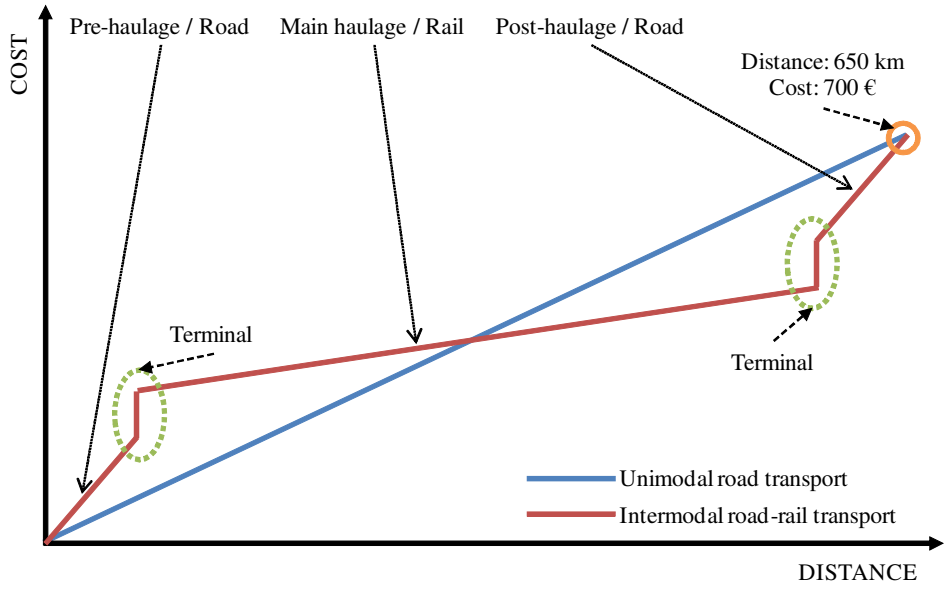

Figure 5. Example cost structure of intermodal transport compared to unimodal road transport. (EIA, n.d.; Rutten, 1998)

According to Rutten (1998), road transport in pre- and post-haulage is relatively expensive, if compared to main haulage because the initial and final legs are relatively short compared to main leg on rails. In Figure 5 there is determined the overall distance is approximately 650 km, which is the break-even point of unimodal road transport and intermodal road-rail transport, and cost is the same whichever mode is used. But if distance is increased over 650 km, intermodal transport is getting more cost-efficient. In general, costs per tonne-kilometers in intermodal transport chain can be decreased by increasing the overall transportation distance, because the transshipment costs are playing more minor role. (EIA, n.d.; Rutten, 1998)

2.3 Intermodal Loading Units

Intermodal loading unit (ILU) is common term for a maritime container or a swap body (EU, 2003b). Nowadays also semi-trailers are considered as an ILU (e.g.

EIA, n.d.; Eurostat et al., 2009). In Table 2 below, are shown common ILU's, their use, dimensions, net and cross weights and the payload. In the table there are listed ILU's inside dimensions because it is the limiting factor while loading the unit. Outside dimensions limit ILUs usage while transporting it, but inside dimensions determines ILU's volume. Especially in transport of general cargo the volume of the ILU is usually limiting factor, while payload is rarely. Also some bulk materials (e.g. wood chips) are so space consuming that the volume of the loading unit is limiting factor, not the payload.

As can be seen in Table 2 below, FEU's (Forty foot Equivalent Unit) dimensions are the same than TEU's (Twenty foot Equivalent Unit), but the length of the container is double. TEU is smaller, but it can carry bigger payload per length than FEU. TEU and FEU are globally standardized maritime containers and are in use all over the world. (DB Schenker, 2011; EU, 2003b)

Table 2. Different intermodal loading units listed. (DB Schenker, 2011; EU, 2003b)

ILU	Use	Inside Length [mm]	Inside Width [mm]	Inside Height [mm]	Net Weight [kg]	Gross Weight [kg]	Payload [kg]
TEU	Dry Cargo	5890	2340	2370	2300	22300	20000
FEU	Dry Cargo	12020	2340	2370	4000	30000	26000
Swap Body	Cargo	7700	2480	2950	4000	18000	14000
Semi-trailer	Cargo	13600	2480	2700	5200	32200	27000

The swap bodies and semi-trailers are not as usable as containers in global transporting, but they are used in incontinent transports widely, especially in Europe. In global point of view swap bodies are rare, but semi-trailers as a unit is in use everywhere. There are few problems in usage of semi-trailers in global transport chain, which are the price of the trailer (can be over 20 times more than standard maritime container) and varying standards of dimensions and weight limits for instance. For sure also the inability to stack up the trailers is a hindering

factor in Lift-on Lift-off (LOLO) transports overseas. (DB Schenker, 2011; EIA, n.d.; EU, 2003b)

To ease identification of intermodal loading units the “ILU-code”, standard EN 13044 has been created. The aim of the standard is to increase safety and efficiency by simplifying the access to combined transport. An important addition to safety is made by identifying the dimensions of non-ISO standardized swap bodies and semi-trailers, which usually needs increased loading gauge to be able to be transported via rails. For instance, wider loading gauge is limiting the transportability especially in rail tunnels. The corresponding codification of loading units and loading gauge is now a lot easier. The ILU-code is compatible with worldwide used BIC-code, which is used to identify ISO 6346 standard maritime containers. BIC-codes are authorized by Bureau International de Containers and European ILU-code by UIRR. The code is a combination of the owner key, registration number and check digit, which is demonstrated in Figure 6 below. (UIRR, 2011c)

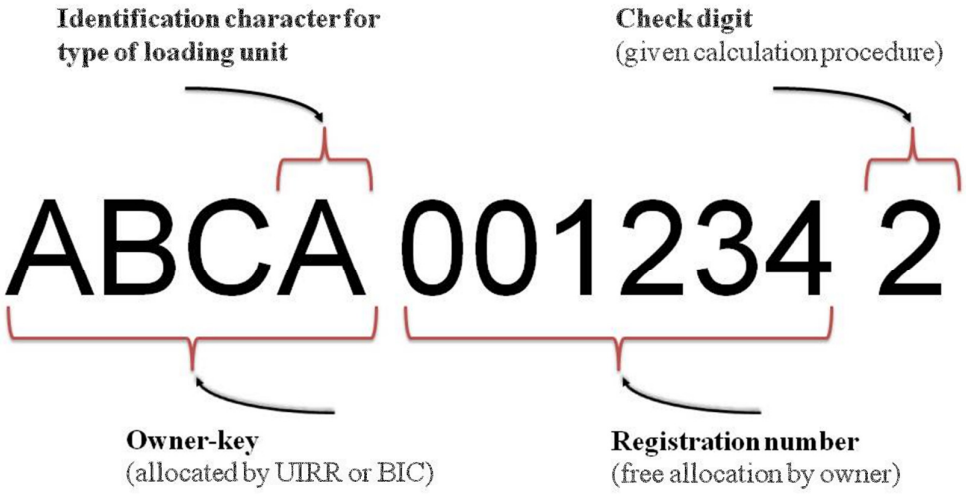

Figure 6. Example of compatible ILU-code and BIC-code. (Adopted from: UIRR, 2011c, p. 3)

ILU-code and BIC-code is in same form, but there is slight difference in the identification character for type of loading unit. The BIC-code, ISO 6346 requires the fourth alphabet to be "U" for containers, "Z" for trailers and the chassis and "J" for the equipment fitted on the container. For comparison, the ILU-code, EN 13044 requires "A", "B", "D", "E" or "K" for intermodal loading units with restricted use for Europe. It is said that standardized codification of loading units brings advantages for all, by possibility to electronic data processing in transport chain, simple identification of the owner e.g. in emergency situations and elimination of the need for different operational markings e.g. for intermodal rail use, while the standardization is given directly by manufacturer of the loading unit. UIRR operators and UIC railway undertakings have decided that they will accept only BIC-code or ILU-code marked units in transportation after June 2014, and after June 2019 only units with the new codification plate are accepted. (UIRR, 2011c)

2.4 Semi-trailers in Intermodal Transport Chain

In international research, the targets have been on investigating maritime containers, ports and terminals, whereas semi-trailers are merely overlooked. For instance, only a fraction of all scientific journal publications, scoping intermodal transport and published after 1997 include other commodities, e.g. RORO cargo. However, there are signs that share of semi-trailers in intermodal transportation will increase. Shipping companies have recently made investments in additional capacity to RORO transports. For example from and to Finland operating companies Eckerö Line announced that they have invested in used 175 meter long RORO vessel (Tekniikka & Talous, 2012). Also Viking Line made an agreement to build a new vessel with STX Europe in late 2010. It is estimated that the new ship will start operating in 2013 on route Turku - Stockholm. And Tallink have already been providing and developing shuttle services between Tallinn and Helsinki since 2007. Also Stena Lines have introduced two new ferries, with 5500 lane meters for semi-trailers, to its Hook of Holland - Harwich route in 2010. (Stena Line, 2011; Tallink, 2011; Viking Line, 2011; Woxenius & Berqvist, 2011)

According to Woxenius & Bergqvist (2011) and Ports of Sweden (2012), in Swedish ports were handled almost 2.5 million trailers, semi-trailers and lorries compared to approx. 1.4 million TEU's in 2010. Other RORO cargo were handled almost 90 000 units. In weight, the tonnes trailers, semi-trailers and lorries (approx. 36 million tonnes) were almost three times and all RORO tonnes almost four times the tonnes of containerized cargo. Notable is that in Swedish ports, from the utilized cargo tonnes handled over quay, approx. 66 per cent was on trailers, semi-trailers and lorries. RORO cargo's share from the total cargo turnover is 28 per cent. The divergence of accompanied and unaccompanied transport is not available. Data from Swedish port operations is shown in Table 3 below. (Ports of Sweden, 2012)

Table 3. Swedish port operations in year 2010. (Ports of Sweden, 2012)

Loading Unit	All units 1 000 pcs	Loaded units 1 000 pcs	Weight of goods 1000 tonnes
Containers (TEU equivalent)	1 408	703	12 939
Road goods vehicles	2 497	1 248	36 311
RORO units	2 584	1 291	40 323

The gap in amount of handled ILU's in Finland is more even than in Sweden. According to Finnish Port Association, in 2010 Finnish ports handled over 1.2 million (approx. 260 000 empty and 990 000 loaded) TEU's (Finnish Port Association, 2012a) and over 850 000 RORO units (Finnish Port Association, 2012b). In weight, the tonnes of the RORO units were slightly better than containerized tonnes, 12.3 million tonnes (RORO) compared to 10.2 million tonnes (TEU). The divergence of accompanied and unaccompanied transport is not available. Data from Finnish port operations is shown Table 4 below. (Finnish Port Association, 2012a; Finnish Port Association, 2012b)

Table 4. Finnish port operations in year 2010. (Finnish Port Association, 2012a; Finnish Port Association, 2012b)

Loading Unit	All units 1 000 pcs	Loaded units 1 000 pcs	Weight of goods 1000 tonnes
Containers (TEU equivalent)	1 246	987	10 216
RORO units	853	n/a	12 273

If Swedish and Finnish statistics are compared with United Kingdom's, handled weight is way higher, as can be seen in Table 5. The overall weight of RORO cargo is almost three times bigger in UK than in Sweden. Actually, UK ports handle goods almost twice as much as Finnish and Swedish ports together. The balance of goods transport can be measured by comparing transported empty units

to total amount of units transported. (Department for Transport, 2011) On the side of container transport, in UK every fourth handled container is empty, where as it is in Finland every fifth container and in Sweden, every other container handled is empty. On the RORO side, situation is interestingly same than on containers, every other handled road goods vehicle is empty. Overall, every other RORO unit was transported empty. The situation in UK is entirely different due to approximately 17 per cent of the all RORO units was handled empty in UK ports. From the overall amount of unaccompanied trailers, only 15 per cent was empty and remarkable is that only 14 per cent of handled road goods vehicles were empty. (Department for Transport, 2011; Finnish Port Association, 2012a; Finnish Port Association, 2012b; Ports of Sweden, 2012) The comparison is of the situation in Finland, Sweden and UK is summed up together in Table 6.

Table 5. United Kingdom Port operations in year 2010. (Department for Transport, 2011)

Loading Unit	All units 1 000 pcs	Loaded units 1 000 pcs	Weight of goods 1000 tonnes
Containers	4 929	3 632	56 674
Road goods vehicles	3 632	3 110	42 405
Unaccompanied trailers	2 712	2 293	36 540
RORO units	7 067	5 899	90 149

Table 6. Shares of different loading units handled empty in ports of Sweden, Finland and United Kingdom. (Department for Transport, 2011; Finnish Port Association, 2012a; Finnish Port Association, 2012b; Ports of Sweden, 2012)

Loading Unit	Sweden	Finland	United Kingdom
Containers	50,07 %	20,79 %	26,32 %
Road goods vehicles	50,02 %	n/a	14,36 %
Unaccompanied trailers	n/a	n/a	15,44 %
RORO units	50,04 %	n/a	16,53 %

According to Woxenius & Bergqvist's (2011) comparison between the container and semi-trailer shipping segments, they differ quite widely. It is obvious that loading units need different preconditions for hinterland rail transport, but the turn-around distance of loading units differs greatly. In Port of Gothenburg context, container shuttles are prospering at transport distances less than only 150 km, because the strict turn-around schedules and time consuming loading and unloading on rails. Woxenius and Bergqvist estimate that in context of Port of Gothenburg, semi-trailers shuttle could be competitive with all-road transportation in distances longer than 150 km. Even though 60 per cent of semi-trailers handled in Port of Gothenburg were heading closer than 150 km, there are still approximately 100 000 semi-trailers to transport on rails with distances that are competitive with all-road. (Woxenius & Berqvist, 2011)

Even though the data of Woxenius & Berqvist's (2011) study is empirical, it gives great image about the differences of container and semi-trailer traffic. The differences between container transport context and semi-trailer transport context are significant. The geographic transport market is for containers trans-ocean, while it is intra-regional or at most short sea and intra-European for semi-trailers. Containers compete mainly with air transportation and semi-trailers with rail and road transportation. Business priority for semi-trailers is convenience for customer while container traffic is utilizing economies of scale. Important is that LOLO traffic is aiming to low cost transport, while RORO traffic focuses on serving customers. Time is critical factor in transportation. The speed of transport is regarded fast of both modes, but if precisions of delivery are compared, the range is for containers a day and for semi-trailers hours. Order time for container is a week, while for semi-trailer it is hours or even minutes. Cargo's dwell time in ports can be interpreted from the frequency of shipping lines. Accompanied cargo's dwell time is only minutes and unaccompanied only hours, while for containers it is days. Where the need for port work is substantial for containers, it is for trailers only limited. Needed technology on rails is definite advantage for containers because only flat wagon with twist locks are needed. Semi-trailers' need for rail technology is more complicated. Either pocket wagons or king-bin

boxes are needed. Needs for road technology for semi-trailers are minor while for containers it is trickier, especially in pickup and delivering. The comparison between containers and semi-trailers is shown in Table 7 below. (Woxenius & Berqvist, 2011)

Table 7. Comparison between the container and semi-trailer shipping segments (Woxenius & Berqvist, 2011, p. 683).

	Container	**Semi-trailer**
Georgraphical transport market	Transocean / deep sea / short sea	Intra-European / short sea
Modal competition	Air for deep sea leg / Rail and road for feeder leg	Rail and road + fixed connections
Business priority	Utilising economics of scale	Providing customer convenience
Port geography	Few large hub ports + feeder ports	Many ports - partly bridge substitute
Hinterland depth	Deep	Shallow
Transport time / speed	Fast	Fast
Precision	Day	Hour
Order time	Week	Day / minute
Frequency	Weekly	Daily / hourly
Transport service co-ordination	Shipping line, line agent or sea forwarder	Shipper, road haulier or general forwarder
Cargo dwell time in port	Days	Accompanied - minutes or none / Unaccompanied - hours
Empty unit dwell time	Days / Weeks	Hours / Days
Port work content	Substantial	Limited
Rail technology	Very simple - flat wagon / twist locks	Complicated - pocket wagon / king-bin box
Road technology	Awkward at end points	Simple and accessible
Road-rail transhipment technology	Fairly simple - automation possible	Dimension factor in weight and handling

2.5 New Concepts for Logistics in Europe

In the battle against tightening requirements and laws on reduction of environmental impacts and on the other hand, tightening quality and transportation lead time requirements from customer side, there is crucial for logistic sector to innovate and develop continually. European Union's aim is to increase the competitiveness of railway in freight transport market. And so far, it is done by tightening the legislation and making directives, or in different words, complicating the road transport. All over the media, there is debate about convenience of trains in freight transport market. For instance, the Ministry of Transport of Germany criticizes strongly European Union's statement about the most significant transport modes. The Head of Department Veit Steinlen from Ministry of Transport of Germany states that vehicles are and will remain the main transport mode. Steinlen also emphasizes that freight traffic should not be forced from roads to rails. Reformation should not be done just because itself, but

the aim should be on system modernization and optimal usage of capacity. (Auto, tekniikka ja kuljetus, 2011; European Union, 2001; European Union, 2011)

The ability to reach the set reduction of 60 per cent of carbon dioxide emissions of transport (European Union, 2011), is possible only by two ways: providing accessible and modest railway services for freight transport or allow the use of longer and heavier vehicles on roads. In further Sub-Chapters, there are introduced three possible options to decrease environmental impact of freight transport. The three presented options are chosen because all of them are available and usable in current conditions and existing transport infrastructure.

2.5.1 Cargo Beamer -System

Loading and unloading semi-trailers on railway wagons is time consuming. Usually semi-trailers are lifted on and off by a crane. According to interviewed expert's estimation, loading or unloading time for whole huckepack train is at its fastest approximately 4 hours. (Private notice, 12.10.2011) This means that whole working day is used only in handling. In that time, a tractor has delivered the semi-trailer easily 600 km (roughly: 8 h x 80 km/h = 640 km) away as a door-to-door service. Of course traffic jams etc. can decrease the total distance, but the dwell times of trailer in road-rail terminal are not noted in calculation either.

In a company called Cargo Beamer AG, there is noticed the problematic handling of semi-trailers and they have developed a system, which allows handling trailers without lifting. This practice allows also non-cranable load units in use, what means lower trailer price and higher payloads on trailers. By using the principle, 100 per cent of semi-trailers can be transported unaccompanied on rails. At the moment on rails can be transported as unaccompanied only 2 per cent of all semi-trailers. Also loading and unloading time is improved dramatically, from several hours to 15 minutes. The system can be operated on already existing network and also under powered railway line. The new components needed for using are

custom style railway wagon called “CargoJet” and loading dock “CargoGate”. (Cargo Beamer AG, 2012a)

The basic principle of operation is to load by driving semi-trailers on pallets, a king-bin box like platforms. Those platforms can be moved on ground with assistance of special conveyor installed in loading dock. Loading, unloading and re-arranging or transversal transshipment can be done automatically. With the Cargo Beamer system, the track and gauge switching can be done easily, hence there no need for single gauge railway network, for instance. (Cargo Beamer AG, 2012b)

2.5.2 Longer Heavier Vehicles

There have been discussions about allowance of longer and heavier vehicles in the road transportation in Europe. In late 2011 there were published a study on the effects on the railway freight traffic, if longer heavier vehicles (LHV) are allowed in European roads. The study was conducted by K+P Transport Consultants and Fraunhofer ISI. The main finding was that if LHV’s are allowed, the back-shift from rail transport to road transport will be fatal for single wagonload transport, for intermodal rail-road transport the effect is not as strong. K+P Transport Consultants & Fraunhofer ISI stressed that back-shift to the road will be strong despite the LHV ban in Switzerland. Also environmental impact was sawn to increase and safety on road to decrease. (K+P Transport Consultants & Fraunhofer ISI, 2011)

According to Åkerman & Jonsson (2007), the usage of LHVs will decrease fuel consumption approximately 22 per cent compared to standard semi-trailer combination. Average fuel consumption was measured in case study companies which are using both, semi-trailer combinations and LHVs on the same route. Average fuel consumption was calculated per every 10 kilometers. Decrease was calculated by two LHVs consumption compared to three semi-trailer

combinations consumption. By this comparison they were able to calculate the average decrease from realistic data. Åkerman & Jonsson (2007) saw three main advantages in using LHVs compared to regular semi-trailers: Increased safety in traffic, and decrease in fuel consumption as well as transport costs. Safety is increasing on roads, when every third combination is taken out; there are fewer vehicles in traffic. Decrease in fuel consumption when two LHVs consume less fuel than three semi-trailers; less emissions. Decrease in transport costs when two combinations; less vehicles equals less maintenance and fewer drivers equal less salary. (Åkerman & Jonsson, 2007)

European Union's strategy is to improve rail traffics competitiveness (European Union, 2001) and allowance of LHVs is against it, yet countries all over the Europe in various groups are discussing about it. For instance, Netherlands have allowed the usage of 25.25 meters long articulated vehicle after impressive results in the trial and it is estimated that allowance in Germany is only a matter of time. (Auto, tekniikka ja kuljetus, 2011b) In Figure 7 and Table 8 are collected and demonstrated dimensions and weights of used vehicles.

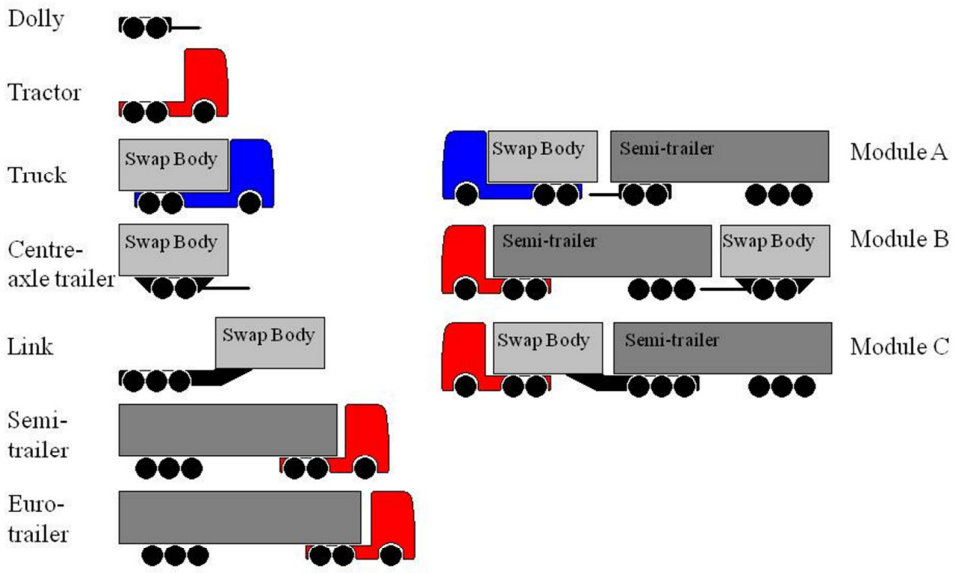

Figure 7. Articulated vehicles and components. (Adopted from: Ahola Transport Oy, 2012; EU, 1996; K+P Transport Consultants & Fraunhofer ISI, 2011; Åkerman, I. & Jonsson, R., 2007)

As can be seen in Figure 7 above, the module combinations do contain approximately 50 per cent more capacity than conventional semi-trailer combination. Euro-trailer combination, or so called "Big Maxx" combination is combination of standard tractor with a bit longer semi-trailer. In fact, the Euro-trailer is 1.3 meter longer than standard semi-trailer and it contains 10 m^3 more loading space. Module A is combination of truck, dolly and semi-trailer. Module B is combination of tractor, semi-trailer and center-axle trailer. In other words, the module B is a standard semi-trailer combination with short extension trailer. Module C is combination of tractor, link trailer and semi-trailer. In Table 8 below, there is presented the specifications of different vehicle combinations.

Table 8. Example vehicle combinations used in Europe. (Ahola Transport Oy, 2012; UIRR, 2011b; Åkerman & Jonsson, 2007)

Vehicle type	Cross Weight [ton]	Max Payload [ton]	Vehicle Length [m]	Number of axles [pcs]	Length of Loadin Space [m]	Volume of Loading Space [m3]	Max number of EUR-pallets [pcs]
Standard semi-trailer combination (tractor + semi-trailer)	40	26	16,5	5 (or 6)	13,6	100	33
"Euro-trailer" combination (tractor + euro-trailer)	40	27,5	17,8	5 (or 6)	14,9	110	37
Module A combination (truck + dolly + semi-trailer)	60	11 + 27 = 38	25,25	8	7,7 + 13,6 = 21,3	150	51
Module B combination (tractor + semi-trailer + centre-axle trailer)	60	27 + 11 = 38	25,25	8	13,6 + 7,7 = 21,3	150	51
Module C combination (tractor + link trailer + semi-trailer)	60	11 + 27 = 38	25,25	8	7,7 + 13,6 = 21,3	150	51

2.5.3 En Trave Till -Vehicle

“En trave till” is Swedish and it stands for “One More Stack” if it is freely translated in English. En trave till (ETT) -vehicle was introduced in research and trial project on transport of timber a 170 km journey from terminal in Överkalix to factory in Munksund in Northern Sweden. The project is led by Skogforsk and it is involving total of some 30 partners. The aim of the project is to decrease environmental impacts, carbon dioxide emissions and lower the consumption of diesel fuel through developing transport technology and higher gross weight vehicles to lower the amount of timber transporters needed in Sweden. The Swedish national goal is way higher than e.g. European Unions, because Sweden is to reduce emissions by 40 per cent compared to year 1990 level, while EU is aiming 20 per cent reduction from year 2005 level. To meet their national goal, Swedish forest industry launched the ETT -project due the need for more energy-efficient timber transporters, ETT -vehicles. (SCA Skog AB, 2010; Skogsforsk, 2010; Skogsforsk, 2012)

Since the beginning of the project in 2006, three different combinations were designed, but the ETT -combination was sawn as promising one. The ETT-vehicle is designed and assembled from components already in use in road transport and in fact, it can be assembled from the components from module A and module C combinations. ETT -project combinations are Volvo FH16 6x4 trucks equipped

with 660 horse power and Volvo I-Shift transmission. Vehicles are a combination of 3-axle lorry, dolly, link and semi-trailer and it is demonstrated in Figure 8 below. ETT-vehicles height and width dimensions are only a bit larger compared to conventional timber trucks (module A). ETT-vehicle is five centimeters wider and thirty centimeters higher than conventional module A. Overall length, gross weight and though, are higher. The total length of the ETT-vehicle is 30 meters, gross weight 90 tons and total payload is 66 tons. If compared, two ETT-vehicles have the capacity of three conventional module A vehicles and in turn, one ETT-vehicles capacity equals to two conventional semi-trailer combinations. Comparison of ETT and standard combinations of semi-trailer and module A is shown in Table 9. The process to allow so large combinations on public roads was complicated and long, but it was successfully ended in 2009 when Swedish Transport Administrator allowed 30 meter long and 90 ton combination to use with specific terms and the trial part of the research was able to begin. Every ETT-vehicle is equipped with alcohol ignition interlock device and pressure meter on every axle. The speed limiters are set on 80 km/h and no over speed is allowed. Speed is more limited on bridges which are longer than the vehicle itself and on those bridges the maximum speed limit is 60 km/h. (Skogsforsk, 2010; Skogsforsk, 2012; Volvo, 2011)

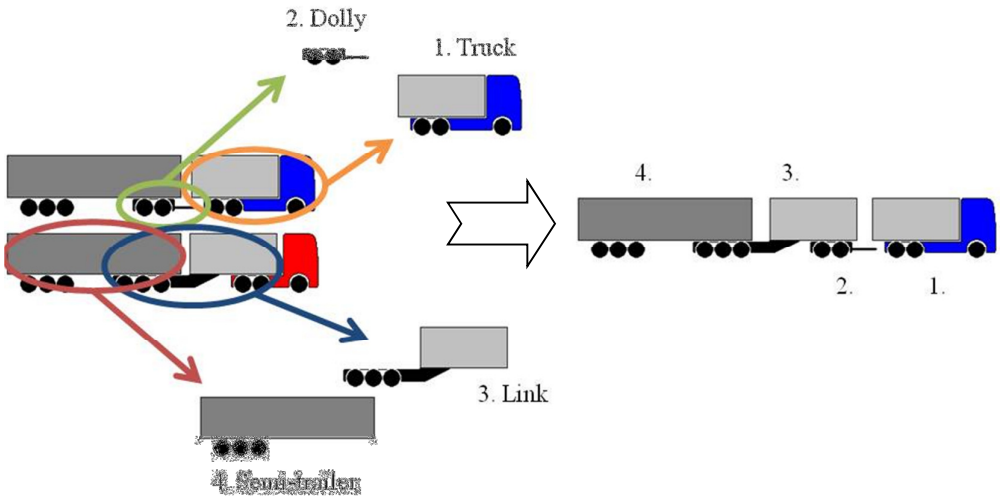

Figure 8. Demonstration of assembly of the ETT-vehicle. (Adopted from: Skogsforsk, 2010, p. 13)

Table 9. Comparison of semi-trailer, module A and ETT-vehicle combinations. (Ahola Transport Oy, 2012; UIRR, 2011b; Volvo, 2011; Åkerman, I. & Jonsson, R., 2007)

Vehicle type	Gross Weight [ton]	Max Payload [ton]	Vehicle Length [m]	Vehicle Width [m]	Vehicle Height [m]	Number of Axles [pcs]	Length of Loadin Space [m]
Semi-trailer combination	40	26	16,50	2,55	4,20	6	13,60
Module A combination	60	42	25,25	2,55	4,20	8	21,30
ETT-vehicle combination	90	66	30,00	2,60	4,50	11	29,00

The main point in the designing process of ETT-vehicle was that the vehicle must not exceed the limits set for the conventional 60 ton timber transporters. Even though, the gross weight of ETT-combination is higher, increase of the road wear was not expected, due the increased amount of axles. With 11 axles the road wear is approximately 8 tons, which is less than conventional 9 ton axle road wear.

Only limiting factor is that load on long bridges is increased and it is taken in account by lowering the speed limits as said earlier. 11 axles and 26 wheels containing combination do offer the handling, traction, stability and breaking capacity, which are comparable to conventional combinations. Since the project started in 2009, the first vehicle in use has been going on 525 000 km's and it have transported 100 000 ton of timber from the terminal to the mill. Along the journey is measured over 20 per cent reduction in diesel consumption, what means that 71 000 liters of diesel fuel is spared. Emissions have decreased correspondingly along reduction of fuel consumed. Transport cost have been measured to decrease over 20 per cent and the need for vehicles in use is reduced approximately 35 per cent. Traffic safety is seen to be improved, while the amount of operating vehicles is decreased. Studies of the usage of ETT vehicle on public roads have revealed no negative reactions from other road users. (Leino, 2012; Penttilä, 2008; Penttilä 2009a; Penttilä 2009b; Sauna-aho, 2009; Skogsforsk, 2010; Skogsforsk, 2012; Volvo, 2011)

3 TOURISM

According to European Union (2011c) tourism refers to the activity of visitors taking a trip to a destination outside their usual environment for less than a year. In statistical context, tourism includes visits for any main purposes, including leisure, business or other personal reasons than to be employed by a resident person, household or enterprise in the place visited. The statistics are limited to at least overnight stay and same-day visits are not usually included. Tourism statistics consists of two main components: Relating to capacity and occupancy in collective tourist accommodation and related to tourism demand. (EU, 2011c)

Tourism is one of the largest industries in the world. Globally the direct contribution of travelling and tourism to world's gross domestic product (GDP) was almost USD 2,000 billion, or almost 3 per cent of total GDP in 2011. If indirect effect is taken in account, the total share of tourism and travelling is 9.1 per cent of total GDP, which means over USD 6.3 billion. Tourism and travelling is also huge employer as it contributes directly almost 100 million jobs (3.3 per cent of total employment). Total contribution on employment tourism and travel industry had almost 255 million jobs and 8.7 per cent of total employment in year 2011. In Europe, the importance of tourism is great, because it's economic and employment potential. Tourism is also important, because it's social and environmental implications. For both, business and citizens the importance of tourism has grown significantly in recent decades. It is estimated that in EU-27 tourism employs up to 14 million people and is worth approximately 5 per cent of EU-27's GDP in 2011. (EU, 2011c; WTTC, 2012a)

Travel and tourism is one of the world's leading industries representing a major source of employment, taxes and GDP. Investments driven by tourism industry are estimated to be some USD 650 billion, or 4.5 per cent of total capital investments in 2011. The impact of travel and tourism is not only to economical sector even though it is greater than for instance world's automotive industry, but also to collaboration of communities and governments. The most important note is

that it is estimated that tourism and travel industry will grow globally 4.3 per cent per annum and will contribute the total of almost USD 10,000 billion to world's GDP in year 2022. It is estimated also that the total employment of the tourism industry will rise by 2.3 per cent per annum and it will achieve some 328 million jobs in year 2022. (WTTC, 2012a; WTTC, 2011)

3.1 Transportation in Tourism

From global tourisms point of view the air transport is the most important passenger transport mode in the world. The total amount of passengers carried was over 2.6 billion in 2010 and over 2.8 billion in 2011. Total passenger-kilometers executed by airlines were over 4.8 trillion in 2010 and over 5.1 trillion in 2011. (ATAG, 2012) The dominance of airlines in tourism transports has been significant especially on long-haul journeys since commercial airlines have been existed. Nowadays the low-fare operators have taken share from the market also on shorter journeys, which have usually been the market for railways and coaches. Low-fare operators have caused the phenomena, which have dropped the competitiveness of railway and coach transport on journey lengths less than 500 kilometers. According to interviewed expert, every destination beyond the 500 kilometers from origin is faster and usually cheaper to reach by airline than other transport mode. (Private notice, 10.11.2011)

Shorter distance travelling, especially in industrialized countries, is done mainly by private cars. According to European Travel Commission (2006), 70 per cent of journeys are executed with private cars in industrial countries. According to European Union (2011c), in EU-27 the total share of private car usage was 83.3 per cent in 2008. In EU-27 the usage share of coaches and busses was 9.4 per cent and railways, trams and metros 7.3 per cent of the total passenger traffic.

3.2 Tourism in the Baltic States

Tourism in Baltic States is developing and increasing though at the moment it is in minor position compared to e.g. EU-27-countries. According to European Union (2011c), the tourism in the Baltic States seems to be mainly domestic. Still the total number of passengers indicates increasing trend. In following paragraphs there is introduced statistics about tourism in the Baltic States.

3.2.1 Viewpoint: Transportation

In Figures 9, 10 and 11 below, is shown the development of number of passengers by transport mode in Baltics. When comparing the amount of passengers between air, sea and rail transport modes must be noted that the values are not comparable with each other directly. The number of air and sea transport passangers are shown in statistics as a exact number and rail transport passengers as passanger-kilometer.

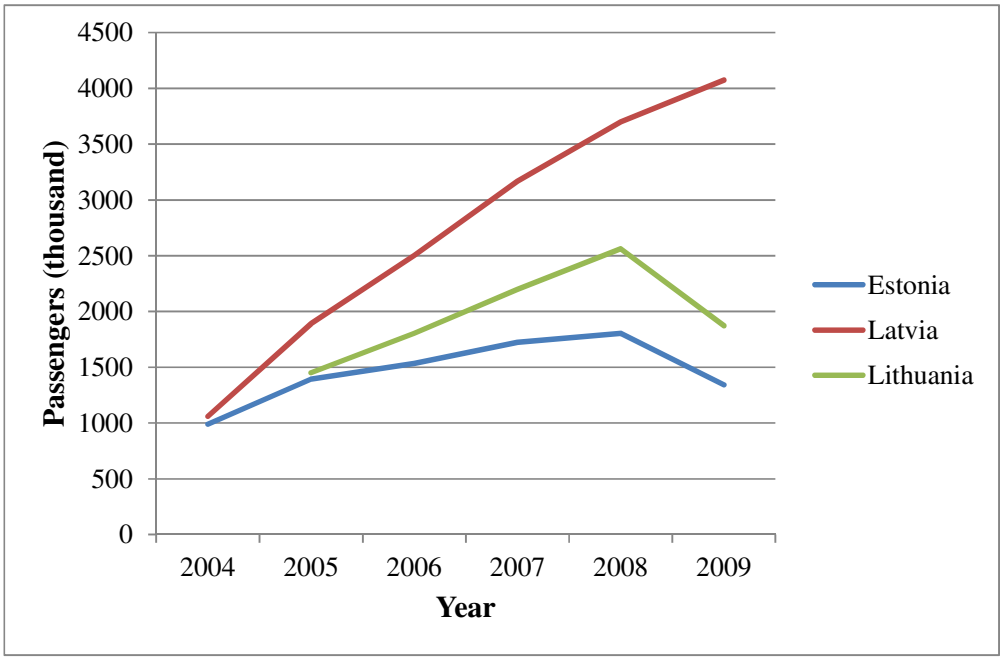

Figure 9. Development of air transport between 2004 and 2009. (EU, 2011c)

According to European Union (2011c) the strongest increase in air transport is faced in Latvia. Because of recession in 2008-2009 the total number of passengers decreased in Estonia and Lithuania. It is significant that Latvia managed increase the number despite the down turn. In 2009 over four million passengers travelled through Latvia, while in Lithuania the number was less than two million and in Estonia less than one and half million passengers. The busiest airport in Baltic States is the Riga airport, which handles almost 100 per cent of passengers in Latvia and over 50 per cent of passengers in Baltics. Even though the Riga airport is busiest in the Baltic States, it cannot be compared to busiest European airports. The development of air transport between 2004 and 2009 in Baltic States can be seen in Figure 10. (EU, 2011c)

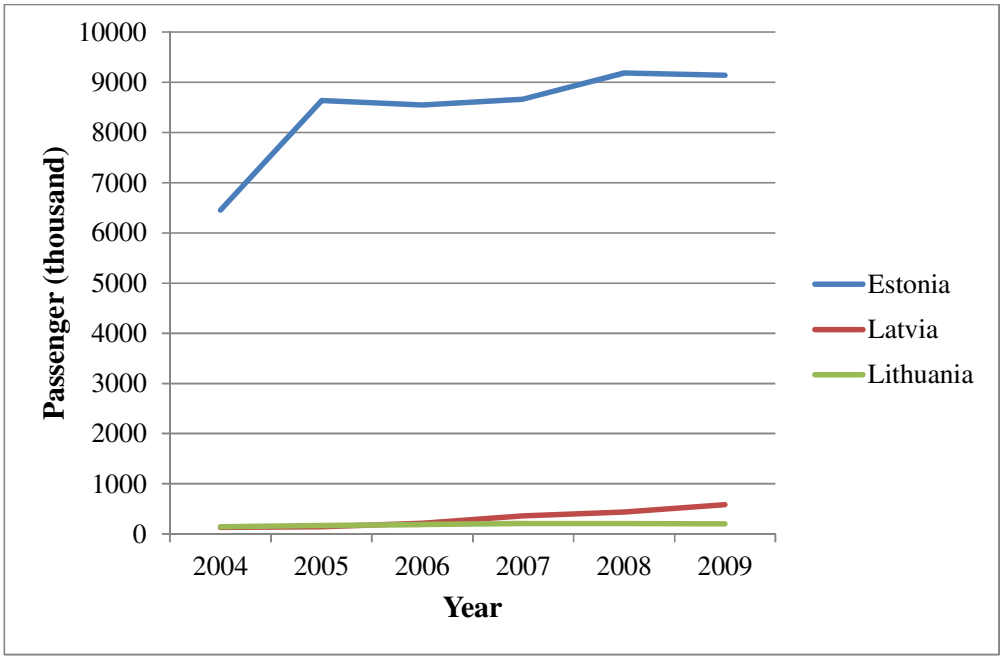

Figure 10. Development of passenger sea transport between 2004 and 2009. (EU, 2011c)

As can be seen in Figure 10, Estonia dominates passenger statistics in sea transport. Even though there has been slightly increasing trend in Latvia and in Lithuania, Estonia is in its own scale, because it handles approximately nine times more sea transport passengers than Latvia and Lithuania together. In 2009 over

nine million passengers travelled through Estonia, while in Latvia the number was approximately 800.000 and in Lithuania 200.000 passengers. Obviously the recession did not effect on passenger sea transport as dramatically as it did on passenger air transport, because the total amount of passengers decreased only slightly. (EU, 2011c)

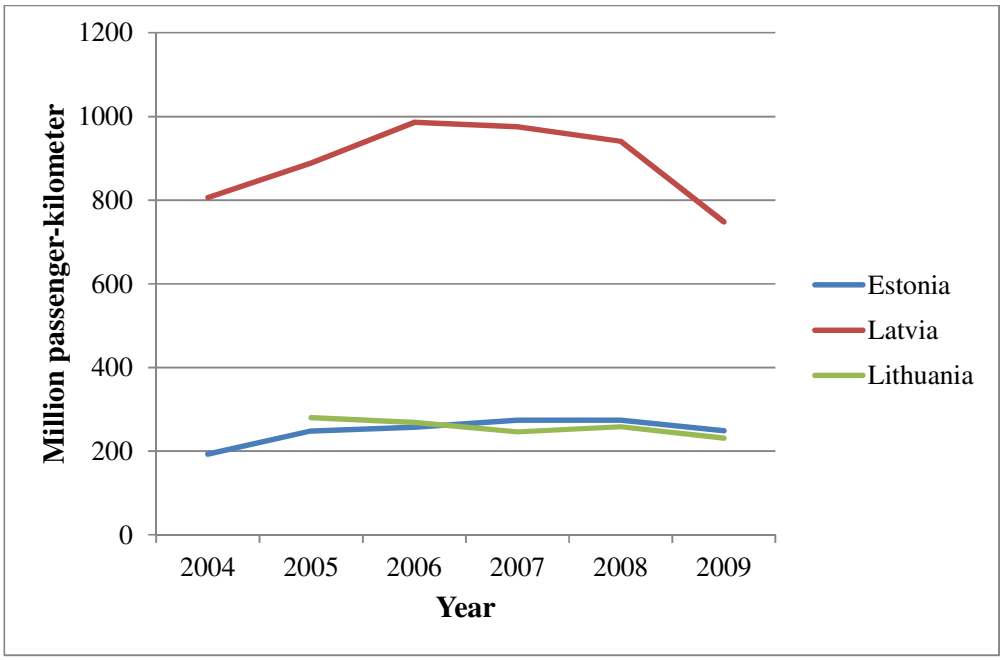

Figure 11. Development of passenger rail transport between 2004 and 2009. (EU, 2011c)

In Figure 11, is shown the development of passenger train traffic. As noted earlier, the exact values of passengers on rails is not raported in EU-27 and that makes the comparison to other transport modes rather difficult. Nevertheless from statistics can be detected decrease in passenger train transport after 2008. The strongest decrease is faced in Latvia where almost 1 billion passenger-kilometers has dropped till approximately 750 million in only four years. In Estonia and Lithuania decrease in performance has not been as significant as in Latvia, because the performance has not been even near the Latvian performance. Still in both countries, Estonia and Latvia, the trend is rather downwards.

3.2.2 Viewpoint: Tourism Indicators

The influence of tourism can be measured also by other yardsticks than transportation values and numbers. Other indicators in statistical side are for example share of population taking part in tourism, total number of trips made by citizens and breakdown of all trips by destination and duration. Also the comparison of expenditure and receipts of travelling helps in creation of the big picture of state of tourism in Baltic countries.

In Table 10 below, is shown the statistics about share of population taking part in tourism. In 2004 the shares in Baltic countries were about the same, approximately every fifth person took part in tourism. In 2009 the situation was not the same, because the share of population taking part in tourism was slightly decreased in Latvia and increased in Estonia and Lithuania. In Lithuania the share of population taking part in tourism were increased some seven percentage points. The most significant growth was faced in Estonia where the share almost doubled. (EU, 2011c)

Table 10. Share of population taking part in tourism. (EU, 2011c)

	2004	**2009**
Estonia	20,40 %	38,90 %
Latvia	21,90 %	19,50 %
Lithuania	21,90 %	29,50 %

Total number of trips taken in 2009 by Baltic citizens is shown in Table 11 below. As can be seen, the duration of the trips are mainly short, lasting from 1 to 3 nights spent. The total share of short trips is approximately 73 per cent of all trips taken by Baltic citizens. The most significant trend of short trips is faced in Latvia, where the long trips, over four night or more, is only every fifth. Trips taken by Estonians and Lithuanians are approximately same, while every third trip is long. (EU, 2011c)

Table 11. Number of trips in 2009 (thousands). (EU, 2011c)

	All trips	Short trips (1-3 nights)	Long trips (4+ nights)
Estonia	1392	907	485
Latvia	4152	3320	832
Lithuania	3219	2158	1061

In Table 12 is presented the breakdown of all trips by destination and duration in 2009 taken by Baltic citizens. As can be seen, the main destination is domestic and duration is short. Estonian citizens are taking more often outbound trips than Latvian and Lithuanians. Commonly the trips to outbound destinatios are more often long than short and the trips to domestic destinations are mainly short. (EU, 2011c)

Table 12. Breakdown of all trips by destination and duration in 2009. (EU, 2011c)

	Short domestic trip	Long domestic trip	Short outbound trip	Long outbound trip
Estonia	48,10 %	8,50 %	17,10 %	26,30 %
Latvia	72,80 %	7,70 %	7,10 %	12,40 %
Lithuania	54,30 %	13,00 %	12,80 %	20,00 %

Development of accommondation services in Baltic countries is presented in Table 13. As can be seen, the total number of hotel and similar establishments has grown in every Baltic country. 120 new hotels or similar accommondation services has been established in Estonia between 2004 and 2009. In Latvia there has been established 173 and in Lithuania 63 new hotels or similar accommondation services in same time. Total number of other collective accommondation service establishments has more than doubled in Estonia from 342 to 704 and almost doubled in Latvia from 65 to 108 establisments. The total

capacity to accomondate tourists can be measured by total number of bed places in hotels and similar establishments. Between 2004 and 2009 the total number of bed palces has grown in every Baltic country. In Estonia the number of bed places has increased by eight thousand up to 31,000. In Latvia the increase has been seven thousand and was on level 25,000 places in 2009. The slightest increse was faced in Lithuania where the growth was five thousand bed places and the total number was on level 24,000 in 2009. (EU, 2011c)

Table 13. Development of accommodation services between 2004 and 2009. (EU, 2011c)

	Hotels & similar establishments (units)		Other collective accommondation establishments (units)		Bed places in hotels & similar establishments (1000)	
	2004	**2009**	**2004**	**2009**	**2004**	**2009**
Estonia	267	387	342	704	23	31
Latvia	278	451	65	108	18	25
Lithuania	317	380	212	175	19	24

In Table 14 below, there is shown the development of usage of accommondation services between 2004 and 2009. The total amount of nights spent in hotels has increased in every country in Baltics. The most nights were spent in Estonian hotels, in total near 3.5 millions. The most significant increase between 2004 and 2009 were faced in Lithuania, where the total amount increased by over four hundered thousand up to almost 2.1 million nights. Only in Latvian hotels the total amount of nights spent by residents decreased. The decrease in Latvia were minor though it was only approximately twenty thousand. While the total amount of nights spent in hotels by non-residents were increasing in Latvia and Lithuania, in Estonia the total amount dropped by over 150,000. Despite the decline, non-residents spent more nights in Estonian hotels than in other Baltic States. (EU, 2011c)

Table 14. Usage of accommodation services. (EU, 2011c)

	Nights spent in hotels & similar establishments (1000)		Nights spent in hotels & similar establishments by residents (1000)		Nights spent in hotels & similar establishments by non-residents (1000)	
	2004	**2009**	**2004**	**2009**	**2004**	**2009**
Estonia	3292	3499	1011	1382	2281	2117
Latvia	1875	2187	865	844	1010	1343
Lithuania	1642	2078	971	1152	671	926

In following Figures 12 and 13 there is presented the expenditure (in Figure 12) and receipts (in Figure 13) of inbound and outbound tourism between 1999 and 2009. Tourism expenditure means the total value citizens spend in foreign countries, while visiting there and tourism receipts from tourism means the total value foreigners spend in the destination they are staying. The overall balance of tourism can be calculated by summing up the total receipts and subtracting the total expenditure.

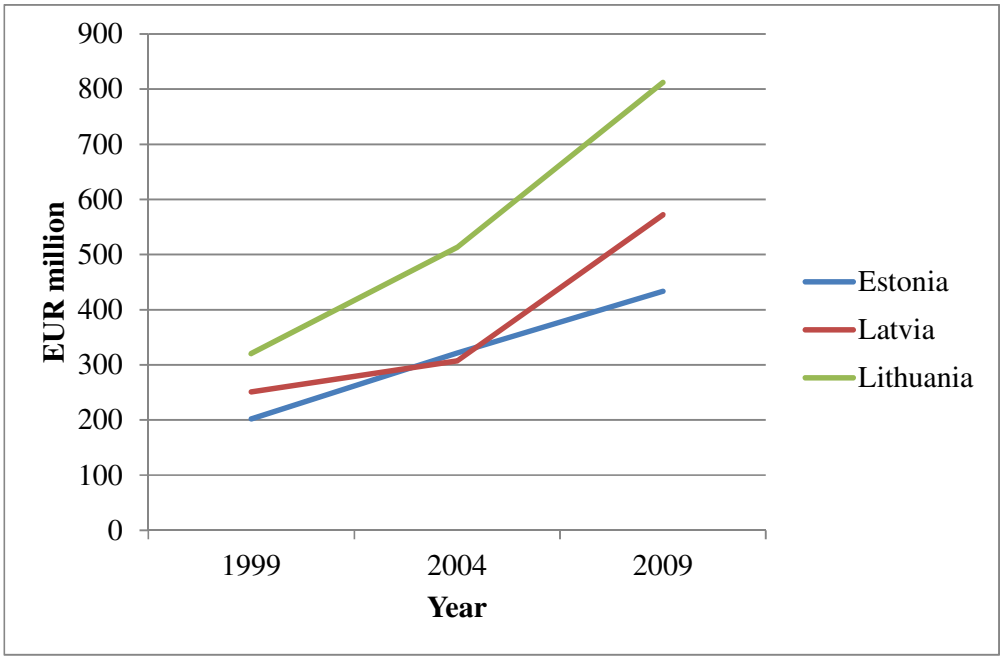

Figure 12. Tourism expenditure from travel. (EU, 2011c)

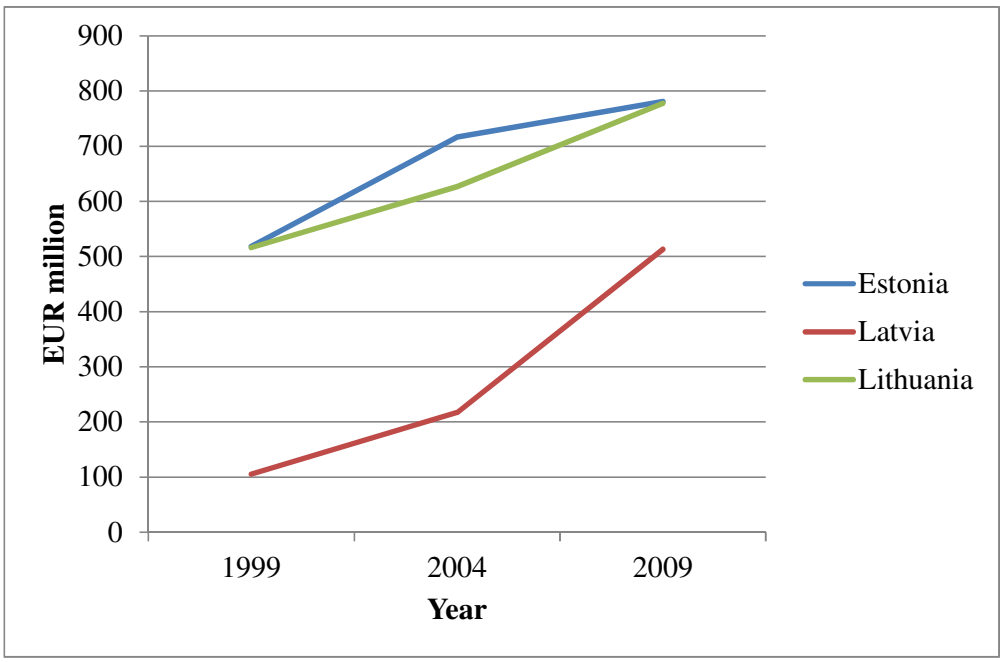

Figure 13. Tourism receipts from travel. (EU, 2011c)

As can be seen in Figures 12 and 13, the balance of inbound and outbound tourism in 2009 was positive, the more money were spent in country by non-residents than money spent in foreign countries by own residents, only in Estonia. Estonian citizens spent some 420 million Euros in foreign countries and foreign tourists spent some 780 million Euros in Estonia. The total balance of tourism was positive for more than 350 million Euros in Estonia in 2009. The situation in Latvia and Lithuania in 2009 was not as bright as in Estonia. The balance was slightly negative in Lithuania, approximately 30 million Euros, and rather negative in Latvia, approximately seventy million Euros. While the balance has been positive all the way from 1999 to 2009 in Estonia, balance has turned to negative in 2009 in Lithuania, when before it was fairly positive. In Latvia the balance has been negative the whole time in between 1999 and 2009. Even though, the gap has narrowed while in 1999 it was approximately minus 160 million Euros and in 2009 merely some minus seventy million Euros. Latvians have been able to cut the negative balance in half in ten years. (EU, 2011c)

According to World Travel and Tourism Council (2012a, 2012b, 2012c) the importance of tourism in Baltic States to world's gross domestic product is only minor. Actually the size of tourism sector is ranked to be nothing more than the average level. Also the growth forecasts are rather moderate overall. Forecasts to growth for Estonian tourism sector are actually quite poor. However, the long-term forecasts to Latvian and Lithuanian tourist sectors are fairly good. The WTTC world ranking of sizes, contribution to worlds GDP, forecast to year 2012 and long-term forecasts are shown in Table 15.

Table 15. World ranking out of 181 countries. (WTTC, 2012a; WTTC, 2012b; WTTC, 2012c)

	Estonia	**Latvia**	**Lithuania**
Size in 2011 (Absolute)	93	103	111
Contribution to worlds GDP (Relative)	62	107	166
Growth forecast to 2012	171	26	173
Long-term growth forecast to 2012-2022	143	34	66

In Table 16 below is presented the impact of travel and tourism industry to Baltic States gross domestic product. The direct contribution to country's GDP is rather minor in Latvia and Lithuania, but fairly important to Estonia. Direct value to countries GDP is actually the same, some half billion in each Baltic country. The total value contribution of travel and tourism to GDP is important to Estonia, where it is almost 13 per cent. The situation is almost the same in Latvia, where the total contribution to GDP is almost 8 per cent. In Lithuania the total contribution of travel and tourism is not as important as in other Baltic States, while it is slightly over 4 per cent. (WTTC, 2012a; WTTC, 2012b; WTTC, 2012c)

Table 16. Travel and tourism industry's impact to countries gross domestic product. (WTTC, 2012a; WTTC, 2012b; WTTC, 2012c)

	Estonia		Latvia		Lithuania	
	EUR billion	% of total	EUR billion	% of total	EUR billion	% of total
Direct contribution to GDP	0,5	3,3	0,6	2,9	0,5	1,6
Total contribution to GDP	2,1	12,7	1,5	7,7	1,3	4,2

Travel and tourism industry' impact to Baltic countries employment is presented in Table 17. Travel and tourism industry contributes some 70 thousand jobs in Baltic States. For countries, the direct contribution is not so significant, but if the indirect contribution is taken account, the importance increases greatly. In Estonia the total contribution to employment is the most significant, while travel and tourism industry employs over 12 per cent of the population. In Latvia the same number is slightly over seven per cent and in Lithuania four per cent. Travel and tourism industry contributes most jobs directly in Latvia and most jobs indirectly in Estonia. In Lithuania the impact of travel and tourism on employment is almost the same by directly and indirectly. After all, the indirect contribution on employment is larger than the direct in every Baltic State. (WTTC, 2012a; WTTC, 2012b; WTTC, 2012c)

Table 17. Travel and tourism industry's impact to employment. (WTTC, 2012a; WTTC, 2012b; WTTC, 2012c)

	Estonia		Latvia		Lithuania	
	Thousand jobs	% of total	Thousand jobs	% of total	Thousand jobs	% of total
Direct contribution to employment	20	3,4	27	2,8	22	1,6
Total conrtibution to employment	73	12,4	70	7,3	56	4

4 METHODOLOGY OF THE RESEARCH

Research is important in academic and business activities. However there is no concurrence in the definition for research because it means different things to different people. Though there seems to be agreement that research is a process of investigation and enquiry. Research aims to increase knowledge with systematic and methodical manner. (Amaratunga et al., 2002)

Research can be divided in two types, quantitative and qualitative. Quantitative research is based on numerology and numerical data while qualitative research focuses on objects, words and pictures. (Amaratunga et al., 2002) The most of logistics research is mainly conducted by quantitative research. Even though there has been discussion about is it sensible to choose using both or only one of the other research types. According to Amaratunga et al. (2002) and Mangan et al. (2004), it can be beneficial to combine both quantitative and qualitative methodologies in logistics research. (Amaratunga et al., 2002; Mangan et al., 2004)

In the interview study, the used research methodology is semi-structured qualitative interview. The method has been introduced by Merton, Fiske and Kendall in their book "The Focused Interview" in year 1956. Theme interview is a mixture of structured and open interview. The main point of theme interview is that the focus is on defined themes rather than exact questions. In every different interview meeting, the same themes are discussed. However, interviewer is able to decide the order of particular themes in theme interview. This freer practice usually leads interviewees to give wider responses. Theme interviews are used often i.e. in business economics research. (Hirsjärvi et al., 2004; Hirsjärvi & Hurme, 2009; Merton et al., 1956)

This study is composed of two different studies. At first in this report is introduced the questionnaire study for Rail Baltica Growth Corridor (RBGC) work package 3 (WP3): Accessibility of the City Regions. WP3 is targeted to

figure out public sector stakeholders in decision making of transportation issues. Questionnaire study was made to deepen the knowledge gained in theme interviews conducted by Laisi and Saranen (for further information, see: Enchasing Accessibility of Rail Baltica Influence Area: Standpoints of Public Sector; Laisi M., Henttu V. and Hilmola O-P., 2011).

Secondly in this report is introduced a part of the interview study for RBGC work package 4 (WP4): Travel and Logistics Service Development and Demand. WP4 is targeted to figure out the private sector perspective towards development of transportation networks in the Baltic Sea Region. Interviews in Finland and Estonia were conducted by the author of this Master's Thesis and Henttu. Other interviews for the WP4 were conducted by company EU Consults. (For further information, see: Private transport market stakeholders in the area of Rail Baltica; City of Warsaw, 2012.)

4.1 Methodology and Data Gathering of the Completed Survey for Public Sector

In the questionnaire study, the used methodology for data gathering is web survey. Public sector stakeholders were invited to answer the questionnaire via e-mail. The questionnaire included 13 questions and the used language was English. A copy of the questionnaire form is shown in Appendix 1.

The questionnaire was performed as a web survey. Survey type was chosen to be web survey because aim was to get as many answers as possible. This type of survey is not only easy to create and send, but also to answer. Questionnaire was created using Aptual's Jalusta software. Invitation to survey was sent to public sector stakeholders in cities nearby the possible Rail Baltica alignments and the main seaports in Baltic Sea Region. Target countries were Finland, Estonia, Latvia, Lithuania, Poland, Germany and Russia. In those countries, 36 different cities nearby the possible Rail Baltica alignments were gathered. Overall amount

of people that were invited to answer the questionnaire was 153. List of contact e-mail addresses were mainly gathered through Internet search by searching different cities and their homepages and contact information. Contacted public sector stakeholders included e.g. mayors and advisers of cities.

E-mail invitations to questionnaire were sent four times during late September and early October 2011. First email was sent 19th of September and first reminder 26th of September. Second and third reminders were sent on 3rd and 7th of October. Overall amount of answers was 19 of which 17 were usable. Two unusable answers were given via e-mail. Respondents, who used e-mail to answer, told that they are not in the position to make decisions or Rail Baltica is not in their interests. Answering percentage was 12 per cent. More specific information about the questionnaire is shown in Table 18.

Table 18. Questionnaire Specifics.

Invitation no.	Date	Total visits on questionnaire	Different recipients visit on questionnaire	Visits from different IP-addresses	Answers
1	19th of September	87	36	41	4
2	26th of September	54	25	28	4
3	3rd of October	37	19	23	5
4	7th of October	13	7	9	6
Total		191	87	101	19

As can be noted in Table 18, questionnaire was interesting among recipients. Those recipients, who have clicked the link to the questionnaire, have visited there in average more than twice. Different visits have also come from different IP-addresses, so at least some of them have come back to questionnaire elsewhere where they received the invitation. Even though there have been a lot of potential responders (101 person), for unknown reasons they haven't respond to the questionnaire. All in all, two out of three from all recipients have visited in the questionnaire page at least once.

From those 17 usable answers, could be used 14 in analysis. Only 14 answers is taken in analysis because it is sensible to use only one answer from every location to avoid the distortion of the analysis. Multiple answers came from Tallinn, Jelgava and Warsaw. Used reasons for rejections were quality and specificity. Those double answers were similar to another answer, but it did not contain as much or as specific information than the other. From those rejected answers were not used numerical data. Even though, the open field answers were considered in analysis.

4.2 Methodology and Data Gathering of the Completed Survey for Private Sector

The methodology of the completed survey for private sector is interview study. Interviews concentrated on nine main themes, which have come up from earlier study RBGC WP3 which focuses on public sector. Outline of WP3 interview framework was used, but it was adjusted to suit better WP4 in private sector. The modified interview framework was also adjusted to suit three types of companies:

1. Logistics service providers (see Appendix 2)
2. Passenger transport operator (see Appendix 3)
3. Client for freight transport (see Appendix 4)

Different interview frameworks are shown in appendices two, three and four.

A list of private sector stakeholders in Finland and Estonia was gathered in cooperation with Research Support Group of RBGC. All the interviewed companies were firstly contacted via email with short description of the project and the interview study. Around one week before the meeting, interviewees were sent the questionnaire framework, which enabled them to get acquainted with the themes in advance. Research reliability was guaranteed by recording all except one interview (did not allow such achieving). All the contacted representatives of the companies were experts in their industry area. Representatives include

logistics managers, CEOs and members of committees. All the interviewed companies are listed anonymously in Table 19 below.

Table 19. Interviews of the private sector stakeholders in Finland and Estonia.

Date	Country	Interviewed company	Duration
9/27/2011	Finland	Company A: Logistics Service Provider	1 h 54 min
9/29/2011	Finland	Company B: Logistics Service Provider	60 min
10/4/2011	Finland	Company C: Logistics Service Provider	1 h 29 min
10/4/2011	Finland	Company D: Logistics Service Provider	1 h 1 min
10/10/2011	Estonia	Company E: Client of Freight Transport	39 min
10/11/2011	Estonia	Company F: Passenger Transport Operator	58 min
10/12/2011	Estonia	Company G: Logistics Service Provider	1 h 50 min
10/13/2011	Estonia	Company H: Passenger Transport Operator	1 h 28 min
10/18/2011	Finland	Company I: Client of Freight Transport	1 h 49 min
11/1/2011	Estonia	Company J: Client of Freight Transport	1 h 26 min
11/2/2011	Estonia	Company K: Client of Freight Transport	60 min
11/2/2011	Estonia	Company L: Client of Freight Transport	58 min
11/16/2011	Finland	Company M: Client of Freight Transport	1 h 2 min
11/21/2011	Estonia	Company N: Logistics Service Provider	1 h 39 min
11/22/2011	Finland	Company O: Client of Freight Transport	1 h 23 min

During the study, three different type companies were interviewed. Characteristic feature for logistics service providers are companies that offer different services concerning logistics e.g. transportation, warehousing, customs brokerage, order processing and local customization of products. Clients of freight transport companies are such companies that usually outsource their logistics processes e.g. manufacturing and construction companies. Passenger transport operators are mainly focusing in passenger transportation services.

In total eight companies were interviewed in Estonia. Two companies were logistics service providers, four clients for freight transport and two passenger transport operator companies. In Finland four logistics service providers and three clients for freight transport companies were interviewed. In Finland total of seven interviews were conducted. Total interviews conducted in this study were 15.

5 EMPIRICAL DATA ANALYSIS OF COMPLETED SURVEY FOR PUBLIC SECTOR

Web-based questionnaire study concerning RBGC WP3 was conducted in seven different countries around the Rail Baltica alignments (Finland, Estonia, Latvia, Lithuania, Poland, Germany and Russia). Empirical part regarding questionnaire study is divided into three sub-chapters. First sub-chapter concentrates in current transportation market. Second sub-chapter represents the development needs of logistical infrastructure in the Rail Baltica area. Third sub-chapter represents the estimated influence of possible Rail Baltica transport corridor to the region.

5.1 Transportation Market Review

According to respondents, road transport dominates both freight and passenger transport markets. Even though the usage of private cars is seen very important, it is very interesting that the increase rate of usage of private cars is seen to equilibrate. The change can be seen in Figure 14 and Table 20 below.

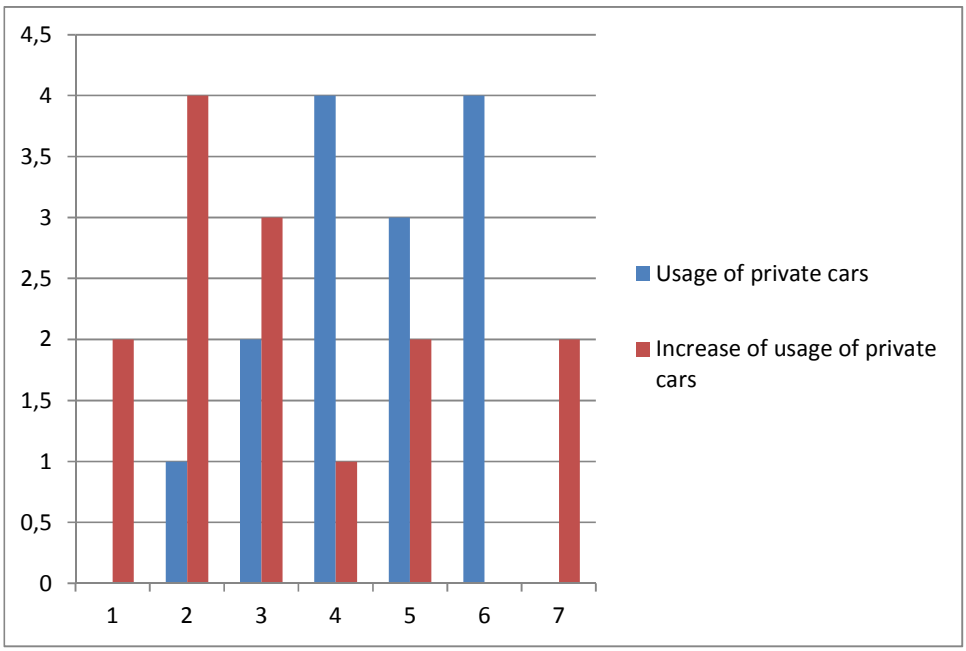

Figure 14. **Frequency of** the usage and increase of the usage of private cars (scale from 1 (extremely negative) to 7 (extremely positive)) (n=14).

In the Figure 14, there is shown sum frequency column, where is semantic differential scale from one (extremely negative) to seven (extremely positive) on axis x, and on axis y, is shown the amount of responses given. According to a few respondents, it seem that there is strong increase of usage of private cars is seen to be only in Poland and slight increase in Latvia. The importance of usage of private cars gets chiefly more higher, while going towards the north.

Table 20. The usage and increase of usage of private cars (scale from 1 (extremely negative) to 7 (extremely positive)) (n = 14).

	Average	Median	Standard deviation	Min	Max	n
Usage of private cars	4,50	4,50	1,29	2	6	14
Increase of the usage of private cars	3,36	3	1,98	1	7	14

In Table 20, the average and median for usage of private cars estimates, that importance of private car usage is a little above neutral. From the standard deviation can be deduced that there is slight differences between locations, but overall estimation is close to neutral. The increasing private car usage is seen slightly negative, according to average and median values. The standard deviation is almost two, so there are huge differences how important the increase of usage is, between different locations.

Importance of other transport modes (air transport, rail transport and waterways) increases in both ends of the Rail Baltica transport corridor. The importance of road transport is high in the entire Rail Baltica transport corridor, but the importance is even higher in the middle of the corridor. More specific data is shown in Table 21.

From Table 21 it can be deducted that the importance of both national and international airports as a part of logistical infrastructure is important. International airport is seen to be slightly more important than national airport. Also the roads and seaports are seen as important. Only inland waterways are seen unimportant. According to median of both railway options, the railways are seen as extremely important. Most respondents estimated the importance of railways to level seven, extremely important, what causes the high value of median. The level of average, as low as approximately 5.5, is caused by a few low estimations, which drops the average value.

Table 21. The importance of different parts of logistical infrastructure (n = 14).

	Average	Median	Standard deviation	Min	Max	n
Airport (international)	5,93	6,5	1,49	2	7	14
Airport (national)	4,4	5	2,27	1	7	10
Railway (high speed, 200 - 220 km/h)	5,56	7	2,6	1	7	9
Railway (fast speed, approx. 160 km/h)	5,45	7	2,34	1	7	11
Road (2- or 3-lane)	6,21	6	0,89	4	7	14
Road (4-lane or more)	4,7	5,5	2,45	1	7	10
Seaport	5,82	6	1,78	1	7	11
Inland waterway connection	2,78	2	1,48	1	5	9

The following analysis is done according to respondents' fully subjective estimations. In the passenger transport side, private car usage is very important. On short distances (less than 100 kilometers) private car usage share is almost half. Also on the longer distances (more than 100 kilometers) private car usage share is almost one-third. Overall the share of road transport on short distances is over 75 percent and on long distances over 50 percent. Share of rail transport on the short distances is about 25 percent and on long distances around 30 percent. On long distance transport, respondents estimated approximately 15 percent share for air transport and two percent share for sea or inland waterway transport.

As assumed on freight side, at short distance (less than 100 km) road transport dominates by share of approximately 60 percent. Rail transport's share is near one-third and waterway transport's 7 percent. On long distance (more than 100 km) transport, road and rail transport have been estimated equal 40 percent share for both. Approximately five percent of long distance transport is estimated to use air transport and little less than 15 percent waterway transport.

Existing logistical infrastructure is shown in the Figure 15. As can be noted in the Figure 15 below, the main competitors for rail transport (air and road transport)

have had their biggest investments earlier. That may be the main factor, why rail transport is used as low as it is currently being used. Even the waterway transport is better option to be used than rail.

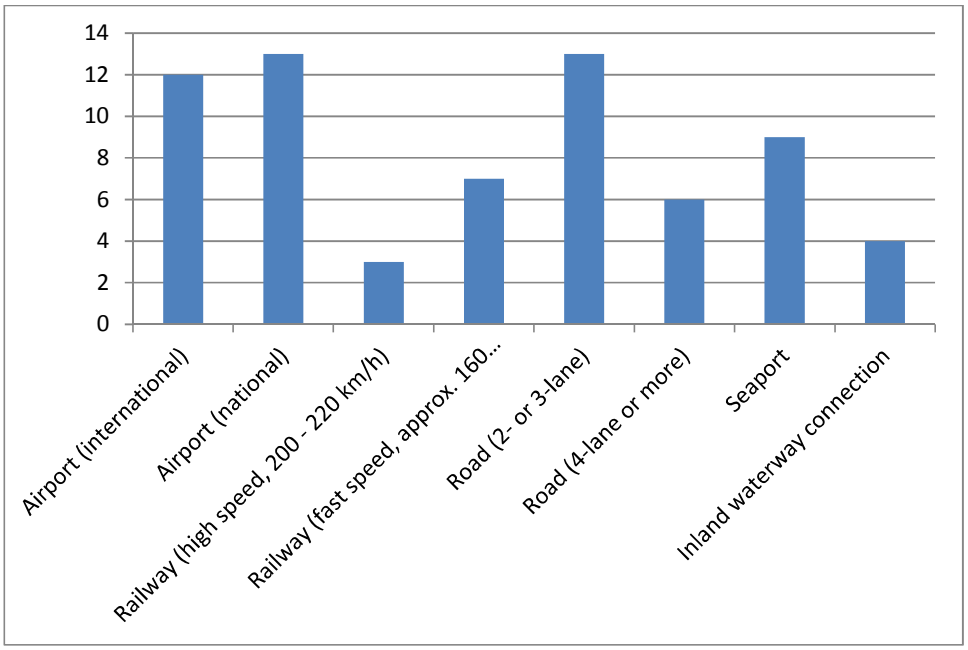

Figure 15. **Frequency of** existing logistical infrastructure classes in Rail Baltica corridor area (n = 14).

In Figure 15, there is shown on axis y the amount of responses for every existing part of logistical infrastructure. It can be deducted from Figure 15, that the most common parts of logistical infrastructure are national airports and two or three lane roads. The amount of railways is significantly lower. Actually the amount of available reasonable railway connections is even lower than waterway connections.

Approximately 30 percent of tourists were estimated to arrive and to depart the region by bus. Share of private car in tourist flows is estimated to be around 25 percent. Air and rail transport were estimated equal, approximately 20 percent both. Little less than 10 percent of tourists were estimated to use waterway transport.

Tourism in Rail Baltica corridor area is considered to have quite important role. Different nationalities as a source of tourism are shown in Figure 16.

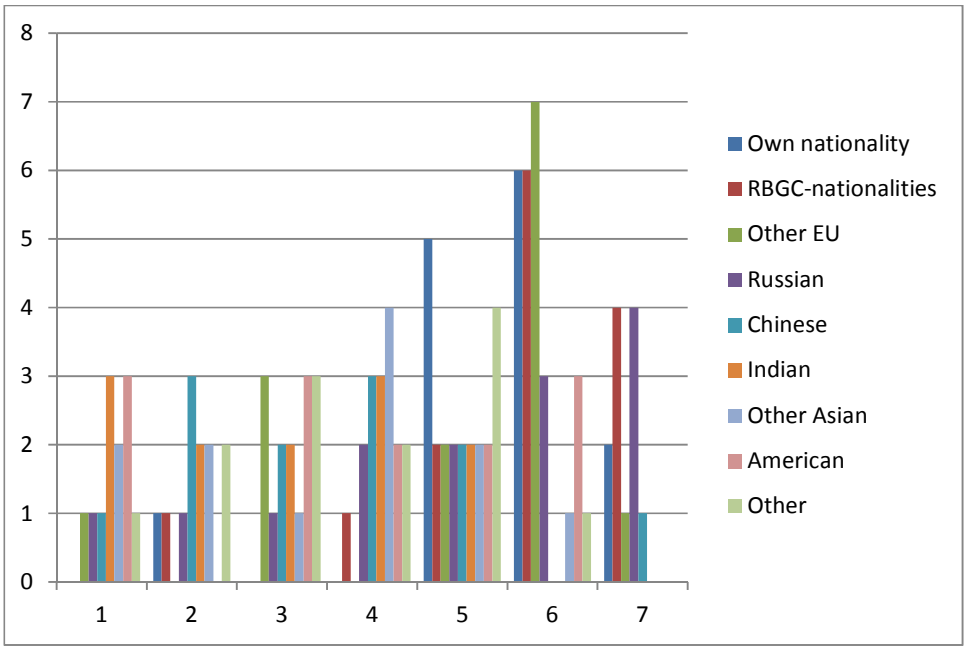

Figure 16. **Frequency of** the importance of different nationalities as a source of tourism (scale from 1 (unimportant) to 7 (vitally important)) (n = 14).

As can be noted in the Figure 16 above, tourism is mainly national level tourism. On the international level, most important source is countries nearby (Rail Baltica Growth Corridor countries, EU countries and Russia). Numerical data of importance of tourism is shown in Table 22 below. Tourism is considered as very important locally, but what can be concluded from difference between minimum and maximum values and varying standard deviation, is that importance varies hugely in different locations. The importance of distant nationalities (Asian, American and other) as a source of tourism is considered to be slightly unimportant or not more than neutral. Overall, the importance of tourism is seen to be increasing.

Table 22. The importance of different nationalities as a source of tourism (scale from 1 (unimportant) to 7 (vitally important)) (n = 14).

	Average	Median	Standard deviation	Min	Max	n
Own nationality	5,50	6	1,22	2	7	14
RBGC-nationalities	5,71	6	1,38	2	7	14
Other EU	4,93	6	1,73	1	7	14
Russian	5,00	5,5	1,96	1	7	14
Chinese	3,50	3,5	1,68	1	7	14
Indian	2,92	3	1,51	1	5	14
Other Asian	3,42	4	1,62	1	6	14
American	3,69	4	1,89	1	6	14
Other	3,69	4	1,49	1	6	14

In the questionnaire, there were asked what are the most attractive sights in the area that respondent represents. According the responses, the most interesting sights are as follows:

- Nature
- Architecture and old towns
- Monuments
- Places associated with culture

According to responses, the industry in the Rail Baltica corridor area is considered to be mainly forest and metal industry (see Figure 17). However, in the area there exists also high-tech and food industry. Share of oil and mining industries in the area is minor. Other existing industries are automotive, machinery, chemical, IT and different kind of service. In Figure 17, on axis y there is represented the amount of responses about existing industries in the area.

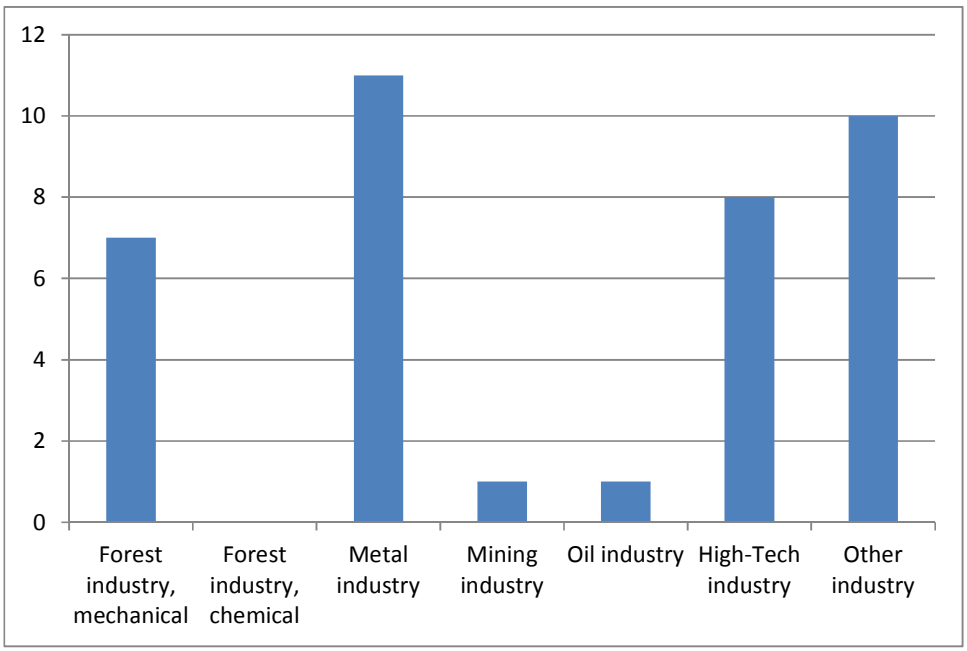

Figure 17. **Frequency of** existing industries in Rail Baltica corridor area (n = 14).

The most important companies in the Rail Baltica transport corridor area, according to responses, are:

- High-Tech industry: Phillips and Daewoo
- Automotive and machinery industry: Volkswagen, Man and BLTR Shipyards
- Food industry: Heineken, Nestle and Kraft
- IT industry: Microsoft
- Chemical industry: Bridgestone and JSC Valmieras Stikla Škiedra
- Service industry: K-line and DB Schenker

Future outlook for heavy and high-tech industries are shown in Table 23. Respondents estimated the future outlook in semantic differential scale from one to seven, one equals extremely negative and seven equals extremely positive. From average and median values, in table below, can be concluded, that situation is near no change, especially for heavy industry. For high-tech industry, future outlook is a little brighter. However, standard deviation is quite high for both, so

locally there can be huge differences between locations. Worst scenarios are for both industries extremely negative, but also for both there are bright future outlook somewhere in the area.

Table 23. Future outlook for heavy and high-tech industries (scale from 1 (extremely negative) to 7 (extremely positive)) (n = 14).

	Average	Median	Standard deviation	Min	Max	n
Future outlook, heavy industry	3,64	4	1,98	1	6	14
Future outlook, high-tech industry	5,92	6	1,68	1	7	12

From the demographic point of view, responses gave nothing new compared to basic knowledge. Overall respondents represent bigger cities; approximately 60 percent of responses came from cities of over 200,000 citizens, and no responses were given from cities having less than 20,000 citizens. According to responses, there is available governmentally owned unoccupied land area and the redemption prices are low. Development of price level has been in slight increase and in future development is estimated to be slight decrease.

5.2 Development Needs of Logistical Infrastructure

Development needs of logistical infrastructure were figured out by selecting three most important parts of logistical infrastructure and then ranking them from first to third. Respondents ranked the three most important development needs in order one to three. Different options for developing the logistical infrastructure are:

- Airport, International
- Airport, National
- Railway, High speed, 200 – 220 km/h

- Railway, Fast speed, approximately 160 km/h
- Road, two or three lane
- Roar, four lane or more
- Waterway, Sea or Inland waterway

For every rank position were given reference points as follows: Every first place gave to the option three reference points. Second place gave two reference points to the option and third place gave one reference point to the option. All the responses were gathered together, and summed up. In case nothing has been ranked e.g. on third place the "surplus" point is divided and added to higher position selections. The sum up is shown in Table 24 below.

Table 24. Reference points for developing logistical infrastructure.

	First selections	Second selections	Third selections	Reference points
Airport (International)	3	4	1	18
Airport (National)	0	0	4	4
Railway (High speed, 200 - 220 km/h)	7	3	0	30,5
Railway (Fast speed, approx. 160 km/h)	2	3	0	12,5
Road (2- or 3-lane)	1	2	1	8,5
Road (4-lane or more)	1	1	4	9,5
Waterway (Sea or Inland)	0	0	1	1
Total	14	13	11	84

Development needs of logistical infrastructure are shown in Figure 18. As noted earlier in Figure 17, railway's share of existing logistical infrastructure is significantly low. However, Figure 18 shows that public sector's interests towards railway have risen and willingness of investments to railway is on great level.

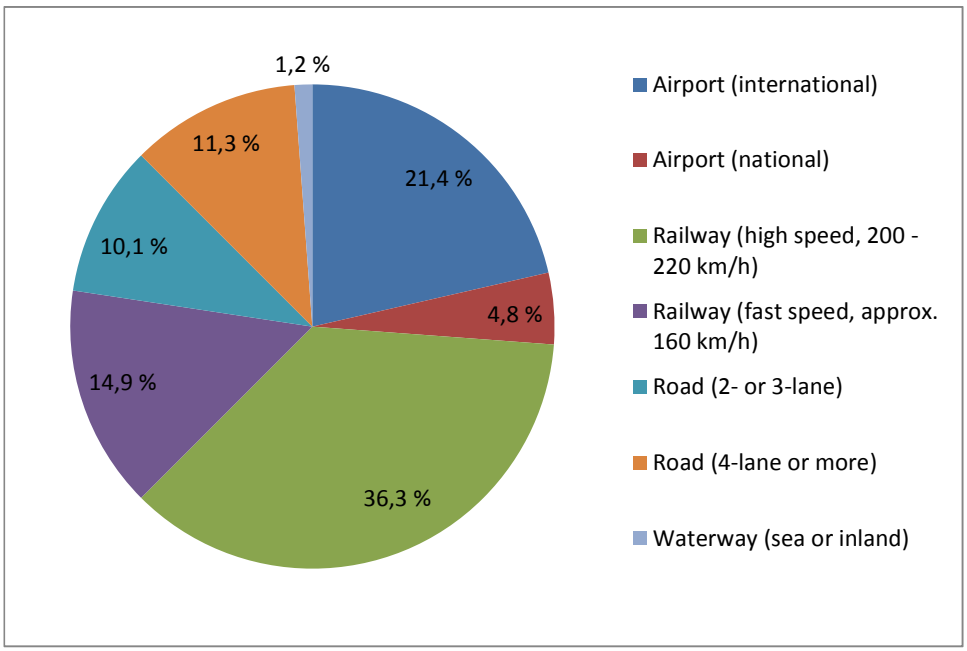

Figure 18. **Shares of** development needs of logistical infrastructure in Rail Baltica area (n = 14).

As can be seen in Figure 18, the importance of railway investments is significant. From the reference points, railway collected more than 50 percent. Noteworthy is also that one-third of reference points were given to high speed (200 – 220 km/h) railway. Importance of investments regarding airports collected around 25 percent of reference points and road a little over 20 percent. Respondents were satisfied of the conditions of waterways, because it gained only one percent of reference points. As a conclusion from the previous can be stated, that public sector stakeholders see that the high speed (200 – 220 km/h) railway is the most important development target.

5.3 Estimated Effect of New High Speed Railway

As noted earlier, it is interesting, how greatly wanted the railway investment is. But what is at least as interesting is how the respondents estimated the affect to

usage of different transportation modes, if their region had an access to high-speed railway. From the responses, estimations have been gathered together and shown in the next four figures. In Figure 19, there are estimations, how would the usage of different transportation modes change in passenger traffic on short distances (less than 100 km). In Figure 20, there is also the same estimation, but on long distances (more than 100 km). In Figures 21 and 22 same estimations are represented as earlier, but considered in freight traffic.

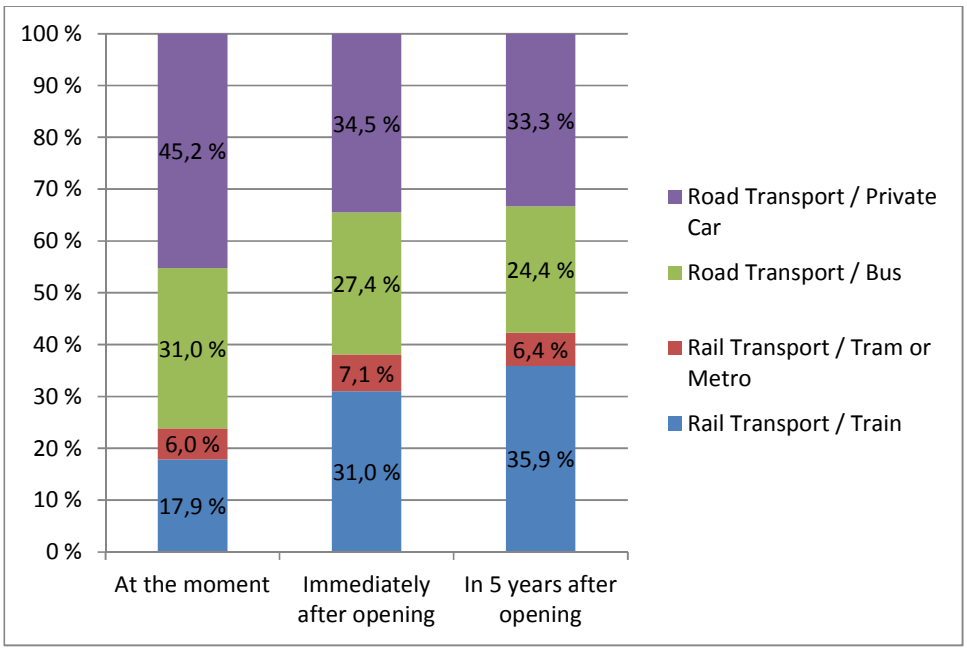

Figure 19. Estimated change in usage of different transportation modes (average): Passenger, short distance (n = 14).

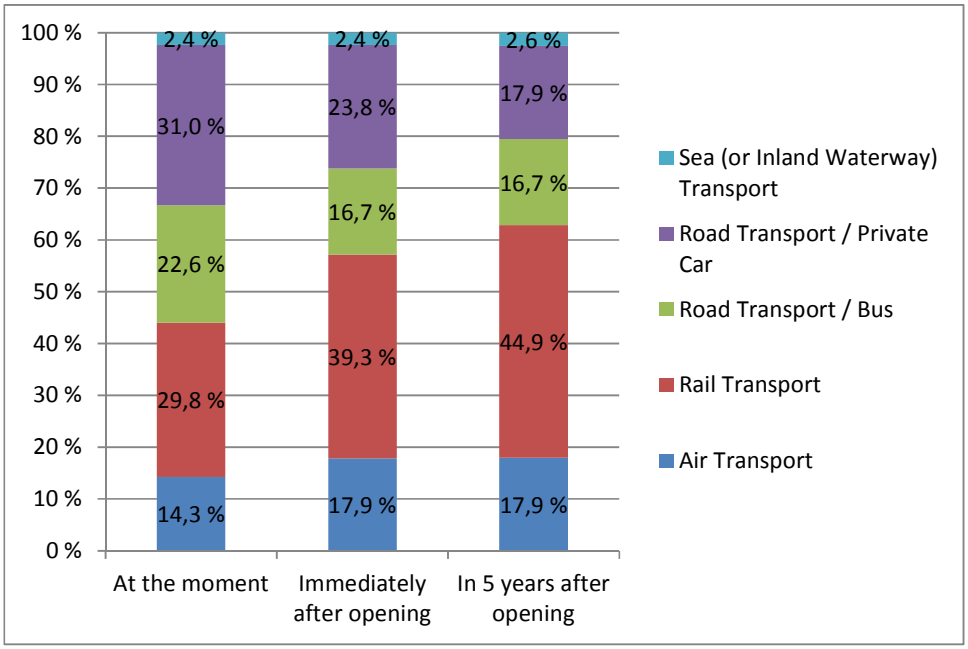

Figure 20. Estimated change in usage of different transportation modes (average): Passenger, long distance (n = 14).

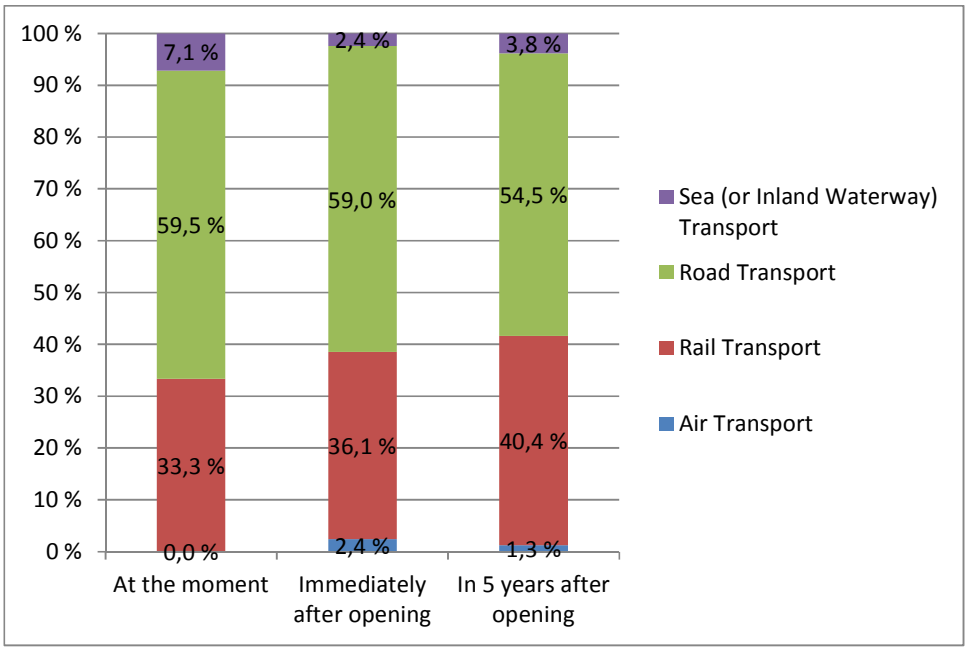

Figure 21. Estimated change in usage of different transportation modes (average): Freight, short distance (n = 14).

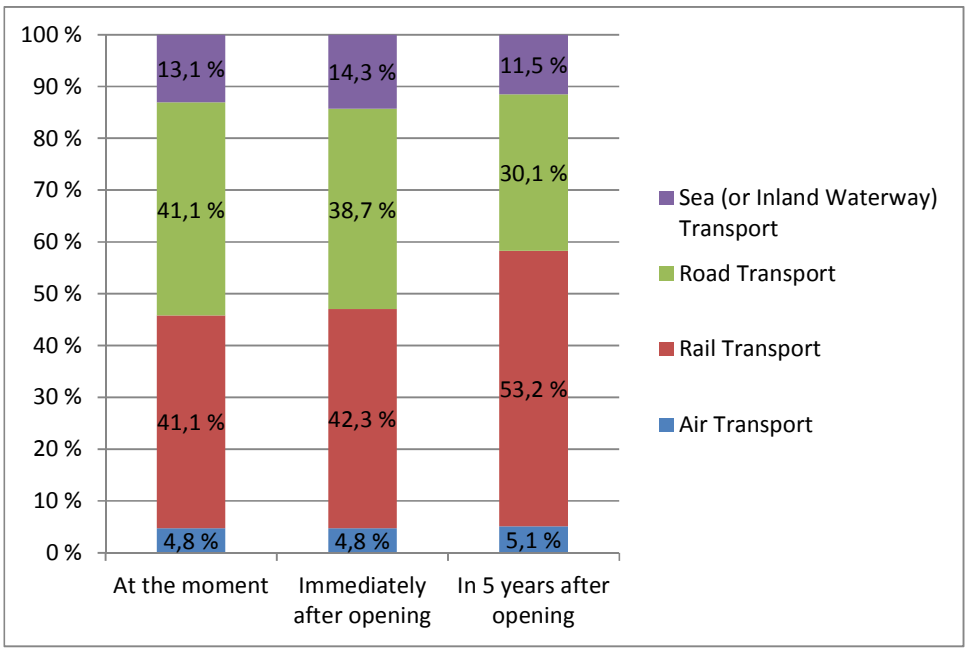

Figure 22. Estimated change in usage of different transportation modes (average): Freight, long distance (n = 14).

The effect for usage of different transportation modes is estimated to reduce road transports in every aspect. On passenger transportation railway usage is estimated to double in five years on short distances (less than 100 km), if compared to the current state. On long distance travelling the usage is estimated to increase over 65 percent, if compared to the current state. On freight side estimations are a little more moderate, but still on short distances it is estimated to increase one-third and on long distances a quarter if compared to the current state. Most of the market share railways increases are estimated to be taken from road traffic's share.

According to responses, also the behavior of tourists will change greatly, if city or region has a connection to high-speed railway. It is estimated that having that connection approximately 40 percent of tourists would use train instead of private car or bus. Also the usage of airlines is estimated decrease. Only the usage of waterway is estimated to stay on same level. The change is shown in Figure 23.

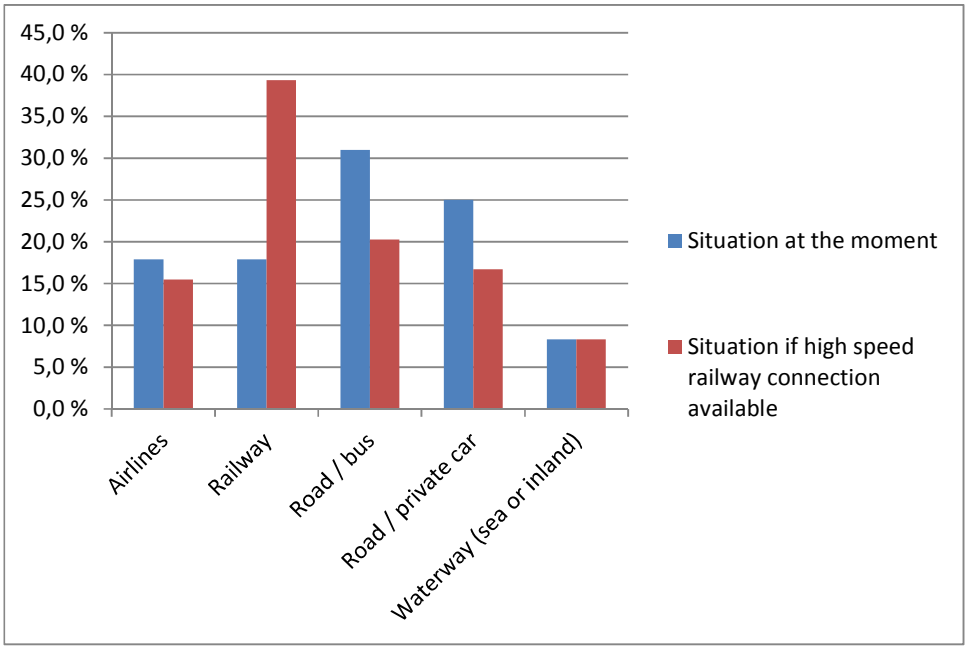

Figure 23. Transportation modes used by tourists (n = 14).

6 EMPIRICAL DATA ANALYSIS OF COMPLETED SURVEY FOR PRIVATE SECTOR

The qualitative semi-structured interview study concerning RBGC WP4 was conducted in two different countries, in Finland and in Estonia. Empirical part regarding the interview study is divided seven parts and interviewed companies in two different segments. At first are presented the large scale volume actors opinions and notes about the seven interview themes: Marpol regulation effects, recession effects, technical issues of freight train, frequency and lead time requirements for freight train, price of freight train, distance and reachability requirements for freight train and requirements for passenger train. After the large scale actors are presented the low and mid-scale volume actors' notes and opinions for the same themes.

6.1 Large Scale Volume Private Sector Actors

All interviewed companies were divided in two different segments according to annual volumes. Large volume is defined to be annually on level half a million tons or more of transported need per year. Low and mid volume is considered to be significantly lower, annually on at most 200,000 tons. Interviewed large scale volume private actors are shown in Table 25 and low and mid-scale volume private actors in Table 33.

Table 25. Large scale volume private sector actors.

Date	Country	Interviewed Company	Duration
27.9.2011	Finland	Company A: Logistics Service Provider	1 h 54 min
29.9.2011	Finland	Company B: Logistics Service Provider	60 min
12.10.2011	Estonia	Company G: Logistics Service Provider	1 h 50 min
18.10.2011	Finland	Company I: Client of Freight Transport	1 h 49 min
21.11.2011	Estonia	Company N: Logistics Service Provider	1 h 39 min
22.11.2011	Finland	Company O: Client of Freight Transport	1 h 23 min

From Rail Baltica's point of view, large volume private actors have the volumes at such high level, that even one of these companies can create the solid basis for freight transportation on Rail Baltica route. If none of these companies is interested to use the route, then there might be difficulties to engage in profitable business with freight trains. Generally these companies estimated increase in freight transports through Europe. Road transportation is getting more difficult to proceed, because tightening limitations and regulations and that allows railway and intermodal freight transportation to grow. The increasing trend on rails is intermodal transportation and that's why more and more semi-trailers are loaded on wagons.

6.1.1 Marpol Regulation's Effect

In Table 26 are gathered and shown large volume actors' most common and most significant opinions on Marpol 73/78 regulation effects.

Table 26. IMO Marpol 73/78 Annex VI impacts.

The regulation increases costs of transportation.
The effect of regulation is hardest to Finland because our harbors are the furthest from the border of SECA-area.
The main concern is competitiveness of Finnish industries. If there is nothing to export, import is way harder to handle. It also raises the prices.
The regulation creates challenges to Finnish export industries. Increase of the costs is estimated to be approximately 1 billion €. Price of transport will increase.
In the worst case scenario our clients will lose their ability to compete. It can lead to closing of operations in Finland.
Huge threat for Finnish economy!
The effect for Finnish transit traffic businesses is large if the regulation does not affect to the ferries going straight through to Russia.
The regulation increases costs in two ways, directly by more expensive fuel and indirectly by decreasing the capacity. The cost increase can be even higher than anyone have estimated.
The only option left open is to seek new routes.
Even though the main purpose to decrease environmental effects is great, with this regulation they increases emissions by directing the goods flows to more polluting transportation modes. A good idea but flawed implementation!

Common impression about Marpol regulation was that it definitely will raise the costs of transportation. Interviewees also agreed that transit related businesses will suffer, if regulation does not affect to ships going straight through to Russia. Especially Finnish export industry is seen to going to lose part of its competitiveness because of cost increasing. Logistics service providers see that the extra costs may be higher than estimated 1 billion €, which is estimated to be fault of more expensive fuel oil. Regulation will cut the amount of ships operating in Baltic Sea and it will destabilize the balance of supply and demand. At least so called ad hoc -transports will disappear. Everyone was also concerned about if exporting volumes drops, importing costs will increase. If the import and export is not in balance, transportation will be costly and way harder to manage. Every interviewee was also concerned about the increasing environmental impacts because ships does pollute less than other transportation modes if compared with emission-payload-rate.

6.1.2 Recession Effects to Private Sector Actors

Comments on effects of the recession confronted in 2008-09 are shown in the Table 27 below. Impact of the recession was negative for everyone. Annual turnovers dropped and operations had to be reduced. One interesting fact is that because of recession, towing prices dropped dramatically, especially in Baltic States. Cheap towing prices shifted lots of freight back to road from rails. Also the usage of intermodal units decreased. According to one interviewee, the towing price approximately was cut in half.

Table 27. Recession effects 08/09.

Annual turnovers dropped.
Towing prices dropped in Baltics, which increased the amount of freight on roads and decreased freight on rails.
Recession caused a trend what bought foreign trucks into Finnish roads. Amount of intermodal units decreased.
Costs of road transportation decreased dramatically: before the picking up and delivering costs tripled the whole transportation costs, but nowadays the picking up and delivery costs are approximately one third of whole transportation costs.

6.1.3 Technical Issues of Freight Train

Large scale companies do not see Rail Baltica project to be worthless. Common opinion is that better railway connection is not needed today, but the situation can change in five years. Though it is not enough that railways are getting better, lots of resources should be invested also in terminal areas and equipment. There is lack of handling equipment already. Also terminals, that meets today's requirements exists only rarely. Common opinions to technical issues are shown in Table 28.

Table 28. Freight Train, technical issues.

The project is not worthless, even though today the demand does not require a new railway connection. Situation might be different in ten years.
Terminal and handling area network should be expanded and renovated. There are only a few terminals which suite todays' requirements of freight handling.
One extremely noteworthy feature of freight traffic in Europe is that it is operated with semi-trailers. Trailer is very convenient to use and quite cheap. For tightening limitations of road transport the answer is interchangeability. With interchangeable trailers the lead time of transport can be minimized.
So called huckepack is probably the only concept to use if freight is wanted to shift from road to rail. The problem is that train is not very flexible and customers are not keen to wait. Also there are no pocket wagons for wider gauge. But anyway, there exist great benefits for intermodal transport units, e.g. higher weight limits.
A loaded huckepack contains approximately 30 semi-trailers, 1500 tons and its length is around a kilometer. It has been a viable in Europe and no reasons comes in my mind why it couldn't be a viable also on Rail Baltica. There is also increasing trend for usage of intermodal transportation, loading semi-trailers on train.
There is nothing to export from Estonia, what could be transported with traditional railway wagons. The network should be hub-and-spoke, and traffic should be operated with huckepack.
Give me even one reason, why general cargo should be transported on rails! Not even green aspects are sensible because electricity is not as green as it is said to be. Total efficiency of power generation with oil is approximately 25 %. If the oil is used by trucks, the total efficiency is 50 %!
Loading and unloading a train or even huckepack is not efficient. Somehow the efficiency should be increased, because existing terminals and equipment do not meet today's requirements.
One problem with the block train option is, that who will own the containers transported on rails? I bet shipping companies are not very keen to allow their containers in that use.
Railway's freight share is quite hard to increase today, because the infrastructure is in poor condition. For example, usually there is only single gauge in the main corridors for freight. Also velocity and weight of transportation units are increasing all the time. That creates requirements to e.g. the axle loads should be increased at least up to 25 ton. Rail Baltica could be sensible for traditional heavy industry, because railway is not flexible enough to serve JIT or LEAN production.

Monopoly or monopolistic railway markets are seen as a headache for logistics service providers. Companies are concerned that without free competition on railway markets trains won't be flexible enough to use and that will suppress the usage. The reason for demand of flexibility, short lead times and scheduled regular service is mainly from the characteristic of goods; general cargo. Every large scale volume company interviewed was handling general cargo and mostly on pallets. Bulk products are transported very rarely. Industries are getting more or less closer to high-tech industry. Value of products and components is getting higher and manufacturers and producers are willing to reduce capital tied up in inventories.

Every logistics service provider saw the huckepack as a solution for Rail Baltica. It is admitted that huckepack will not be able to carry the project all the way, but it can create the basis. To be effective and profitable Rail Baltica does need also passenger trains and traditional freight trains. One factor to must be noted that freight traffic in Europe is operated with semi-trailers and it does advocate the huckepack in use. Block trains are seen as an option, but the problem is, that there exists no container traffic inside Europe. One noteworthy aspect is also the question, who owns the containers transported on rails. It is significant question though shipping companies may not be willing to give their containers in that use. Even though the large scale companies were slightly concerned about the volumes; will they ever be sufficient? One thing that is sure is that the project needs everybody to be involved. Some interviewees criticized also the eco-friendliness of trains in marketing. They saw that this kind of marketing is misleading and gave an example about efficiency. Interviewee stressed that if overall efficiency is taken into account, the truck is better option. Every interviewee agreed that eco-friendliness is not a selling argument. In business-to-business operations no one wants to use train just because it's fun.

6.1.4 Frequency and Lead Time Requirements for Freight Train

Comments on frequency and lead time of railway transports were almost the same in every large scale company. The most common opinions on frequency and lead time requirements are shown in Table 29 below.

Table 29. Freight Train, issues concerning frequency and lead time.

The combination of lead time, price and flexibility is the factor that matters.
If the lead time is shorter with train than ferry, it improves competitiveness.
It is quite hard and costly to create better connections from Finland to Germany with railway because the good ferry connections. 30 departing ferries in a week and lead time approximately 20 hours. Rail Baltica would be only one additional option, nothing more.
Lead time should be comparable with truck and frequency should be at least once a day.
Scheduled connection is even more important that high frequency. For example twice a week. Lead time should be on level 20 hours from Tallinn to Poland.
Frequency and lead time requirements to Poland are not so tight than to Germany. Increasing connections to Poland will be definite plus, but if Rail Baltica is wanted to compete with ferries, it will be tough job.
Lead time from Finland to Poland should be less than 72 hours.
From Tallinn to Germany lead time have to be less than 24 hours.
According to our project type industry, high frequency means nothing but schedule and its reliability is everything.
It takes approximately 12 hours from Tallinn to Berlin by truck.
By train it should take less than 26 hours to reach Northern Germany from Tallinn.

Everyone stressed that combination of lead time, price and flexibility is the factor that matters. Trains on Rail Baltica are seen as an extra option and a competitor for direct truck haulages and ferries. Requirements for trains were presented also in comparison with trucks and ferries. According to interviewees' estimations, it can be made a conclusion that if frequency is once a day and lead time is at most 24 hours from Tallinn to Berlin, it would be suitable for all. Interviewees were concerned about the volumes transported on rails to Germany. Everyone were skeptic about is there enough demand. For example from Finland to Germany, there are about 30 departing ferries every week. Interesting is that there is quite open requirements for connections to Poland. There are no efficient connections available from Finland to Poland and south directions from there. Logistics service providers estimated that, if Warsaw is reached from Finland in less than 72 hours, railways would be very sensible option. And for that route there exists demand already.

6.1.5 Price of Freight Train

Every interviewee was absolutely sure that the price is definitely the factor what makes the difference. In Business-to-Business markets the price is everything, and clients are not willing to pay more. Some of logistics service provider's clients were declined the offer to cut carbon dioxide emissions in half just because it would cost five percent more to use train in the transport chain. According to that, the eco-friendliness is definitely not a selling argument. That is why price should be comparable to trucks and ferries just like frequency and lead time. Interesting is also that trains are not seen as reliable as other transport modes. The most common comments on price issues are shown in Table 30.

Table 30. Freight Train, price issues.

The price is in huge role in business to business markets.
Even if lead time is shorter, price cannot be much higher.
If train is cheaper, it could be an option, but only if train is not much slower than ferry.
Should be on reasonable level and comparable to ferries and trucks.
Environment friendliness is not a selling argument! It is price what matters.
Combination of price and lead time is important.
It is the price what it is all about; train just can't be more expensive! Not even in the case where it is faster than other modes.
None of the green values cannot change the decision, if transporting via Rail Baltica costs 10 % more just only because it's fun to use train!
Clients do reject offers which halve the transport emissions but costs 5 % more. This is the reality.
Just for you to get the whole image, truck from Tallinn to Germany costs 1300 €.
How will be the fluctuations in the transport price taken into account? In downturn railway usually loses its competitiveness because of the high level of fixed costs.
For us, the most important factors are price level, quality and reliability of transport.

Interviewees estimated that even if train via Rail Baltica would be way faster than trucks or ferries, it could not be much more expensive. As a statement from one interviewee, it can be said that even if train could do the same trick, it still should be cheaper. Other interviewees agreed that cheaper price will gain more interests. Though, if the train is way cheaper than, but not as capable as competing transport modes, train will be out from the competition.

6.1.6 Distance and Reachability Requirements for Freight Train

Every interviewee saw that Rail Baltica is not realistic on its own. There is no one who wants to transport something just between Tallinn and Berlin. Everyone stressed that Rail Baltica should be considered as a feeder route and a link between Trans-Siberian Railway and the whole European rail network. The most agreed comments about distance and reachability are shown in Table 31.

Table 31. Freight Train, issues concerning distance and reachability.

Connection between Tallinn and Berlin is worthless if you can't reach rest of the Europe and Russia by rails.
Berlin is never the destination for freight. Freight either passes over Berlin or does not go even that far.
Rail Baltica should work out as a hub-and-spoke-concept and main hub should be located in e.g. western Poland.
It would be great if Rail Baltica could reach German harbors.
Eastern Europe should be reached by rails. Rail Baltica could be the connecting link there.
Even though Rail Baltica is always marked to end to Berlin, in real world freight goes to south from Warsaw.
Rail Baltica should be connected to TSR.
There is a problem with further connections for Rail Baltica because Lübeck-Milan corridors capacity is already in use. Freight from north cannot be transported further via that corridor. This problem decreases the value of the whole idea of transporting freight on Rail Baltica.
To be realistic, Rail Baltica should be built up from Berlin to Vilnius or Kaunas. There is no need to go any farther to north. North direction from Kaunas to Tallinn is sensible to manage with trucks.

Travelling distances are not convenient to be too short, because railway is not efficient on short legs. Train is sensible to use on long journeys and big volumes. One interviewee stated that there is no need to build railway through Baltics just because there is lack of volume there. It would be enough to have railway from Berlin to e.g. Kaunas, north direction can and should be operated by trucks. It is said that there is nothing to transport from Estonia that could be transported by train. Large scale volume companies were concerned about the ability to convey freight forward from Germany or Poland. Companies wondered is there enough capacity e.g. in European rail network. At least the capacity of corridor between Lübeck and Milan is used already.

6.1.7 Requirements for Passenger Train

Large scale volume companies' comments on passenger train focused on price issues and lead times. The most common comments on requirements for passenger train are shown in Table 32.

Table 32. Passenger Train.

Passengers would not travel by train from Tallinn to Berlin because flights are today too cheap.
It is hard get the train tickets cheap enough that passengers could choose train rather than airplane.
Nowadays the fossil fuels are too cheap, but it will change!
The train should be fast enough to compete with airlines.
Lead time from Tallinn to Riga should be 3 hours and to Warsaw 6 hours.
From Tallinn to Riga in 2 hours, and to Berlin in 16 hours would be sensible lead time.

Interviewees estimated that from Tallinn to Riga should be able to reach in less than 3 hours and to Berlin approximately in 16 hours. On price issues, interviewees estimated that train won't be able to compete against airlines because it is not as fast and also it is hard to get price level even on the same than airlines.

6.2 Low and Mid-Scale Volume Private Sector Actors

Low and mid-scale volume private actors have approximately a half of the annual volumes if compared to large scale volume private actors. Small and mid-scale companies contains two logistics service companies, two passenger transport operators and five clients of freight transport, which are shown in Table 33 below.

Table 33. Low and mid-scale volume private actors.

Date	Country	Interviewed Company	Duration
4.10.2011	Finland	Company C: Logistics Service Provider	1 h 29 min
4.10.2011	Finland	Company D: Logistics Service Provider	61 min
10.10.2011	Estonia	Company E: Client of Freight Transport	39 min
11.10.2011	Estonia	Company F: Passenger Transport Operator	58 min
13.10.2011	Estonia	Company H: Passenger Transport Operator	1 h 28 min
1.11.2011	Estonia	Company J: Client of Freight Transport	1 h 26 min
2.11.2011	Estonia	Company K: Client of Freight Transport	60 min
2.11.2011	Estonia	Company L: Client of Freight Transport	58 min
16.11.2011	Finland	Company M: Client of Freight Transport	62 min

These companies do not have such volumes that could create basis for freight or passenger traffic on Rail Baltica. Even though, these companies made many important notes, which should be taken into consideration in further planning of Rail Baltica. Every interviewee in small and mid-scale companies agreed that distances inside Estonia and Finland are too small that it could be operated with trains. Small and mid-scale clients for freight transport has similarities in managing transportation, usually it is outsourced to logistics service providers. They agreed, that it is not important how transport operations are done as long as schedule is accurate and quality of transports is good enough, e.g. fragile goods are not broken. Small and mid-scale logistics service providers stressed that the most important factor is how the balance of import and export can be ensured. One noteworthy factor is also not small and mid-scale companies either than large scale companies were worried about who is the operative actor. If it is governmentally owned company or collaboration of governmentally owned companies, it probably will not be enough. Operative actor should be market oriented and independent. Demand for competition on Rail Baltica was underlined by interviewees.

6.2.1 Marpol Regulation's Effect

Small and mid-scale volume companies saw Marpol regulation slightly better than and not as harmful as large scale companies. Comments from small and mid-scale companies on Marpol regulation is shown in Table 34.

Table 34. IMO Marpol 73/78 effects.

Will increases costs of transportation, even though the idea of decreasing environmental impact is great.
Regulation will increase the costs and decreases the ability to compete against foreign companies.
Definitely increases costs.

One interviewee stated that everything what is needed to transport will be transported. It is just matter of alternative transport modes. Small and mid-scale companies thought that decrease of environmental impact is great idea. Every company though agreed that Marpol regulation will increase costs just like every large scale company did. Rail Baltica is seen as an option for transport in every interviewed company.

6.2.2 Recession Effects for Private Sector Actors

Recession confronted in 2008-09 had greater impact mainly on small and mid-scale than large scale companies. Comments on recession effects in small and mid-scale volume private actors are shown in Table 35.

Table 35. Recession effects 08/09.

Because of recession, operations needed to be reduced.
Annual turnover haven't gained even anywhere close the level where it was at 2007.
Towing prices of semi-trailers dropped dramatically.
Recession cut the amount of passengers.

For passenger transport, the amount of passengers has barely increased on the level what it was on 2007. Also annual turnover dropped. However, the overall situation is now improving. Logistic service providers and clients for them had noticed the drop in towing prices, but it hasn't had such impact than in large scale companies.

6.2.3 Technical Issues of Freight Train

Like in large scale companies, characteristic of goods is the same in small and mid-scale companies. Everyone is dealing with general cargo, which is mainly on pallets. No raw or bulk materials were dealt with. Important note is also that in small and mid-scale companies have very low shipping volumes. From these companies the weekly volume is in range of one to five semi-trailers. Smallest article shipped was a size of letter and biggest at most a size of refrigerator. Amount of shipments can be huge, but tons and cubic-meters are very low. The most common comments on technical issues of freight trains are shown in Table 36.

Table 36. Freight Train, technical issues.

Characteristic of goods is general cargo and usually on pallets. Volumes are low.
Our volume and its frequency are far away to cover the railway transportation.
Gauge must be the European standard.
Overall railway infrastructure and terminals should be improved before the railway freight is even an option.
What is the concept of freight transport on Rail Baltica route? If it is newer, e.g. huckepack or double stacking it is realistic, but if it is traditional, you can forget it!
Even the huckepack won't be enough (with passenger trains), we also need long traditional trains going on.
The reason why semi-trailers are so widely in use is that trailers bring the flexibility to the supply chain.
The amount of semi-trailers will increase when the cost of truck driver increase. Then trailers will be loaded in ferries or on trains.
The freight traffic between Helsinki and Tallinn is RoRo-traffic.
How the traffic between Helsinki and Tallinn will be handled? If the ferries stay, the project is more or less on half way.
The safety issues of railway freight are questionable. How it will be ensured that e.g. consolidation won't break the fragile goods?
Even if the lead time of Rail Baltica is short enough, will the effectiveness be anywhere near the reasonable level?

Interviewees from small and mid-scale companies saw that the problem with the different gauge is that there is only one solution, and it is the European standard gauge. The operations should be done with huckepack or bloc train with double stacking. If there are no new concepts in use railways are out from the competition. There is also said to be lack of modern railway terminals and lack of usable equipment. The usage of semi-trailers is sawn as better option in small and mid-scale logistics service providers than in large scale ones. In both segments semis are seen very flexible and cheap solution for transporting. Estimations about the increase of intermodal transport were similar in both segments. Interviewees agreed that intermodal transport usage will increase as salaries of truck drivers' increase.

The effectiveness of Rail Baltica was questioned in both segments. Concerns were about the solution how traffic will be managed and will there ever be enough volume to be profitable and competitive. If the railway does not reach Helsinki, the whole project will be more or less in half way. Also even if freight train is fast enough compared to ferries and straight truck haulages, will it ever be profitable.

6.2.4 Frequency and Lead Time Requirements for Freight Train

Instead of requirements for short lead time and high frequency the small and mid-scale companies stressed that the ability to schedule and easiness to use are the matter making factors. Small and mid-scale companies' opinions about lead time and frequency issues are shown in Table 37.

Table 37. Freight Train, issues concerning frequency and lead time.

The ability to schedule the route and easiness to use are in key roles.
Lead time must be comparable to ferry and truck.
Requirements for frequency and lead time are more stringent when transporting to Germany than to Poland. To satisfy the demand to Poland, frequency can be lower and transport can take more time.
Lead time must be faster than by ferries and frequency at least the same.
Frequency should be at least once a day and lead time from Tallinn to Berlin or Northern Germany at most 12 hours.
Frequency of three times per week and lead time everything less than 48 hours should be fair enough.
Railways attractiveness will increase when lead time gets shorter.

Of course interviewees agreed that lead time should be short and frequency high enough that Rail Baltica could be compatible. Small and mid-scale companies gave slightly more weight to green aspects in decision making than large scale volume companies.

6.2.5 Price of Freight Train

The most common comments on freight trains freight issues are shown in Table 38.

Table 38. Freight Train, price issues.

Rail Baltica should be cheap feeding corridor.
Price level should be comparable to ferry and truck.
If the lead time or frequency do not meet the ferries, prices should be way cheaper than ferry prices.
If the lead time using Rail Baltica corridor is shorter than using ferries, we can pay a little extra.
The cost of transportation is an important factor in decision making.
Even though price is the factor that matters, but the importance of green values is gaining.

Interviewees from small and mid-scale companies admitted that Rail Baltica should be cheap feeder corridor like large scale companies did. Also price level was desired to be at most on truck and ferry levels. Only one company was ready to pay a little extra, if Rail Baltica meets their other requirements. It is significant to note that only one of fifteen companies had this kind of willingness. Other companies stressed that train should be cheaper, because the cost issues do have the biggest role in decision making.

6.2.1 Distance and Reachability Requirements for Freight Train

Like the larger companies, the small and mid-scale companies thought that Rail Baltica should be a connective link at least between Baltics and Central Europe. There was also same kind of thoughts about involving Russia. Many interviewees asked that what the point is, if Russia is not involved. This question is common in both, large scale and small and mid-scale companies in Finland and Estonia. Obviously the Russia is important for everyone in these countries. Comments on reachability were also that largest seaports and the hot spots in Europe should be reached. The most important comments on distances and reachability are shown in Table 39.

Table 39. Freight Train, issues concerning distance and reachability.

By using Rail Baltica, Central Europe should at least be reached.
South- and East-Europe are needed to be reached by using Rail Baltica.
What's the point, if Russia is not involved?
If we talk about reachability, Rail Baltica should be the connective link between Antwerp (or Rotterdam or Hamburg) and Moscow.
Distances inside the Baltic States are way too short if we think about railway freight. Even Lithuania is not very far from Tallinn.
Overall amount of goods transported in Baltic States is minor, mostly because the market and number of population is small.
By using Rail Baltica, the hot spots of Europe should be reached that the whole project is even reasonable.

About distances all of the companies in both segments saw the situation almost the same; distances in Baltic States are too short for freight trains. Also the size of market area is questionable. There are not enough inhabitants in region. Even Lithuania is sawn to be too near from Tallinn.

6.2.2 Requirements for Passenger Train

Comments on requirements for passenger trains are much more specific from small and mid-scale companies just because in this segment two passenger traffic operators were involved. These companies had lot knowledge and very noteworthy comments on passenger trains on Rail Baltica. Interesting aspect is that these companies do not see possible passenger train operator as a threat or even competitor. Passenger traffic operators stressed that they have only one competitor on this route, which is the usage of private cars. The most important comments on requirements for passenger train are shown in Table 40.

Table 40. Passenger Train.

Rail Baltica creates an alternative option for flying.
In ideal world, you could take a train from Helsinki to St. Petersburg, to Moscow and to Berlin. Too bad that the connection is available in Tallinn but not in Helsinki.
There are a lot of people traveling back and forth in Baltic States; sure there will be potential for train!
Passengers are quite willing to pay for faster connections.
Reasonable lead time from Tallinn to Riga by train will be approximately 2 hours, to Warsaw 6 hours.
If we think alternative alignments of the railway, Rail Baltica's ability to compete in passenger traffic is zero, if the corridor goes via Tartu.
The connection should definitely go to Vilnius. Freight can go to Kaunas, but passengers want to go to Vilnius.
Reasonable frequency is three or four times a day.
Ticket prices should be on level 30-40 € from Tallinn to Riga, with prices over 60 € you can forget the whole thing. For longer journeys the train ticket will cost approximately the same than flying will, even if train is subsidized by government. Who wants to pay the same for the train, but will arrive to destination 10 hours later?
The frequency of passenger train is a matter of life and death. In reasonable 300 km legs, frequency should be at least once per two hours. Once in an hour is even better. Lower frequency means that you are out of competition. If you miss the train, by car you could be home before next departs.
It is realistic to think fast railway connection between Tallinn and Riga or Tallinn and Vilnius.
To be honest, it is stupid to talk about fast railway connection from Tallinn to Warsaw or Berlin! The legs over 500 kms are airline market, not railway market! This kind of ideas comes from people who know nothing about passenger transport markets!

Interviewees from both segments wondered an ideal world, where it could be possible to take a train to St. Petersburg, Moscow and Berlin from Helsinki. Everyone but passenger traffic operators thought that there will be demand for a train connection between Tallinn and Berlin. The passenger traffic operators agreed that there are a lot of people travelling back and forth between Tallinn and Vilnius, but if considered on the whole route from Tallinn to Berlin, the idea is stupid. One interviewee almost lost his temper when he was thinking this idea. Based on his professional knowledge and experience, the Tallinn-Berlin connection is nothing but airline market. Both passenger traffic operators thought that there will be never enough passengers to profitable transportation between Tallinn and Berlin. The train ticket price will be on same level with airline tickets, even if it is subsidized by governments. According to passenger train operators, the train will never be able to compete against airlines on legs 500 km's or more.

Interviewees estimated that lead time from Tallinn to Riga should be around 2 hours and to 6 hours. Also the frequency is needed to be on high level. According to passenger traffic operators, on passenger traffic the frequency is matter of life and death. To be competitive, frequency should be at least once in two hours, rather once per hour. For passengers traffic also the shortest alignment is vital. It is not sensible if railway goes via Tartu. Passengers are quite willing to pay extra for faster connections, but no one wants to travel 150 kms more without a reason. Prices of train tickets should be low enough, because people in Baltics are relatively poor. Sensible ticket price from Tallinn to Riga is approximately 30 €. If price is higher than 60 €, train will be out from competition.

7 DISCUSSION

The results shown in previous Chapters 5 and 6 are partly similar but also they vary slightly with the literature. Main difference maker could be the highly different background and position of the respondents and interviewees. Also the form of the questions asked was stressed rather opinions and fully subjective estimations than cold facts. Finding out opinions was the main reason for this research, so the differing theories and results are actually additional valuable result.

In public sector the main opinions were rather positive towards railway traffic and Rail Baltica. With better railway connections public sector decision makers do believe that passengers and freight would be transported more on rails no matter the operating method. On public side respondents also saw that better railway connections would bring more tourists in the area and also change their behavior in arriving and departing the area.

In private sector opinions towards railway traffic and Rail Baltica were not as positive and bright than in public sector. Opinions and estimations also did differ wider among the private sector decision makers than in public side. Main difference makers are the company size and also the nationality of interviewee. In general, equally sized companies and same nationalities had more or less congruent opinions. Finns were mainly more positive towards Rail Baltica and railway traffic overall than Estonians. Also large scale volume manufacturers and transport companies were more positive towards Rail Baltica than smaller scale volume companies. In private sector the main opinion about the operating method on Rail Baltica were that the intermodality has to be involved. Huckepack (semitrailers on train) was seen as better option than block train (maritime containers on train). Actually only one company thought that they would consider using the traditional train, if the connections were better. Other companies stressed the importance of intermodality. One of the interviewees also thought that it is useless to build the new railway up to Estonia. Interviewee said that new

railway should end in Lithuania, e.g. in Kaunas, and from there goods could be transported on trucks as it is done today. Private sector agreed that the gauge should be the European standard all the way from Berlin to Tallinn.

Passenger transport operators brought up some noteworthy points about the passenger trains and operations in passenger traffic that no one had mentioned earlier. Mainly the points concerns on time issues and pricing. At first, if the frequency of departures is not high enough, there won't be demand for passenger trains. At second, the promptness, if train takes too much time or involves too many stops or passengers have to change trains too many times, travelling by train is not convenient to e.g. business travelers. At third, the distance, if the distance is too long and train is not capable to achieve high speeds, travelling by train takes too much time. And at fourth, people in Baltic States are relatively poor, so the tickets should be priced on reasonable level. If prices are too high, Baltic citizens would not use it. Passenger transport operators stressed that Rail Baltica could be great project and difference maker only if the standardization level of railway infrastructure is higher and railway is not considered as a competitor to other public transports. Also passenger transport companies stressed that common opinion against public transportation and particularly passenger trains should be improved in Baltic States.

Literature about intermodal transport supports the logistic service providing companies concerns about reachability. Especially on transport service providing companies stressed that the end of Rail Baltica, Berlin, is only rarely the final destination for freight. Companies pointed out that Rail Baltica should be considered as a part of European railway network, not only as itself. In literature review there is listed intermodal railway service providers and numbers about their performance from Europe and North America. Those numbers points out obviously that the transportation distance is an issue. In North America the total distance and average speed of trains are on their own level when compared European ones. In Europe, the freight trains are slow and reachability is poor. The distance between origin and destination should be increased in Europe. Also the

trains should be able to travel without unnecessary stops and longer distances. Profits of different companies' intermodal operations vary a lot. Mainly intermodal transportation is profitable in North America, but not in Europe. Of course the environment and ownership of railway infrastructure is different in North America and Europe. But it is clearly an issue for freight trains that they have to yield passenger trains, it do damage the performance of railway freight.

Literature also supports the private sectors opinion about the importance of semi-trailers in transport chain within the Europe. Statistics from Finnish, Swedish and English ports points out that the freight traffic is mainly managed with semi-trailers and trucks. Academic sources and information about this is rather difficult to find, because research of transport is considered mainly from continent to other continent as well as world scale, and that is why it is mainly loaded in maritime containers. Short sea scale and shorter distance freight transportation has been under research only rarely.

Literature about tourism in Baltic States varies a bit than the opinions and estimations of questionnaire respondents. In public sector the importance of tourism is seen to increase its importance in the area. Actually the balance of expenditure and receipts of inbound and outbound tourism is positive only in Estonia. Latvians and Lithuanians do spend more money in foreign countries than foreigners spend in their own country. Even though the total amount of expenditure and receipts are grown annually in Baltics. Statistics also supports the estimations that domestic tourism is more important at the moment than inbound tourism. Also the estimations about the importance of neighboring countries as a source of tourism are supported in literature.

It is estimated in Baltic States that the travel and tourism sector will increase in general. Actually in literature the important increase of tourism sector is forecasted only in Latvia. In shorter period tourism sector is forecasted to grow faster Estonia than in Lithuania. Longer time period forecasts the growth other

way around. It is important to notice that the growth is rather slow in Baltics when it is compared to other countries in the world.

8 CONCLUSIONS

In this last chapter is presented the conclusions about the research. In the first sub-chapter there is presented conclusions from the survey for public sector, and in the second sub-chapter there is conclusions from survey for private sector. In third sub-chapter the main findings of research is summed up and research questions are answered. In the fourth, in the last sub-chapter of this research, is presented the limitations of this study, but also suggesting future research avenues in the theme area.

8.1 Conclusions from Completed Survey for Public Sector

The aim of the web-based questionnaire study was to deepen knowledge already gained by the theme interview study (for further information see: Laisi, Milla, Ville Henttu & Olli-Pekka Hilmola (2011, editors). *Enhancing Accessibility of Rail Baltica Influence Area: Standpoints of Public Sector.* Lappeenranta University of Technology, Department of Industrial Management. Research Report 237). The questionnaire was created after the interview study and the main themes were gathered from interview frameworks. Overall, 153 persons were invited to answer the questionnaire and total response rate was 12 percent.

Results concerning current state did not include much new information. Almost everything was as expected or a priori assumed. Road dominates the transportation markets, there is land area available and its price is actually cheap. However, the survey rose up also several interesting aspects about the importance of tourism, and how better railway connections would change the usage of different transport modes.

Local differences in tourism are actually wider than expected. Mainly the source of tourism is from own country or from nearby countries. That brings out a question: Is the other continents aware about this region? One fact to be

noteworthy is the importance of Russians as a source of tourism for Rail Baltica area is very significant. However, the importance of tourism is varying a lot based on location, but it is increasing in overall.

Local differences from the point of view of industry are varying widely. Even though worst scenarios about the future outlook for industries are very negative, in some places especially high-tech industry's future looks quite bright. For heavy industry the future does not look as good. From previous, a conclusion can be made that there will be goods to be transported also in the future. The characteristic of goods is, however, in change; there will be more general cargo and less bulk in the future.

All in all, railway is seen as a very important development target. Respondents saw clearly that usage of railways will increase with better connection. They estimated that much more freight and passenger traffic would go through rails, if there was better railway connection available. Respondents also saw that importance of tourism is increasing and with better railway connections more tourists would use railway while arriving and departing from the area.

8.2 Conclusion for Completed Study for Private Sector

The aim of completed interview study for private sector decision makers was to figure out what are the private sectors opinions and attitudes towards possible new railway alignment, Rail Baltica. Used three interview frameworks were created partly from former interview study for public sector by choosing relevant themes and questions from those interview frameworks. Partially used interview frameworks were created in cooperation with the project group of Rail Baltica Growth Corridor. Overall, total of 15 semi-structured theme interviews were conducted in Finland and Estonia.

Interviewed companies agreed that Rail Baltica, as if the new railway alignment will be realized, should be competitive with alternative on surface transport modes. Pricing the Rail Baltica should be somewhere near the alternative modes, approximately 52 € per net tonne for transport from Tallinn to Berlin. It have to be noted that because the economic downturn confronted in 2008-09 freight rates on road became significantly cheaper, the given estimation about price may be too cheap. Demands for lead time from Tallinn to Berlin vary a lot, but though every interviewed company agreed that train should be competitive in lead time and frequency with other transport modes. Every respondent stressed also the importance of standardized frequency in traffic. Demands for lead time were from the longest four days to the shortest 20 hours. In average the lead time expectation form Tallinn to Berlin is around 24 hours. Nevertheless the accurate time expectations, train needs be moderately fast and frequent.

Private sector actors emphasized also the importance of market oriented operators on Rail Baltica route. Everyone agreed that none of governmentally owned companies would be flexible enough to serve modern just in time logistics needs. Every respondent agreed also that operating method should be something faster than traditional freight train. For instance, intermodal transportation was a thing mentioned many times during interviews. Private sector stressed that traffic on Rail Baltica should be serving mainly freight traffic and everything should be based to that fact. For example different geographical areas should not be served equally. That is obvious because the ability to compete against other transport modes was widely emphasized, the lead time will be damaged greatly with too many stops. Every company also stressed that Rail Baltica connection should not be understood as lonely route, Rail Baltica have to be understood as a part of European railway network with forwarding possibilities up to Italy and Spain. Mainly in private sector Warsaw was considered as the ending / starting point and a hub of Rail Baltica rather than Berlin. Rail Baltica was seen as connecting link between North European and Russian railways and the rest of European railways.

The main difference between large and smaller scale companies was that large scale volume actors were concerned about gaining transport costs and were looking towards new routes to transport their goods. Mid and small scale volume companies were more settling in the situation and stated that what needs to be transported, will be transported, no matter what. Larger companies were worried. how the transport market and costs will develop after the date when Marpol regulation will be taken in use. Companies had concerns that the regulation will affect harder than it is estimated to. That supports the idea about building up alternative routes such as Rail Baltica.

8.3 Summary and Main Findings

The main findings from the studies can be listed as follows:

- Attitude towards the RBGC-project is very positive.
- New railway connection is wanted in many ways.
- Rail Baltica connection could be alternative option for road transport to passengers and freight.
- Rail Baltica should be fast and frequent.
- Pricing should be on the level of alternative transport modes.
- New methods on freight side, such as huckepack or similar intermodal method, should be used.
- Focus on Rail Baltica should be more on serving industrial needs than passenger needs.

Overall attitude towards this project have been very positive. Mainly every respondent though that the project is interesting and saw that RBGC-project can make difference. New railway alignment and better connections were in the wish list of every respondent. Public sector saw that if the Rail Baltica is realized, it will bring benefits widely to the surrounding areas. Private sector saw that Rail Baltica would change their transport processes and also some of the interviewed companies saw new business possibilities within the project. Only a few

respondents had doubts that the volumes may not be high enough, but also they were not worried, if Finland and Russia were involved to the project.

Demands and expectations towards new Rail Baltica alignment were that connection should be fast, frequent and reasonably priced. Using the train should not be too time consuming for passengers and also for freight. Train speed should be high and train should not stop too many times. Frequency of traffic was considered as one of the most crucial factor of profitable operating on Rail Baltica. Users of the railway have to be able to timetable the transportation. Passenger transport needs mainly higher frequency though missing a train should not cause too long due. For example, if waiting time is longer for next train than driving time to destination, roughly saying, there is no use of train in case of that. Freight transport is not so high frequency demanding, because there are two alternative options to take the load from Tallinn to Berlin. For instance, even though if the freight train departs once a week, there probably would be users for it. Main focus has to be put into that the train also arrive its destination in time. Of course if the frequency is higher so will be the volumes also. Roughly could be said that frequency defines the feature of goods transported on route. Slow speeded and low frequent traffic will be suitable mainly only for bulk products, which are not perishing by nature. But if the frequency and train speed are high, transport is suitable also for just in time logistics and groceries for instance.

According to this report main focus on Rail Baltica should be on freight transport with new operating methods. Public sector decision makers were mainly on the side that the focus should be more on passenger transport side or at least equally on both sides. Passenger transport operators instead were quite skeptic about is there enough passengers to the route. Passenger transport operators agreed that the total distance between Tallinn and Berlin is too long to be reasonably used. Today's flights are too cheap and a lot faster than the train on Rail Baltica will ever be. And according to that, the whole Rail Baltica route is not realistic for passenger transport. For shorter distances, e.g. from Tallinn to Riga Rail Baltica is very interesting, but not to the whole route to Berlin.

There is possibility that railway freight could manage to be profitable, but only if the whole route from Tallinn to Berlin is standardized and harmonized to suite for modern just in time logistics needs. Companies stressed that intermodality should be taken somehow in operation. Huckepack were seen as better solution than traditional freight train or block train. Main reason was that globally operating logistics service companies do already have their own trailer pools, they use already semi-trailers. From this perspective operators on Rail Baltica should be focused to provide services for logistics service companies like at the moment shipping companies do with roro- and ropax-vessels. Nevertheless it is important to remember that all of the interviewed large scale volume companies do already have volumes to generate profitable transportation on Rail Baltica themselves. It is important to take in consideration about those companies' needs and concepts, which could be whole different than huckepack.

Anyway, transportation is fully customer service. Neither directives nor laws will change it. What needs to be transported will be transported from the origin to very last destination with best suitable and available methods and modes which are cheapest in total supply chain costs, which are the combination of transport costs and inventory costs. There is no idea in forcing volumes from one mode to alternative mode. The best way to change transportation sector will be offering alternative options with lower costs.

After all, Rail Baltica should not be considered as competitor for other transportation. It should be considered as alternative option and connective link between North Europe and Russia to the rest of Europe. Even though the Rail Baltica may not be today's project, but it will be needed in future.

8.4 Limitations and Suggestions for Further Research

This research is limited to the small target group in rather small geographical area. Total of 101 people around the whole Rail Baltica Growth Corridor area and near

the possible alignments of the railway were invited to respond to the questionnaire study. Answer rate was approximately 14 per cent.

The interview study was targeted to Finnish and Estonian companies, which may have interests towards the new transport corridor. Total of 15 companies were interviewed in the study, seven in Finland and eight in Estonia. Companies' represents three types of operating sectors: logistics service providers, clients of freight transport and passenger transport operators.

The total amount of answers is not so high that they could have great statistical reliability in the analysis. Answers are fully subjective estimations and thoughts and they may not have any factual basis at all. The main target was to discover thoughts about the Rail Baltica project and it was achieved.

In further research could be interesting to study more critic and critical aspects of railway transport. At the moment railways are only rarely criticized in research and not at all in European Union publications. It is crucial to investigate faults and come clear with negative features to be able to renew and develop better railway transportation.

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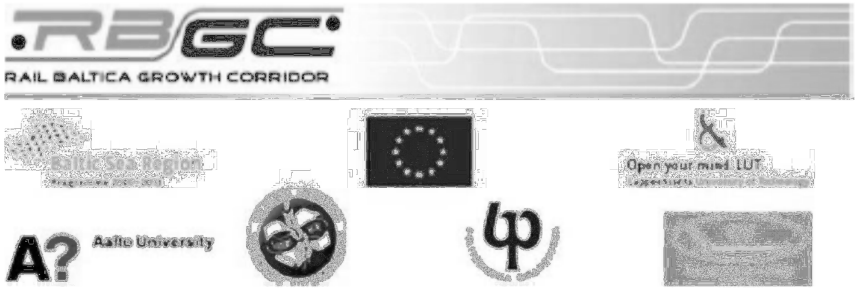
APPENDIX 1

The questionnaire form:



Rail Baltica Growth Corridor - Work Package 3: Accessibility of the City Regions

Questionnaire

This questionnaire is targeted to the public sector in the Rail Baltica area, and it is part of multiyear EU Baltic Sea Region funded project from this topic (for more information, please visit: [illegible]).

Do note: If you don't wish exact answers to all questions, you can either estimate or leave the answer blank. Thank you!

Please type your answering code and the name of the organization / city you present in following fields. Answering code can be found in the invitation e-mail.

Answering code:

Name of organization/ city:

---

2. How do you see the overall influences of the following phenomenons in your city / region?

Please choose number in scale from one to seven which presents your opinion.

Do note: 1 = extremely negative, 7 = extremely positive.

- Usage of private cars ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Increase of the usage of private cars ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

---

3. Which parts of logistical infrastructure exists in your city / region?

Please select from the list below, which logistical infrastructures does exist in your city / region.

Note: Choose also airport, seaport or inland waterway, if there exists nearby (in range approx. 200 km) your city / region.

- In your city / region, there exists:
  - ☐ Airport (international)
  - ☐ Airport (national)
  - ☐ Railway (high speed, 200 - 220 km/h)
  - ☐ Railway (fast speed, approx. 160 km/h)
  - ☐ Road (2- or 3-lane)
  - ☐ Road (4-lane or more)
  - ☐ Seaport
  - ☐ Inland waterway

3. How do you estimate the importance of the following parts of logistical infrastructure to your city / region?

Please concider to the current state. Please choose number in scale from one to seven which presents your opinion.

Do note: 1 = unimportant, 7 = extremely important.

- Airport (international)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Airport (national)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Railway (high speed, 200 - 220 km/h)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Railway (fast speed, approx. 160 km/h)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Road (2- or 3-lane)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Road (4-lane or more)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Seaport (or good connection to seaport)	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7
- Inland waterway	○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

---

4. How would you estimate the usage rate of different transportation modes in your city / region at the moment?

Please rank the transportation modes in order of usage for both freight and passenger transport in short and long distance.

Passenger (short distance, less than 100 km):

- 1st (most widely used):	-
- 2nd:	-
- 3rd:	-

Passenger (long distance, more than 100 km):

- 1st (most widely used):	-
- 2nd:	-
- 3rd:	-

Freight (short distance, less than 100 km):

- 1st (most widely used):	-
- 2nd:	-
- 3rd:	-

Freight (long distance, more than 100 km):

- 1st (most widely used):	-
- 2nd:	-
- 3rd:	-

---

5. How would you estimate the usage of different transportation modes will change in your city / region, if your city would have an access to high speed railway (up to 220 km/h) connection (e.g. RaiI Baltica) or access would be nearby (in range approx. 100 kms)?

Please rank the transportation modes in order of usage immediately new connection opens and in five years from the connection opening.

< IMMEDIATELY AFTER OPENING THE NEW CONNECTION >

Passenger (short distance, less than 100 km):

- 1st:	-
- 2nd:	-
- 3rd:	-

Passenger (long distance, more than 100 km):

- 1st:	-
- 2nd:	-
- 3rd:	-

Freight (short distance, less than 100 km):

- 1st:
- 2nd:
- 3rd:

Freight (long distance, more than 100 km):

- 1st:
- 2nd:
- 3rd:

< IN FIVE YEARS AFTER OPENING THE NEW CONNECTION >

Passenger (short distance, less than 100 km):

- 1st:
- 2nd:
- 3rd:

Passenger (long distance, more than 100 km):

- 1st:
- 2nd:
- 3rd:

Freight (short distance, less than 100 km):

- 1st:
- 2nd:
- 3rd:

Freight (long distance, more than 100 km):

- 1st:
- 2nd:
- 3rd:

---

6. How would you prioritize the development needs of the connections in your city / region?

Please choose three most important development targets to your region.

DEVELOPMENT TARGETS:
> Airport (international)
> Airport (national)
> Railway (high-speed, 200 - 250 km/h)
> Railway (fast speed, approx. 160 km/h)
> Road (2- or 3-lane)
> Road (4-lane or more)
> Waterway (sea or inland)

The most important development needs to your city / region:

- 1st:
- 2nd:
- 3rd:

---

7. What is the number of population in your city / region?

Please choose the alternative to describe your region best.

- Inhabitants in the region:

8. What is the situation on use of land in your city / region?

Please answer to the following questions.

- What is the percentage of governmentally owned, unoccupied land area in your region? [-]

- What is the average redemption price for land area (€ / hectar)? (estimated value) [-]

- What is the average redemption price for land area (€ / hectar)? (exact value, if available) [ ]

- How have the prices of land area developed recently? (Do note: 1 = decreased significantly, 7 = increased significantly.) ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

- How would you estimate the prices of the land area will develop in near future? (Do note: 1 = decrease significantly, 7 = increase significantly.) ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

---

9. What kind of industry exists in your city / region?

Please choose industry types from the following list, if there exists that type of industry in your city / region. Please also name the main companies.

- Industry types:
  - ☒ Forest Industry (mechanical)
  - ☒ Forest Industry (chemical)
  - ☐ Metal Industry
  - ☐ Mine Industry
  - ☐ Oil Industry
  - ☐ High Tech Industry
  - ☐ Other Industry

- If you selected "Other Industry", please define the industry type: [ ]

- Name the main companies: [ ]

---

10. What is the future outlook for heavy and high-tech industry in your city / region?

Please estimate future outlook in scale from one to seven.

Do note: 1 = extremely negative, 7 = extremely positive.

- Heavy Industry: ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

- High-Tech Industry: ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

---

11. What is the importance of tourism in your city / region?

Please estimate the importance of tourism in scale from one to seven.

Do note: 1 = unimportant, 7 = vitaly important.

- National level tourism ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

- International level tourism ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

- What is the most attractive sight in your city / region? [ ]

---

12. How would you estimate the importance of following nationalities have on tourism (considering from duration and money spent) in your region?

Please consider especially from duration and money being spent. Please choose number in scale from one to seven, which describes the situation best.

Do note: 1 = unimportant, 7 = extremely important.

____ Own nationality ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

______________________________ EU15-nationalities ([illegible], [illegible], [illegible], [illegible], FR) ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Russian ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Other EU ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Chinese ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Indian ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Other Asian ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ American ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

____ Other ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7

13. What is the main transportation mode tourists' use?

Please choose three main transportation modes in order of tourists using while arriving / departing your city / region. Please also estimate what would be the situation, if you have an access to high speed railway (200 - 220 km/h) connection (e.g. Rail Baltica).

Different transportation modes:
- Airplane
- Railway
- Road (bus)
- Road (private car)
- Waterway (sea or inland)

« DEPARTURE AT THIS MOMENT »

- 1st (mainly used):
- 2nd:
- 3rd:

« DEPARTURE IF YOU HAVE A HIGH SPEED RAILWAY CONNECTION »

- 1st:
- 2nd:
- 3rd:

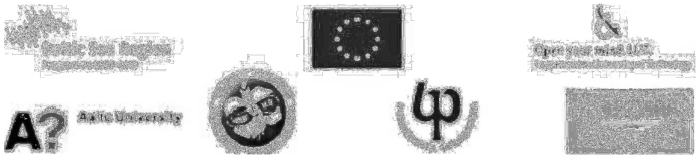
After you have answered all of the questions, please click the button "send" in below to send your answers.

Thank you for your participation!

Response gift

Are you interested to get the research report when it is finalized? ○ No ○ Yes

Send



APPENDIX 2

Rail Baltica Growth Corridor - Work Package 4 - Interviews
Semi-structured interview - Logistics Service Provider

INTERVIEW FRAMEWORK

1. Company background
   1.1. Company operations (general description)
   1.2. Main geographical market areas
   1.3. Main products / services
   1.4. Annual turnover / sales (in EUR)
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.5. Amount of employees
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.6. Ownership of transport equipment
      - Owning / Leasing / Other
      - Transport equipment in terminals / warehouses / factories / manufacturing sites
   1.7. Subcontractors / Outsourcing agreements
      - Transactional basis / annual contracts

2. Logistic process
   2.1. Characteristics of goods (Sending and receiving)
      - Bulk (solid)
      - Liquid bulk
      - Gas
      - General Cargo
      - General Cargo (on pallets)
      - Temperature-controlled goods
      - Dangerous (or detrimental to the environment) goods and materials
   2.2. Served transportation modes
      - Railway / Road / Sea / Inland waterway / Air
      - Development of transportation modes recently
      - Future estimations
      - Which factors have the main influence on decision making in choosing different transportation modes?
      - Are you able to affect in transportation process?
        - Routes / Modes / Schedule / Quantity
        - What logistic services does your company offer?
          - Customs, transportation, loading / unloading etc.

2.3. Forwarding volumes
- Volumes / Quantities
- Directions / Locations
  - Countries, factories, terminals, warehouses etc.
- Distances

2.4. Rail transportation
- Usage of rail transportation
  - Could the volume of rail transportation be increased?
    - If no: Kindly describe main hindering factors (cost, technological, infrastructural and cultural issues etc.)
  - What kind of improvements should be done to increase the attractiveness of rail transportation? (Technological, infrastructural and cultural)

2.5. Problems / challenges and possibilities in transportation system
- In general
- In particular for your company

3. Intermodality in logistics

3.1. Use of intermodal transportation
- Usage of containers in supply chain
  - 20 feet / 40 feet / 45 feet / other
  - If yes, could it be used more? Why?
  - If no, could it be used? Why?
  - How do you see the usability and attractiveness of container transport in supply chain in your company?
- Usage of other intermodal units?
  - Semi-trailers / Swap bodies
- Usage of different transportation modes in intermodal transportation in your company
- Usage of Intermodal transportation in inland / hinterland transportation

3.2. Future plans for intermodal transportation
- Increase, why?
- Decrease, why?

3.3. Use of multimodal transportation
- Usage of multimodal transportation?
  - Combining road / rail / sea (e.g. Ropax, RoRo)

4. Infrastructure / Superstructure
- Road / rail connections, warehouses, terminals, factories etc.

- Ownership

4.2. Main problems / challenges confronted in infrastructure / superstructure
4.3. Future outlook

5. Decision-making processes & laws
   5.1. Kindly describe the decision-making process in your country related transport market
      - Structure of the process
      - Which interest groups has possibility to influence on the process
      - Who makes the final decision (parliament etc.)
   5.2. Your company's role in the process
      - Possibility to influence on the process

6. European Union
   6.1. How EU's role and EU regulations affect in logistics process in your company?
   6.2. Problems and possibilities (focusing in logistics)

7. The green aspect
   7.1. What is the importance and influence of environmental friendliness to your company?
   7.2. What is the importance and influence of environmental friendliness to your company's customers?
   7.3. What is the future outlook in decreasing environmental impacts?
   7.4. How have green aspect been taken into account in your company?

8. Attitude towards co-operation with public sector?
   8.1. Kindly describe your co-operation with public sector
   8.2. Have you had co-operation with private sector?
   8.3. Have you used public-private-partnership (PPP) as a form of co-operation?
   8.4. Have you had co-operations with educational institutions (concerning logistics)?
   8.5. Have you had co-operation with EU?
   8.6. Are you aware what is public sectors overall opinion about Rail Baltica?

9. Rail Baltica
   9.1. Overall opinion about Rail Baltica
   9.2. If Rail Baltica is realized, how would it affect operations of your company?
   9.3. If Rail Baltica is realized, how would it affect supply and value chains in your company? (Transport volumes and modes, costs etc.)
   9.4. If Rail Baltica is realized, how would it affect on economy and transport sector in your country?
   9.5. Is Rail Baltica considered as an important transport corridor for your company?
   9.6. What are main strengths and weaknesses in Rail Baltica?

APPENDIX 3

Rail Baltica Growth Corridor - Work Package 4 - Interviews
Semi-structured interview - Passenger Transport Operator

INTERVIEW FRAMEWORK

1. Company background
   1.1. Company operations (general description)
   1.2. Main geographical market areas
   1.3. Main products / services
   1.4. Annual turnover / sales (in EUR)
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.5. Amount of employees
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.6. Ownership of transport equipment
      - Owning / Leasing / Other
   1.7. Subcontractors / Outsourcing agreements
      - Transactional basis / annual contracts

2. Transportation process
   2.1. Transportation volumes
      - Volumes / Number of passengers annually
      - Directions / Locations
         - Countries
      - Distances
   2.2. Co-operation / competition with other transport modes
      - What is the main transportation mode your company is competing with?
   2.3. Are you able to affect in transportation process?
         - Routes / Modes / Schedule
   2.4. Rail transportation
      - What kind of improvements should be done to increase the attractiveness of rail transportation?
         - Technological, infrastructural and cultural
   2.5. Problems / challenges and possibilities in transportation system
      - In general
      - In particular for your company

3. Intermodality in logistics
   3.1. Use of intermodal transportation
      - Usage of intermodal terminals in passenger traffic
        - Combined air, rail or road transport
   3.2. Future plans for intermodal transportation
      - Increase, why?
      - Decrease, why?

4. Infrastructure / Superstructure
      - Road / rail connections, terminals etc.
        - Ownership
   4.2. Main problems / challenges confronted in infrastructure / superstructure
   4.3. Future outlook

5. Decision-making processes & laws
   5.1. Kindly describe the decision-making process in your country related transport market
      - Structure of the process
      - Which interest groups has possibility to influence on the process
      - Who makes the final decision (parliament etc.)
   5.2. Your company's role in the process
      - Possibility to influence on the process

6. European Union
   6.1. How EU's role and EU regulations affect in transportation process in your company?
   6.2. Problems and possibilities (focusing in transportation)

7. The green aspect
   7.1. What is the importance and influence of environmental friendliness to your company?
   7.2. What is the importance and influence of environmental friendliness to your company's customers?
   7.3. What is the future outlook in decreasing environmental impacts?
   7.4. How have green aspect been taken into account in your company?

8. Attitude towards co-operation with public sector?

8.1. Kindly describe your co-operation with public sector
8.2. Have you had co-operation with private sector?
8.3. Have you used public-private-partnership (PPP) as a form of co-operation?
8.4. Have you had co-operations with educational institutions (concerning logistics)?
8.5. Have you had co-operation with EU?
8.6. Are you aware what is public sectors overall opinion about Rail Baltica?

9. Rail Baltica
   9.1. Overall opinion about Rail Baltica
   9.2. If Rail Baltica is realized, how would it affect operations of your company?
   9.3. If Rail Baltica is realized, how would it affect supply and value chains in your company? (Transport volumes and modes, costs etc.)
   9.4. If Rail Baltica is realized, how would it affect on economy and transport sector in your country?
   9.5. Is Rail Baltica considered as an important transport corridor for your company?
   9.6. What are main strengths and weaknesses in Rail Baltica?

APPENDIX 4

Rail Baltica Growth Corridor - Work Package 4 - Interviews
Semi-structured interview - Clients of Freight Transport

INTERVIEW FRAMEWORK

1. Company background
   1.1. Company operations (general description)
   1.2. Main geographical market areas
   1.3. Main products / services
   1.4. Annual turnover / sales (in EUR)
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.5. Amount of employees
      - Difference between 2010 and 2011? (Increase / Decrease?)
   1.6. Ownership of transport equipment
      - Owning / Leasing / Other
      - Transport equipment in terminals / warehouses / factories / manufacturing sites
   1.7. Subcontractors / Outsourcing agreements (focusing in logistics)
      - Transactional basis / annual contracts

2. Production process
   2.1. Characteristics of goods (Sending and receiving)
      - Bulk (solid)
      - Liquid bulk
      - Gas
      - General Cargo
      - General Cargo (on pallets)
      - Temperature-controlled goods
      - Dangerous (or detrimental to the environment) goods and materials
   2.2. Used transportation modes
      - Which modes are used
        - Railway / Road / Sea / Inland waterway / Air
        - Development of transportation modes recently
        - Future estimations
      - Which factors have the main influence on decision making in choosing different transportation modes?
      - Are you able to affect in transportation process?
        - Routes / Modes / Schedule / Quantity
        - Does your company buy logistic services?

        - Customs, transportation, loading / unloading etc.

2.3. Transportation volumes
- Volumes / Quantities
- Directions / Locations
    - Countries, factories, terminals, warehouses etc.
- Distances

2.4. Rail transportation
- Usage of rail transportation
    - Could the volume of rail transportation be increased?
        - If no: Kindly describe main hindering factors (cost, technological, infrastructural and cultural issues etc.)
    - What kind of improvements should be done to increase the attractiveness of rail transportation? (Technological, infrastructural and cultural)

2.5. Problems / challenges and possibilities in transportation system
- In general
- In particular for your company

3. Intermodality in logistics

3.1. Use of intermodal transportation
- Usage of containers in supply chain
    - 20 feet / 40 feet / 45 feet / other
    - If yes, could it be used more? Why?
    - If no, could it be used? Why?
    - How do you see the usability and attractiveness of container transport in supply chain in your company?
- Usage of other intermodal units?
    - Semi-trailers / Swap bodies
- Usage of different transportation modes in intermodal transportation in your company
- Usage of Intermodal transportation in inland / hinterland transportation

3.2. Future plans for intermodal transportation
- Increase, why?
- Decrease, why?

3.3. Use of multimodal transportation
- Usage of multimodal transportation?
    - Combining road / rail / sea (e.g. Ropax, RoRo)

4. Infrastructure / Superstructure
    - Road / rail connections, warehouses, terminals, factories etc.
        - Ownership

    4.2. Main problems / challenges confronted in infrastructure / superstructure

    4.3. Future outlook

5. Decision-making processes & laws

    5.1. Kindly describe the decision-making process in your country related transport market
    - Structure of the process
    - Which interest groups has possibility to influence on the process
    - Who makes the final decision (parliament etc.)

    5.2. Your company's role in the process
    - Possibility to influence on the process

6. European Union

    6.1. How EU's role and EU regulations affect in transportation process in your company?

    6.2. Problems and possibilities (focusing in transportation)

7. The green aspect

    7.1. What is the importance and influence of environmental friendliness to your company?

    7.2. What is the importance and influence of environmental friendliness to your company's customers?

    7.3. What is the future outlook in decreasing environmental impacts?

    7.4. How have green aspect been taken into account in your company?

8. Attitude towards co-operation with public sector?

    8.1. Kindly describe your co-operation with public sector

    8.2. Have you had co-operation with private sector?

    8.3. Have you used public-private-partnership (PPP) as a form of co-operation?

    8.4. Have you had co-operations with educational institutions (concerning logistics)?

    8.5. Have you had co-operation with EU?

    8.6. Are you aware what is public sectors overall opinion about Rail Baltica?

9. Rail Baltica
   9.1. Overall opinion about Rail Baltica
   9.2. If Rail Baltica is realized, how would it affect supply and value chains in your company? (Transport volumes and modes, costs etc.)
   9.3. If Rail Baltica is realized, how would it affect on economy and transport sector in your country?
   9.4. What are main strengths and weaknesses in Rail Baltica