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SCENARIO-BASED TRAFFIC FORECASTS FOR ROUTES BETWEEN THE PENTA PORTS IN 2020

Anssi Lappalainen

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CENTRAL BALTIC
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Käyntiosoite / Visiting address:
ICT-talo, Joukahaisenkatu 3-5 B, 4.krs, Turku

Postiosoite / Postal address:
FI-20014 TURUN YLIOPISTO

Puh. / Tel. +358 (0)2 333 51
http://mkk.utu.fi

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FOREWORD

Maritime transport across the Baltic Sea is facing many changes. Changes in the Baltic's economy and demography, rising energy costs, tightening emission standards, political changes as well as in lifestyles and preferences are influencing transport flows and also transport demand and choices regarding transport modes. Effective and competitive port procedures and sea transportation solutions are important for the interconnectivity, growth and sustainability of the regions the ports serve. Since changes in the cargo and passenger flows affect ports directly, it is important that the ports try to anticipate these changes.

This report focuses on future expectations regarding liner transport flows between the so-called PENTA ports of Stockholm, Tallinn, Helsinki Turku and Naantali. Three scenario-based traffic forecasts up to the year 2020 for routes between PENTA ports are presented. The chosen methodology for the analysis is PESTE, in which the main emphasis is laid on economic factors affecting future traffic flows. In addition, the futures table method was utilised in the creation of the scenarios. The report is a continuation of the report "Drivers of demand in cargo and passenger traffic between PENTA ports" and it is based on the same material, including interviews and mail surveys, and statistics on the cargo and passenger flows between the PENTA ports from 2000 to 2010. The statistics were gathered during 2011 and 2012 with the help of the port authorities.

The report was written as part of the PENTATHLON project which is coordinated by the University of Turku, Centre for Maritime Studies. The project is financed by the Central Baltic INTERREG IV A Programme 2007-2013 of the European Union Regional Development Fund, the Ports of Stockholm, the Port of Helsinki, the Port of Turku, the Port of Naantali and the Estonian government. The purpose of the project is to explore alternatives and develop measures to better comprehend and face current and future challenges concerning maritime transport, while increasing the competitiveness of the ports. The research was carried out and the report written by M.Sc. Anssi Lappalainen.

The authors of this report would like to express gratitude to all people and organisations who participated in this study and to the partners and financiers of the PENTATHLON project. Minna Alhosalo and Olli-Pekka Brunila are acknowledged for reviewing the report.

Turku March 6th, 2013

Sakari Kajander
Head of Unit
University of Turku, Centre for Maritime Studies

ABSTRACT

Maritime transport is the foundation for trade in the Baltic Sea area. It represents over 15% of the world's cargo traffic and it is predicted to increase by over 100% in the future. There are currently over 2,000 ships sailing on the Baltic Sea and both the number and the size of ships have been growing in recent years. Due to the importance of maritime traffic in the Baltic Sea Region, ports have to be ready to face future challenges and adapt to the changing operational environment.

The companies within the transportation industry – in this context ports, shipowners and logistics companies – compete continuously and although the number of companies in the business is not particularly substantial because the products offered are very similar, other motives for managing the supply chain arise. The factors creating competitive advantage are often financial and related to cost efficiency, but geographical location, road infrastructure in the hinterland and vessel connections are among the most important factors. The PENTA project focuses on adding openness, transparency and sharing knowledge and information, so that the challenges of the future can be better addressed with regard to cooperation.

This report presents three scenario-based traffic forecasts for routes between the PENTA ports in 2020. The chosen methodology is PESTE, in which the focus in on economic factors affecting future traffic flows. The report further analyses the findings and results of the first PENTA WP2 report "Drivers of demand in cargo and passenger traffic between PENTA ports" and utilises the same material, which was obtained through interviews and mail surveys.

TIIVISTELMÄ

Meriliikenne on Itämeren alueen kaupankäynnin perusta. Se on kooltaan noin 15 % maailman rahtiliikenteestä ja sen ennustetaan kaksinkertaistuvan tulevaisuudessa. Itämerellä liikennöi joka hetki yli 2000 alusta ja niiden määrät sekä koot ovat kasvaneet viime vuosina. Johtuen meriliikenteen suuresta merkityksestä Itämeren alueella, on satamien oltava valmiita kohtaamaan tulevaisuuden haasteita sekä sopeutumaan muuttuvaan toimintaympäristöön.

Kuljetusteollisuuden yritykset – tässä yhteydessä satamat, varustamot ja kuljetusliikkeet – kilpailevat jatkuvasti keskenään. Koska alalla olevien yritysten lukumäärä on suhteellisen pieni ja tarjotut palvelut sekä tuotteet ovat vain hieman toisistaan poikkeavia, nousevat muut motiivit esille toimitusketjua johdettaessa. Kilpailuetua luovat tekijät ovat usein taloudellisia ja liittyvät kustannustehokkuuteen mutta sataman maantieteellinen sijainti, takamaan tieverkosto ja alusten liikenneyhteydet kuuluvat myös tärkeimpiin tekijöihin. PENTA projekti keskittyy avoimuuden ja läpinäkyvyyden lisäämiseen, sekä tiedon ja informaation jakamiseen, jotta tulevaisuuden haasteisiin pystytään varautumaan paremmin yhteistyöllä.

Tämä raportti esittää kolme skenaariopohjaista liikenne-ennustetta PENTA satamien välisille reiteille vuonna 2020. Valittuna metodologiana käytetään PESTE-analyysia, jossa pääpaino on taloudellisilla tekijöillä tulevaisuutta muokkaavina tekijöinä. Raportti analysoi tarkemmin ensimmäisen PENTA WP2-raportin ”Drivers of demand in cargo and passenger traffic between PENTA ports” tuloksia ja käyttää hyväkseen samaa materiaalia, joka hankittiin haastatteluilla ja sähköpostikyselyillä.

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1 INTRODUCTION

1.1 Background

According to the European Commission, short sea shipping must be encouraged and promoted. The share of short sea shipping has been steady for the past few years and it plays a valuable role in the economy. Previous forecasts show that global transport demand will be 50% higher in 2020 than in 2000. Over the same period, the growth of road transportation in tonne-kilometres will almost equal the growth in short sea shipping (Commission of the European Communities 2007). In the Baltic Sea area, maritime transport is the foundation for trade. There are currently over 2,000 ships in the area and both the number and the size of the ships have been growing in recent years. In 2009, maritime traffic in the Baltic Sea region (BSR) represented 15% of the world's cargo traffic and it was predicted to increase by over 100% in the future (Commission on the European Communities 2009). Due to the importance of maritime traffic in the BSR, ports have to be ready to face future challenges and adapt to the changing operational environment.

1.2 Purpose of the study

This report is part of the research project PENTATHLON, which studies the Ports of Stockholm, Helsinki, Tallinn, Turku and Naantali (PENTA). The PENTA project is managed and coordinated by the University of Turku, Centre for Maritime Studies. Other partners involved in carrying out the project are TFK Transport Research Institute from Stockholm and the Estonian Maritime Academy from Tallinn. The purpose of the project is to explore alternatives and develop measures so that the five ports can better comprehend and face current and future challenges and increase their competitiveness. The PENTA project is divided into four work packages; this report belongs to work package two "Passenger and cargo flows and their future estimates". The report reflects the views of the author. The Managing Authority of the INTERREG Central Baltic IV A Programme cannot be held liable for the information published in this report.

The purpose of this report is to present scenario-based traffic forecasts for the year 2020 for the PENTA ports. The report further analyses the findings and results of the first PENTA work package two report "Drivers of demand in cargo and passenger traffic between PENTA ports" and utilises the same material, which was obtained through the interviews and mail surveys.

1.3 Methodological approach

The chosen methodology for the analysis of cargo and passenger flows is PESTE. It is a method which clarifies the political, economic, social, technological and environmental state and future of a phenomenon or organisation. The dynamics monitored can be utilised in different ways, for example when creating scenarios they can serve as the

variables of the futures table or as background material for organisations creating their own scenarios (Finnish National Board of Education 2013).

In this report, the PESTE analysis provides the framework for the analysis of business and macro environmental factors. The main focus is on economic factors, including economic growth, trade and bunker costs according to Figure 1.1.

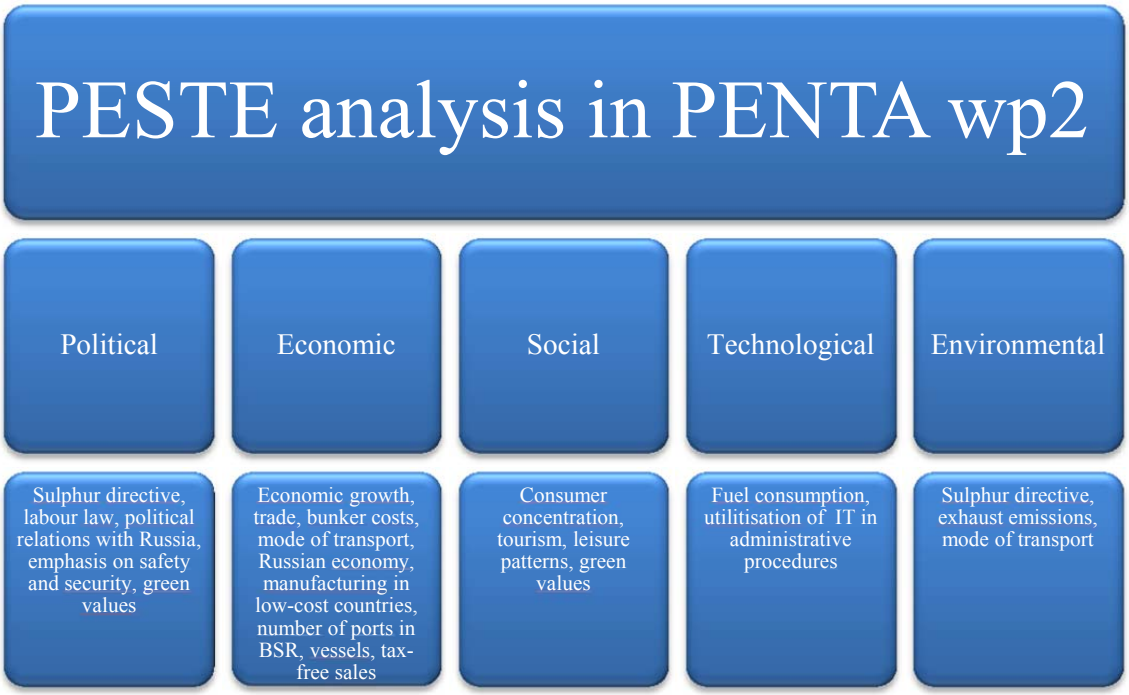

Figure 1.1. PESTE analysis in work package 2.

Social factors such as tourism, leisure patterns and lifestyle are taken into consideration when analysing passenger traffic. The sulphur directive affects both political and environmental aspects. All the factors presented in Figure 1.1 arose when conducting the research and interviews.

1.4 Structure of the report

This report is divided into three main sections. The first one focuses on future expectations in relation to qualitative and quantitative issues. The second section presents three alternative scenarios which were developed during the project. The third section elaborates on the traffic forecasts for each scenario. The conclusions and summary of the research are presented in the final chapter. The statistics in the appendices were gathered (with the help of the port authorities) in 2011 and 2012 and they are used to estimate future traffic flows based on transport history.

2 FUTURE EXPECTATIONS

2.1 Developments of traffic flows based on transport history

This chapter presents an analysis of the developments of traffic flows based on recent transport history. The figures below lay foundations for the anticipated traffic volumes in 2020 when the developments between 2000-2010 and 2005-2010 are taken into consideration.

2.1.1 Stockholm

The cargo traffic on the routes Stockholm-Helsinki and Stockholm-Tallinn is slowly increasing. The volumes between Stockholm and Turku – the most important route for the Port of Stockholm in terms of tonnes – have been declining over the past ten years (Figure 2.1).

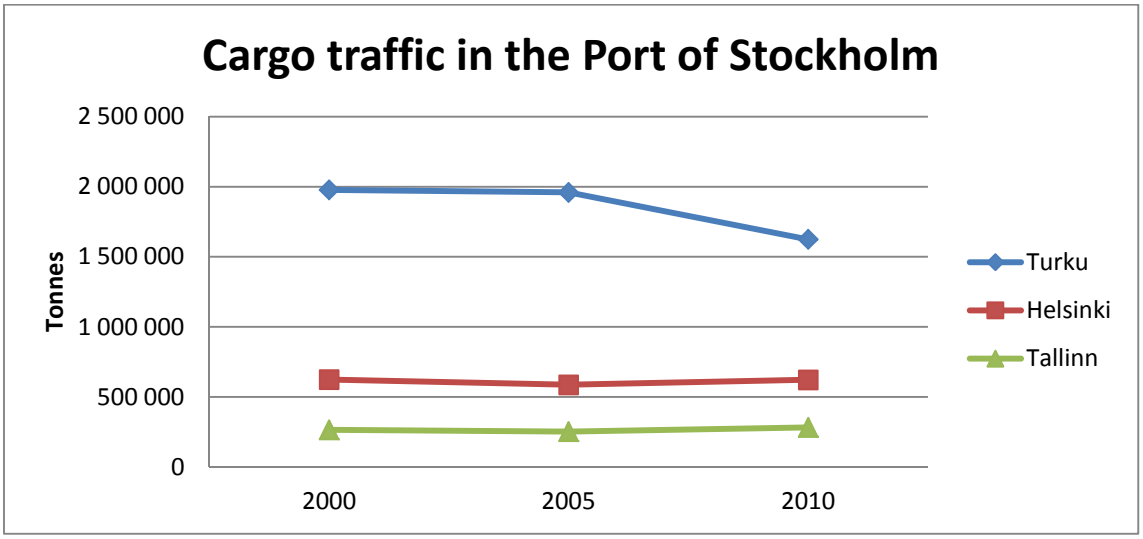

Figure 2.1. The development of cargo traffic in the Port of Stockholm.

The amount of transported trucks and trailers has not followed the same pattern. Based on the data from 2005 to 2010 it appears that the number of transported units will increase rather than decrease between Stockholm and Turku (Figure 2.2). The amount of transported units between Stockholm and Helsinki will remain at the current level but estimating the Stockholm-Tallinn route is problematic due to fluctuations in the transported units.

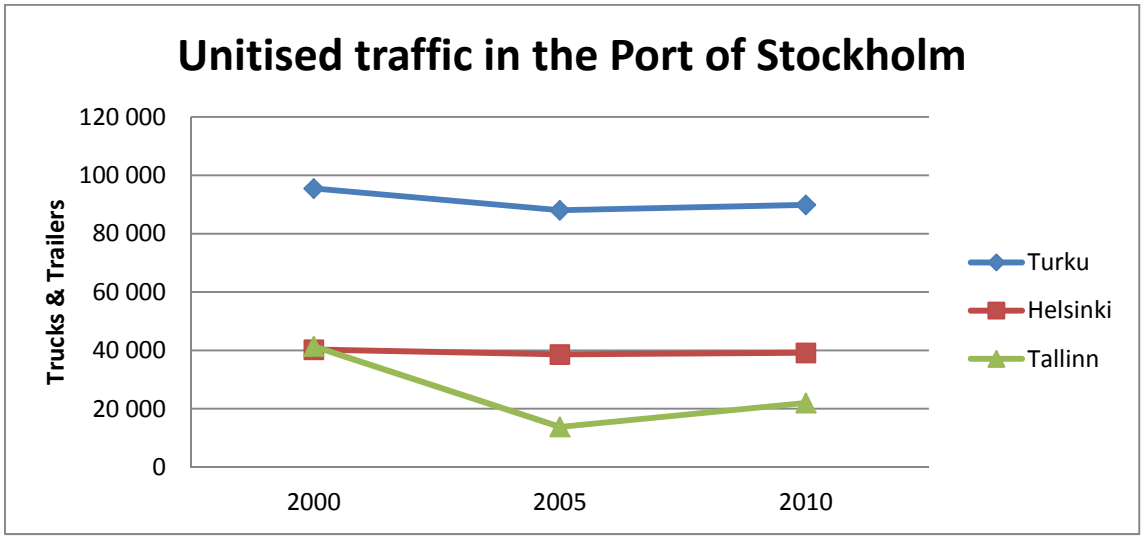

Figure 2.2. The development of unitised traffic in the Port of Stockholm.

The future of passenger traffic between the Port of Stockholm and other PENTA ports is promising (Figure 2.3). The Stockholm-Tallinn route shows a steady increase, even though the flows for Stockholm-Helsinki may decline. Passenger traffic between Stockholm and Turku has always been significant and the new Viking Line ferry is likely to further assist the increase in passenger traffic.

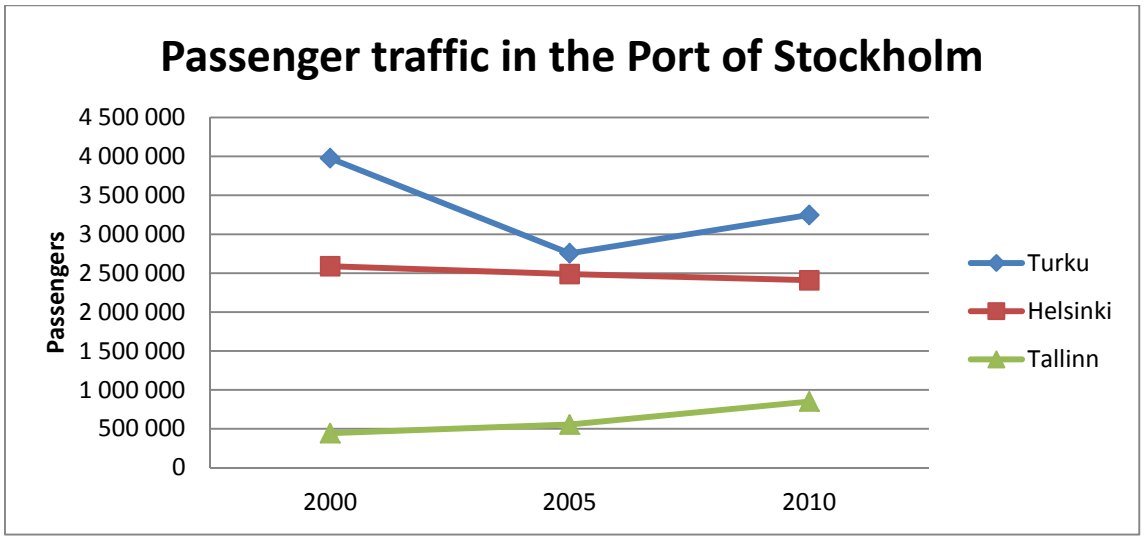

Figure 2.3. The development of passenger traffic in the Port of Stockholm.

Cargo traffic to the Port of Kapellskär will increase. The growth was moderate from 2005 to 2010, but if we take the figures since 2000 the volumes between Naantali and Kapellskär have increased rapidly. In Figure 2.4, Paldiski represents both the privately owned North Harbour and the South Harbour which is part of the Port of Tallinn.

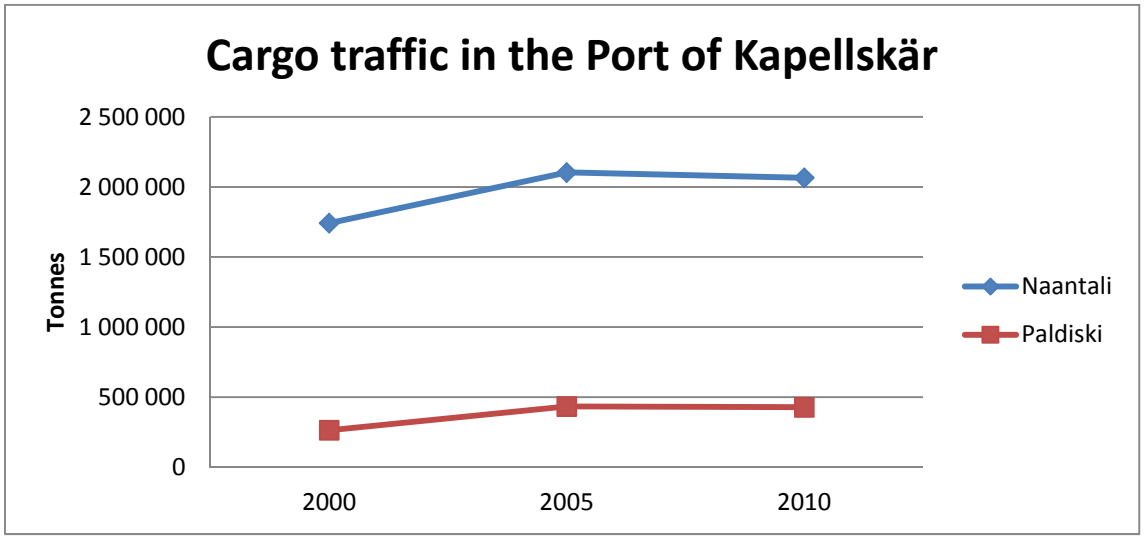

Figure 2.4. The development of cargo traffic in the Port of Kapellskär.

The number of trucks and trailers passing through Kapellskär will follow the same trend as the volumes for cargo traffic (Figure 2.5). Similarly to the Port of Stockholm, the growth in the amount of transported units will be faster than the growth of freight tonnes.

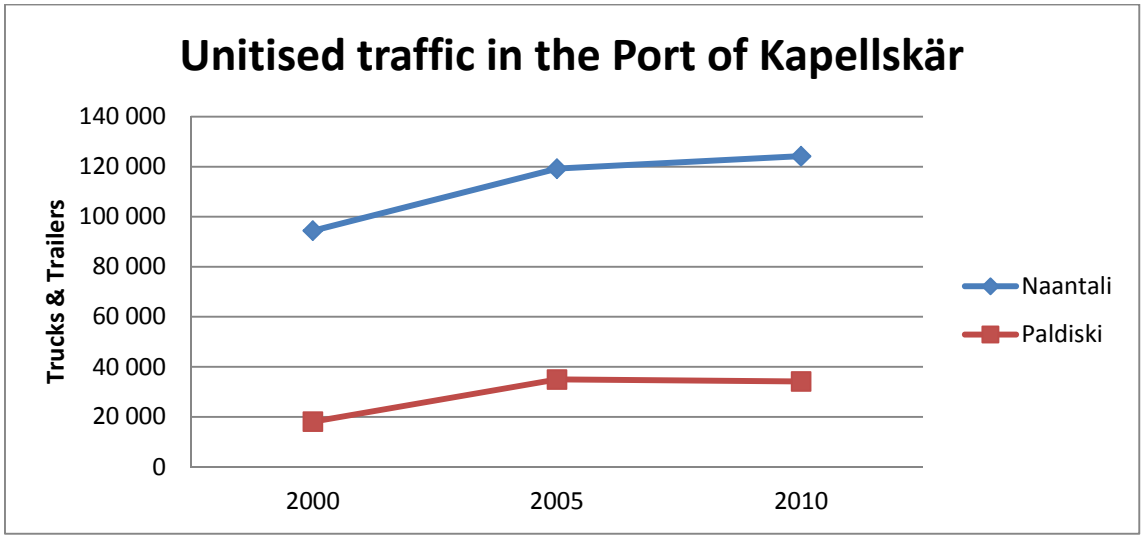

Figure 2.5.The development of unitised traffic in the Port of Kapellskär.

The importance of passenger traffic in the Port of Kapellskär is not as relevant as cargo traffic. The passengers on routes to and from Kapellskär mainly consist of truck drivers, which is why future developments in passenger traffic to and from the Port of Kapellskär are limited. However, this does not explain the relatively large variations in the number of passengers passing the Kapellskär terminal seen in Figure 2.6.

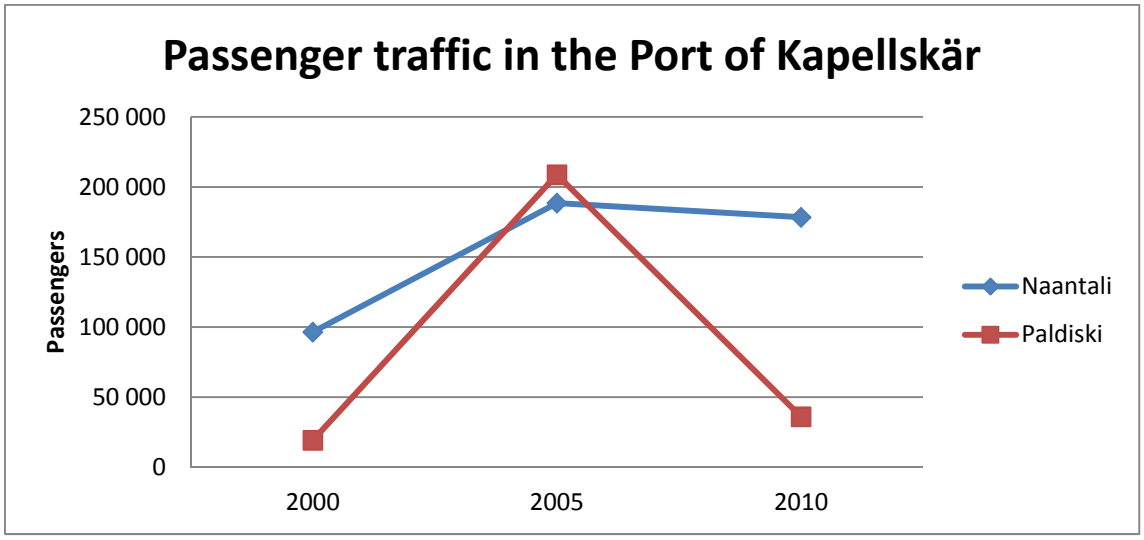

Figure 2.6. The development of passenger traffic in the Port of Kapellskär.

2.1.2 Tallinn

The port of Tallinn is estimated to show rapid increase in the growth of cargo traffic between the Port of Helsinki and itself. Freight volumes have been increasing steadily since 2000 without a slowdown (Figure 2.7). The traffic between Estonia and Sweden is much lighter compared with the traffic between Estonia and Finland. The future volumes on the routes Tallinn-Stockholm and Paldiski South Harbour-Kapellskär are likely to remain low.

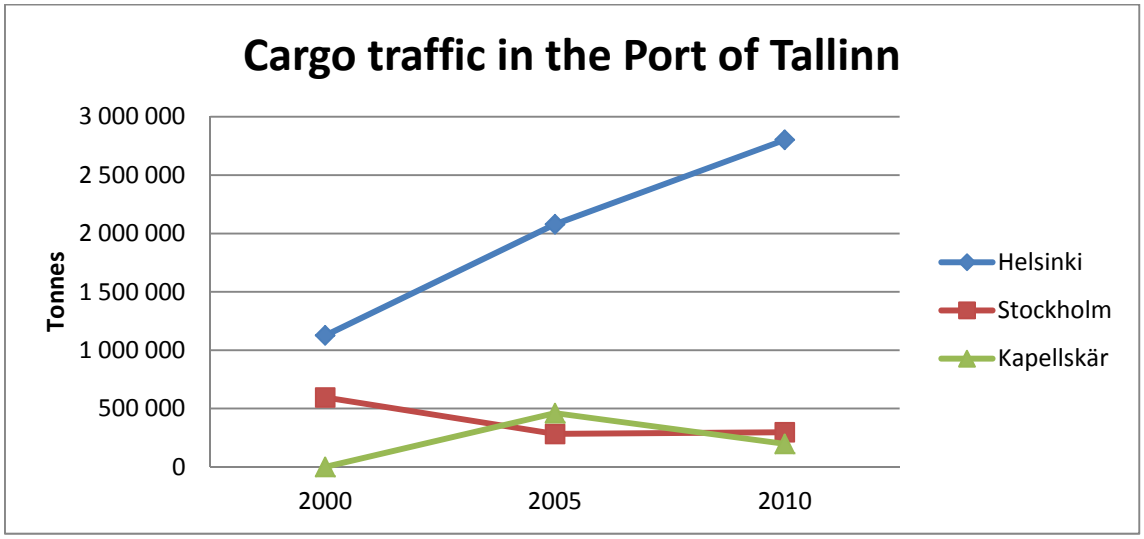

Figure 2.7. The development of cargo traffic in the Port of Tallinn.

The unitised traffic in the Port of Tallinn has increased remarkably on the route Tallinn-Helsinki and the outlook for development is positive. Transported units between the Port of Tallinn and the Ports of Stockholm, however, are expected to show only minor changes in the future as can be seen from Figure 2.8.

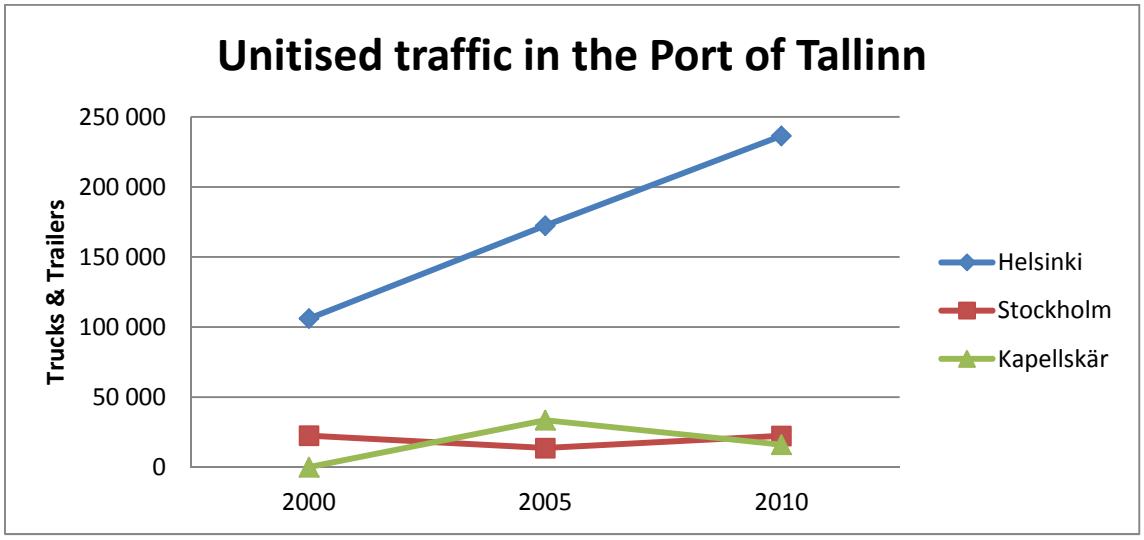

Figure 2.8. The development of unitised traffic in the Port of Tallinn.

Passenger traffic to or from the Old City Harbour in the Port of Tallinn is expected to rise on all routes. The growth of the traffic flows between Tallinn and Helsinki is expected to accelerate, while the flows for Tallinn-Stockholm will increase but at a slower rate (Figure 2.9).

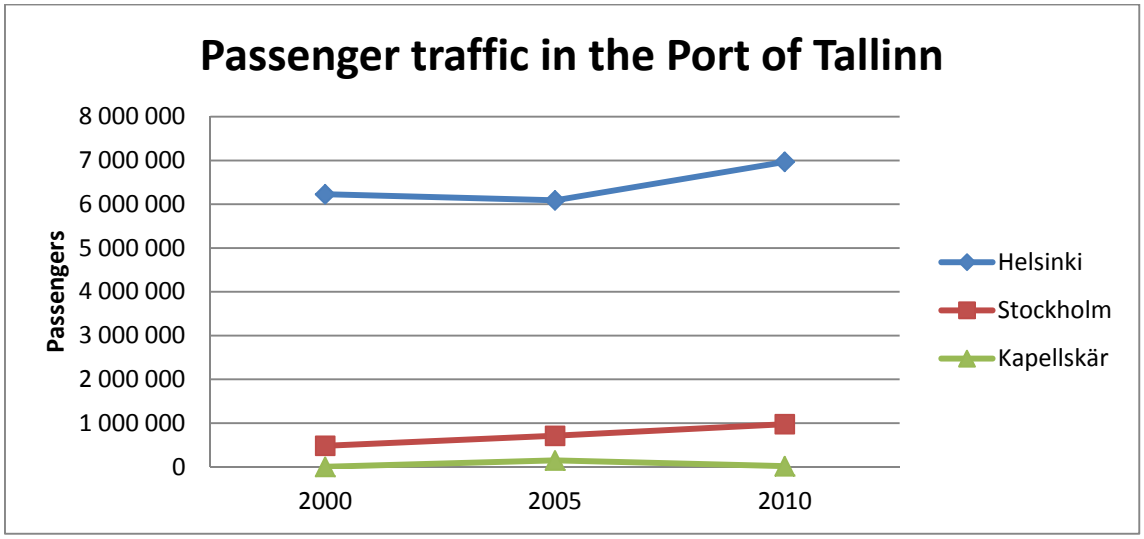

Figure 2.9.The development of passenger traffic in the Port of Tallinn.

2.1.3 Helsinki

The future for cargo traffic in the Port of Helsinki is promising. Traffic flows for Helsinki-Stockholm have been stable for over ten years whereas cargo traffic between Helsinki-Tallinn has been increasing tremendously (Figure 2.10).

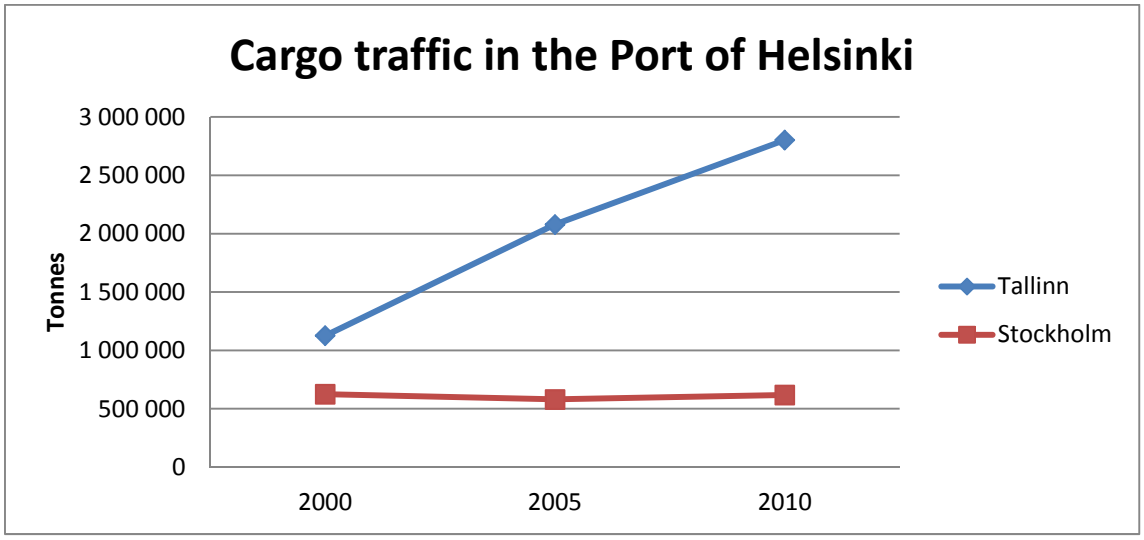

Figure 2.10. The development of cargo traffic in the Port of Helsinki.

The figures for the increased cargo traffic and transported units correspond quite well to each other for the Port of Helsinki (Figure 2.11). In the beginning of the 21st century, the traffic flows between Helsinki and Tallinn were approximately twice as high as traffic flows between Helsinki and Stockholm. If the current trends continue, traffic flows between Helsinki and Tallinn will be even six to eight times higher in 2020 compared to Helsinki-Stockholm.

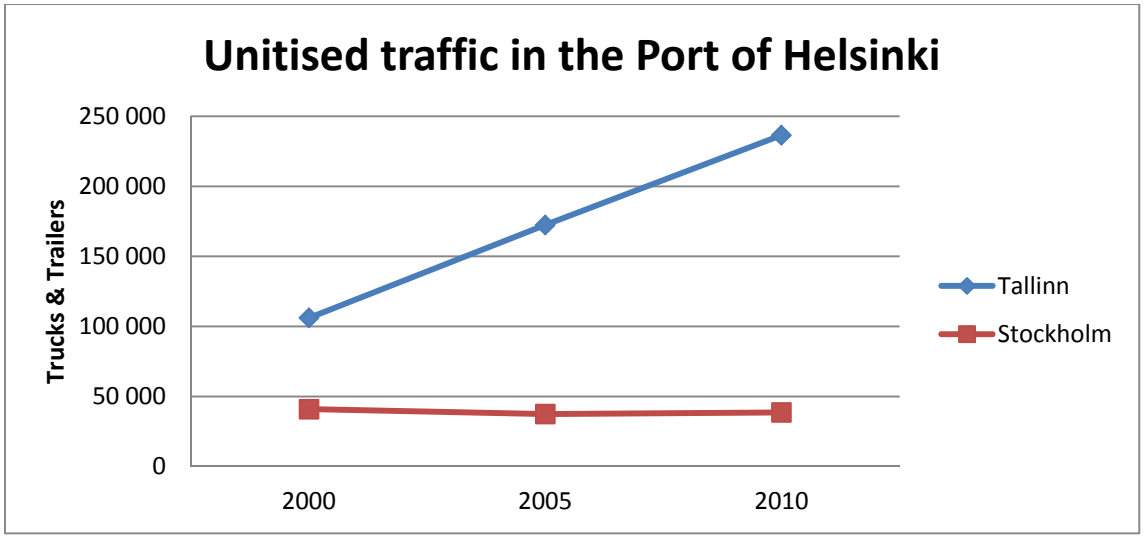

Figure 2.11. The development of unitised traffic in the Port of Helsinki.

The most remarkable change in passenger traffic within the PENTA project happens on the Helsinki-Tallinn route, which will increase due to tourism, work-related trips and the lower costs of doing business in Estonia. The crossing-time is also shorter than for any other route in the PENTA project. Passenger flows between Helsinki and Stockholm will face a minor decrease and annual traffic will be approximately 2,000,000 passengers in 2020 (Figure 2.12).

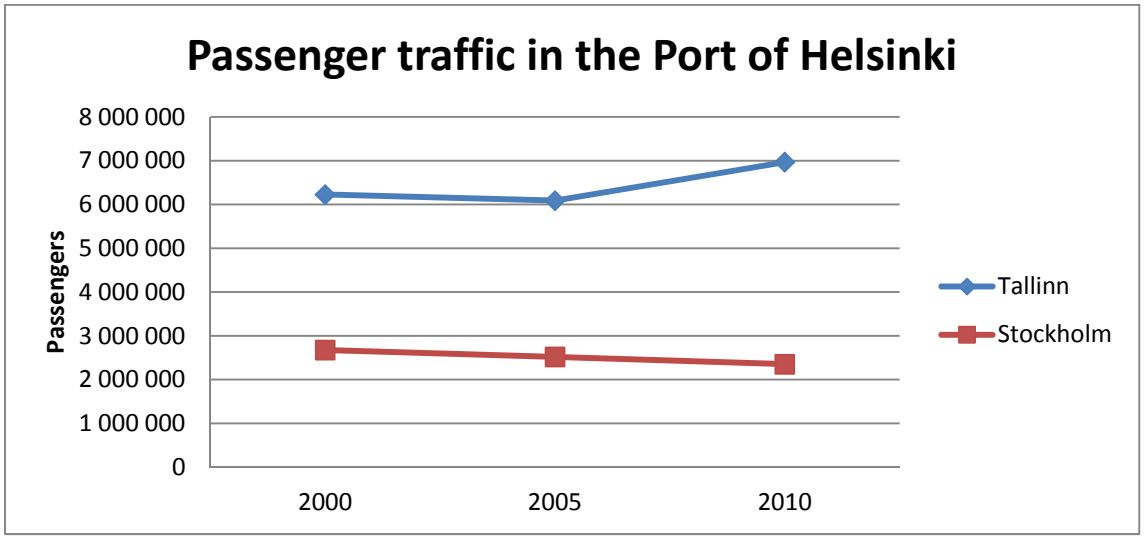

Figure 2.12. The development of passenger traffic in the Port of Helsinki.

2.1.4 Turku

Cargo traffic between the Port of Turku and the Port of Stockholm has decreased lately (Figure 2.13). The reason for this is mainly due to the economic depression. Nevertheless, the outlook is disconcerting, unless cargo volumes start rising soon. When analysing figures for the Port of Turku the fact that in 2000-2005 the route between Turku and Kapellskär was in use, yet with lower traffic flows compared to the Turku-Stockholm route, must be taken into consideration.

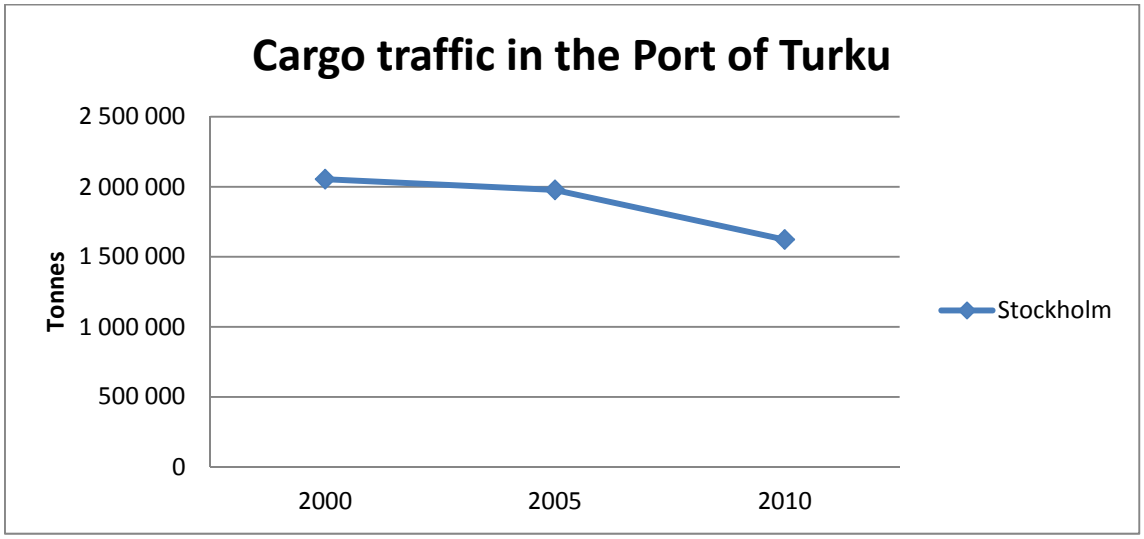

Figure 2.13. The development of cargo traffic in the Port of Turku.

The number of transported units between Turku and Stockholm remained nearly unchanged for the period 2005 to 2010 (Figure 2.14). The port of Turku shares the same pattern as the other PENTA ports in which the decrease of cargo volumes has been

stronger compared to the decrease in transported units, or, in other words, the increase in transported units has been higher compared to the increase in total volumes.

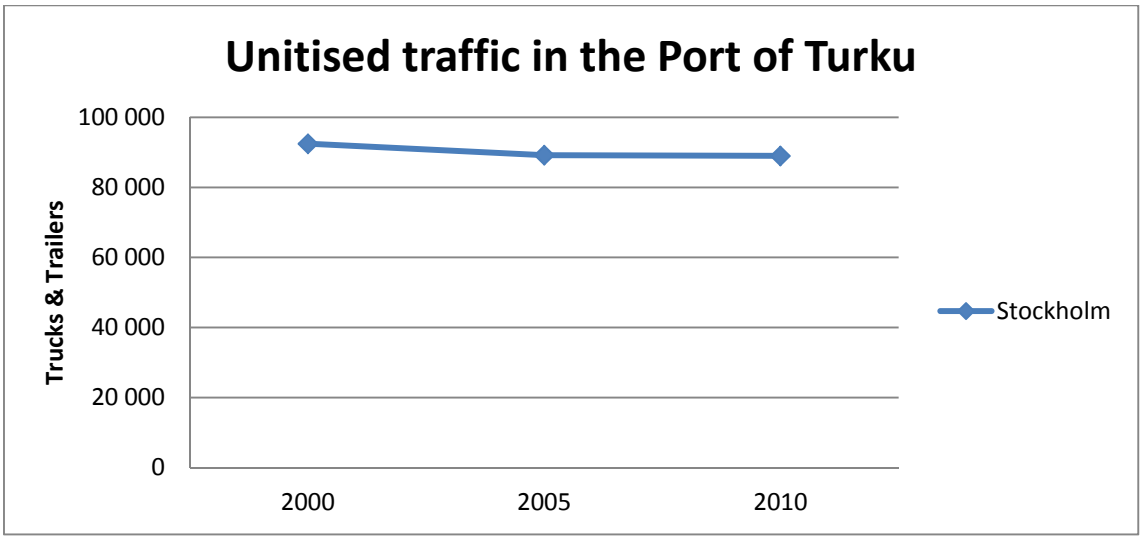

Figure 2.14. The development of unitised traffic in the Port of Turku.

Based on recent transport history, passenger traffic in the Port of Turku will decrease slightly (Figure 2.15). In 2005, approximately 600,000 passengers travelled between Turku and Kapellskär, which explains the decreased figure for the Turku-Stockholm route in 2005. Nevertheless, traffic flows between Turku and Stockholm decreased nearly 13 per cent from 2000 to 2010.

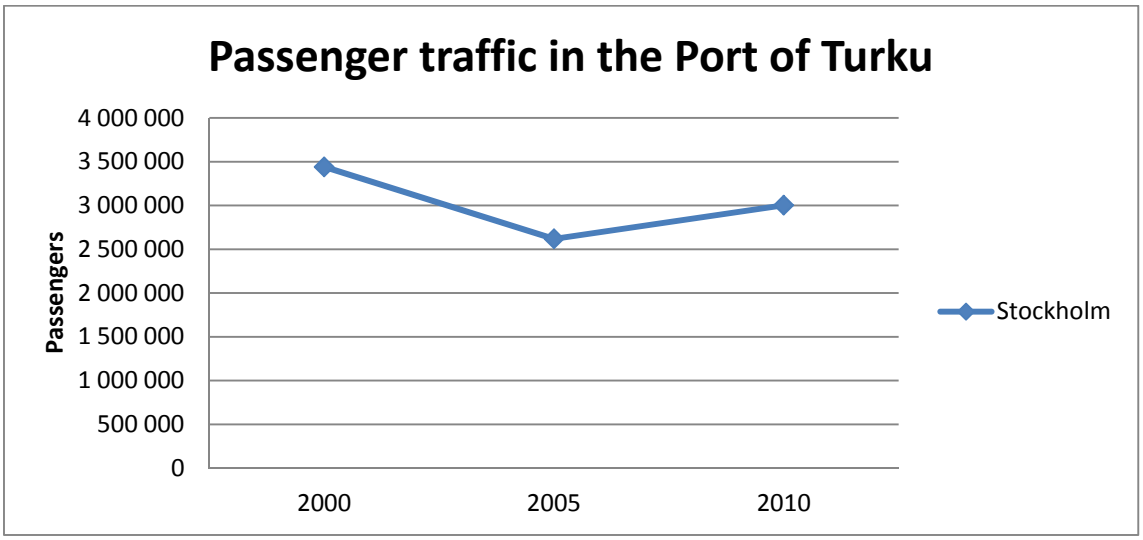

Figure 2.15. The development of passenger traffic in the Port of Turku.

2.1.5 Naantali

Cargo traffic in the Port of Naantali is increasing steadily (Figure 2.16). Despite its closeness to the Port of Turku, the change in traffic volumes has been almost the exact opposite of Turku's and the future estimates are encouraging.

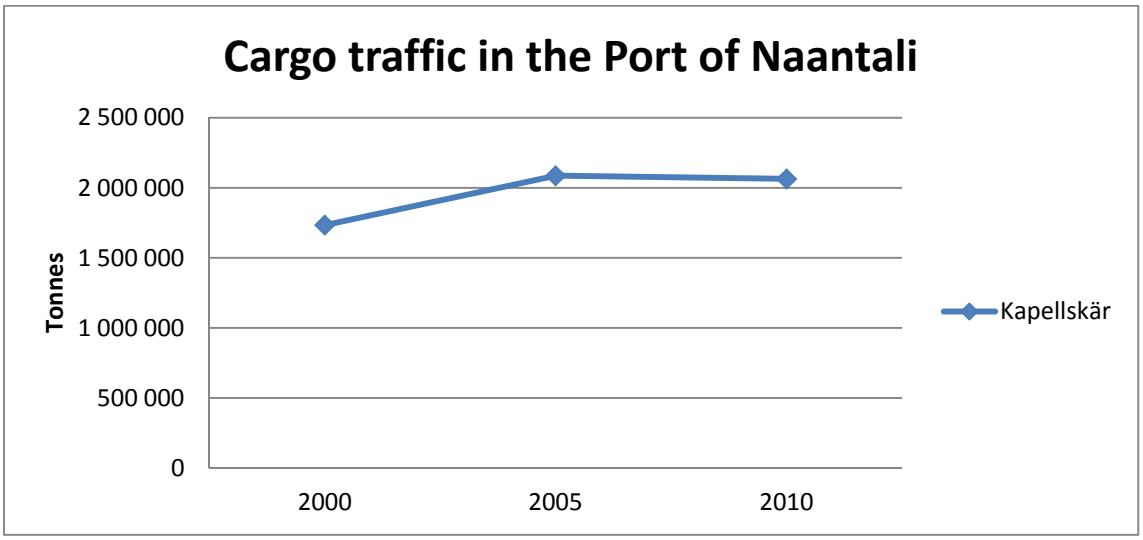

Figure 2.16. The development of cargo traffic in the Port of Naantali.

The amount of transported units between Naantali and Kapellskär has been increasing as well and this growth has been even stronger than the growth in cargo volume. Figure 2.17 presents the development of trucks and trailers passing the docks of Naantali since 2000.

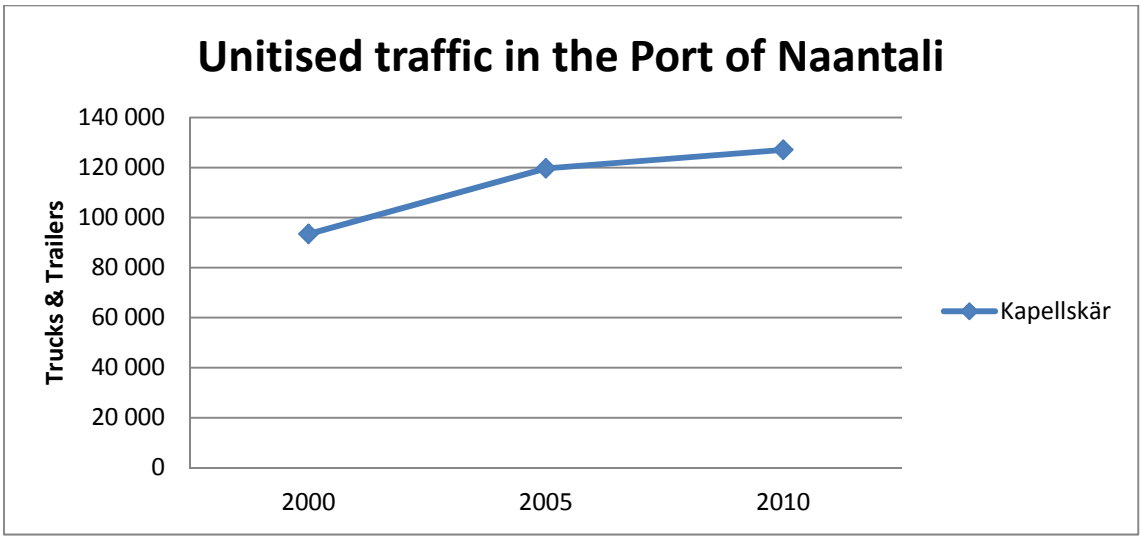

Figure 2.17. The development of unitised traffic in the Port of Naantali.

Passenger traffic is not a priority for the shipowner Finnlines – the company which operates the route Naantali-Kapellskär. Nevertheless, the number of passengers has

been increasing steadily since 2000, even though approximately 70 % of the passengers are truck drivers (Figure 2.18).

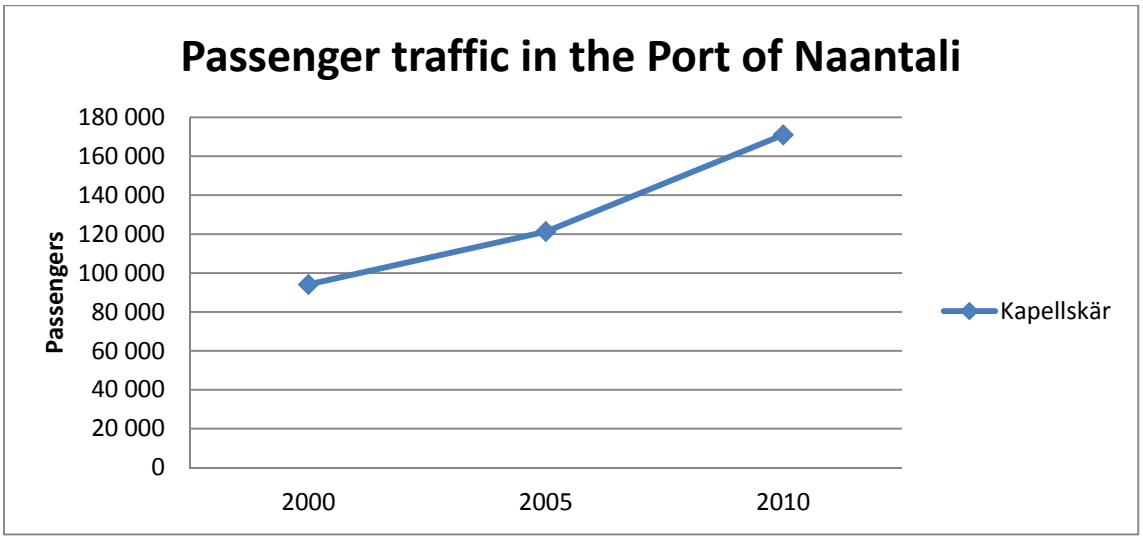

Figure 2.18. The development of passenger traffic in the Port of Naantali.

2.2 Results of the interviews

This chapter presents the results of the interviews. The interviewees were asked to give their opinions on the future developments of traffic flows and other matters affecting the operational environment in the BSR. The interview form contained seven themes (Appendix 1). A total of 29 interviews were conducted (Appendix 2).

2.2.1 Cargo traffic

The future development of cargo traffic is strongly dependent on growth in Gross Domestic Product (GDP) in each country. This can be seen from the correlation in which GDP generates trade, which, in turn, requires transportation. The development of the bilateral trade between two countries or traffic between two ports is dependent on various determinants and GDP in each country is by far the most important factor (Baltic Maritime Outlook 2006).

The largest driving force behind the growing trade in the Baltic Sea is the high growth in trade between Russia and Germany. Germany is the largest export market for many Baltic countries, although Sweden, Finland, and Poland are large importers too. These countries are also expected to see the strongest growth in imports up to 2020 – Finland significantly more than Sweden. Exports to Sweden will increase from Denmark, Estonia and Latvia, whereas Finland will be the fastest growing export market for Sweden (Baltic Maritime Outlook 2006).

The conducted interviews support the assumption that cargo traffic in the BSR will increase strongly in the next 10 years. The growth will be most vigorous in the Baltic States and Poland. The tremendous increase in container traffic will also continue. The strong economies in Sweden and Finland will further increase cargo traffic between the PENTA countries. Estonia already perceives Finland and Sweden as virtual domestic markets and corporate acquisitions in the future could further assist this development.

Due to the imbalance in foreign trade, especially in Finland where imports dominate volume-wise, the ratio between imports and exports can be even 80% to 20% for some lines. In general, the ratio on routes from Finland to Europe is around 65% to 35%. Partly because of this, future exports will increasingly be shipped from big import ports since the supply of vessel-traffic is broader in range. There are already situations in which exports to certain destinations are nearly free of charge and one has to pay only for bunker and terminal handling costs. Future exports in the Northern Baltic Sea region will be bulk and general cargo, whereas imports are more likely to be single consignments. This is why exports have to find the right ports from which to ship. Rising industries will also alter the routes and cargo volumes. For example, Finnish ore traffic is expected to grow substantially and both shipping and loading will have to be done near the mines, which are located in the far North.

2.2.2 Unitised traffic

The future development of unitised traffic is dependent on the performances of the industries in each country and the volume of exports. In general, the volume of unitised traffic will increase in the Baltic Sea area whether it is on ships, trucks, or trains. RoRo-ferries will continue to carry the same cargo as they are carrying today, but the share of fast moving consumer goods will grow. Furthermore, the rise of intermodal transportation will assist the use of containers. Rail-shipping, however, is slowly disappearing because it is not cost-efficient and trucks are perceived as more convenient since door-to-door shipments are enabled. Warehousing will diminish, creating pressure to change ferry timetables and consignments will have to be shipped on the same day.

According to the interviews, by 2020 the volume of trucks and trailers transported between PENTA ports will increase by approximately 20% to 30%. The interviewees also stress that the business of ports will develop in the same way as the economy of each country. Future customers will also be the same as they are today. The development, which can be seen from the customers of logistics companies, highlights the fact that the number of transported units will increase faster than the volume of transported goods. This is expected to be caused by consumers demanding faster and more reliable transportation. Partly because of this, it will not be unusual to have empty space in transported units. This is how customers will want it to be and they will be prepared to pay for it.

Trade between Sweden and Finland has always been strong and shipowners predict that unitised traffic between Sweden and Finland will increase rather than decrease. One of the main accelerators will be the increase in population in the Nordic countries and also

the increased population concentration in urban, residential areas – nearly half of the population in Sweden lives in the hinterland of Stockholm. The only decrease in RoRo-vessels carrying cargo is likely to occur between Estonia and Sweden, unless additional ships are put on the route. According to the interviews, the extension of the Port of Nynäshamn is a beneficial project and it will increase the amount of unitised traffic in the Ports of Stockholm. On the other hand this puts the Port of Turku in a problematic position because cargo flows are concentrated away from the central ports of Stockholm. Nevertheless, high passenger traffic on route from Turku-Stockholm supports business in the Port of Turku.

According to the interviewees, the forecasting of traffic flows in 2020 is challenging. After a recession, it takes two to three years for cargo volumes to recover but the decrease in volumes is always faster. Logistics companies make forecasts but the prognosis is made only for one year at a time. In the long run imports from Asia will increase but the growth in the following years will be moderate. The relative share of cargo volumes operated by different logistics companies and shipowners can alter, but the total volume will remain at least at its current level. Manufacturing will increasingly be based on orders and warehousing will be reduced. The door-to-door concept, in which go-betweens are reduced and short lead times are valued, will become increasingly significant.

2.2.3 Passenger traffic

The passenger traffic between the PENTA ports is somewhat unique and it is difficult to find any equivalent. According to the interviewees – especially shipowners – the demand for passenger traffic between PENTA ports will increase in the long run. Only the interest in the entertainment offered and destinations is predicted to change, while the gap between work-related trips and leisure cruises will be clearer.

The number of ferries operating between the PENTA ports has steadily risen since the 1980s and capacity is currently adequate. The building of new vessels is expensive but the travel itself is inexpensive, even free of charge. Getting on-board is relatively effortless and passenger consumption generates income streams for shipowners. Passenger traffic between Finland and Sweden has been stable for a while but passenger traffic between Finland and Estonia continues to increase. On the other hand, increased passenger traffic towards Tallinn is a rival to traditional routes between Finland and Sweden. Nevertheless, new ferry-layouts can introduce new ways to travel and increase people’s interest in all existing routes.

According to the interviewees, the cost structure and the price level in Estonia are key issues when future passenger traffic between PENTA ports is analysed. Increasing prices will have a direct impact on the attractiveness of Tallinn as a tourist destination. When the price level in Estonia increases, the enthusiasm of Finnish or Swedish passengers to travel there is likely to decrease. This trend is currently clear as people already travel further from Tallinn by car.

Based on the interviews, Estonian passengers travelling to Finland and Sweden will remain unchanged before 2020. One factor which affects passenger traffic from Sweden to Estonia is the distance. Swedish passengers also have easier and closer destinations for travel, such as Norway and Denmark. Another aspect affecting passenger traffic is the image of Estonia and the image of travelling to Estonia. Even though Estonia is gaining a better image among Swedish people, the building of a good reputation as a travel destination takes several years, but one negative incident can destroy it. The maritime disaster of M/S Estonia in 1994 had a remarkably negative influence on passenger traffic towards Estonia – just when Tallink started to operate the line between Tallinn and Stockholm. Nevertheless, Swedish companies are currently relocating to Estonia in the same way that Finnish companies did. Passenger traffic between Sweden and Estonia consists mainly of people on vacation. Business travellers also have possibilities for alternative travel arrangements, such as the newly introduced travel-packages, where one can take a plane in one direction and come back by ferry. Such packages do not have a big market share though.

The number of Russian passengers on routes between PENTA ports will increase in the future. The route Turku-Stockholm is expected to have an especially large increase as Russians perceive Stockholm as an interesting destination. Currently Russian passengers arrive in Turku by coach, but this mode is expected to move to train and finally, according to the wealth of individuals, car travel. It is argued that acting as a gateway is something cities can better exploit. Cruise vessels entering the Ports of Stockholm and the Port of Tallinn will also increase in future. The cruise business has developed strongly in the past 10 years and progress will continue. At the same time, ships are getting bigger and carrying more passengers. On the other hand, this can be problematic because future vessels may not fit into existing ports anymore. The Port of Turku is hard to approach for cruise vessels, whereas the Port of Helsinki is easy to visit. Nevertheless, Helsinki acts only as a quick stopover before departure to Saint Petersburg – the number one cruise destination in the Baltic Sea.

2.2.4 Transit traffic

The definition of transit traffic is goods which are transported through a country which is not the source country or the destination country. Usually this includes multiple modes of transports. A good example from the PENTA project is when Russia exports by road or rail through neighbouring Baltic Sea countries – thus generating transit traffic – and freight continues by sea (Baltic Maritime Outlook 2006).

A previous study predicted that transit traffic would decrease in the Baltic Sea region between 2003 and 2020 since an increasing amount of exports are expected to be transported directly to trading partners and less through transit countries. This means that the growth in transport is forecast to be lower than the actual growth in trade (Baltic Maritime Outlook 2006).

According to the interviews, defining transit traffic is difficult and reliable statistics are hard to find. Even commodity groups and final destinations are hard to distinguish

because smaller transportation companies often pick goods after the original departure and unload cargo before the final destination. Larger companies do provide better statistics though. The interviewees are of the opinion that future cargo flows will be shipped increasingly straight from Europe to their final destinations. This presumably means that the transit share in PENTA ports will not rise anymore. On the other hand, the sulphur directive will have its own impact on future transit volumes. The assumption is that road transportation will increase and the demand for longer shipping routes will diminish. The logistics companies stress that if transit traffic towards Russia were to increase it would be wise to use more trailers as traffic eastwards is less dependent on drivers.

The share of transit traffic in Finland is currently only a small percentage of the total cargo volume. New cars transported to Russia have almost vanished and the figures for other products are decreasing as well. Special goods, such as medicine, expensive electronics, and cargo with safety regulations, will remain but otherwise the figures are set to decrease. Transit traffic in the eastern ports of Finland is higher, but it includes no goods for industry. The port of Helsinki is not likely to become a conventional transit port since the Port of HaminaKotka is located closer to the border with Russia. The interviewees are of the opinion that adding transit traffic on top of Helsinki's own import-export traffic would be challenging but however, possible. In spite of this, Russian companies using Finnish ports were considered to be convenient partners because they usually pay what is asked without bargaining.

The significance of transit traffic in Sweden is low as well. The traffic between Norway and Finland goes mainly through Sweden since there are no good ferry connections. Furthermore, Danish exports heading to Finland as well as the small amount of traffic between Germany and Finland is also delivered through Sweden. However, the port of Stockholm could become more significant for transit traffic if it gains more traffic from southern ports, such as the Port of Karlshamn. Currently these ports transport goods to Lithuania.

Estonia is a significant transit country due to its long history with Russia. Regardless of that, transit traffic through Estonia, either to or from Russia, has decreased remarkably since the political conflict of the Bronze Soldier of Tallinn in 2007. Its huge potential to become a larger transit traffic country still remains but easier border crossing and a more supportive infrastructure would make a difference. Currently Finland has the competitive edge over Estonia.

Manufacturing in the Czech Republic, Slovakia, Hungary and Poland have been the key factors why transit in the Baltic countries has increased. For the same reason Latvia and Lithuania are simultaneously competing over transit traffic towards Russia. According to the interviewees, Estonian transit traffic grows if transport from Finland to Latvia and Lithuania increases. Estonia also exports transit goods to Sweden and it will continue to transport small amounts of cargo to Norway and Denmark via Sweden. Estonian transit traffic between Sweden and Russia is mainly towards Russia. Estonian transit to Finland is not expected to increase before 2020.

2.2.5 Vessel traffic

The considerable growth in maritime transport has led to increased vessel sizes in recent years. This has resulted in a growing concentration of traffic at certain ports because fewer ports are able to handle larger vessels. The emergence of hub and spoke networks has made many mid-sized ports play a feeder role to larger ports. While larger vessels travel between the major transshipment hubs in these networks, the prosperity of smaller ports is becoming increasingly dependent on the route strategies of the major shipping lines. These tend to favour ports which are in a good geographical position relative to other ports of call for best transit and steaming time and port rotation. Distance to market, the required facilities, services and infrastructure as well as the added flexibility to maintain ships are all crucial factors (Livey 2005).

According to the interviews, the demand for vessel traffic in general results from the requirements of industry and trade which demand certain goods at a certain time. The priority for logistics companies is to make good contracts with shipowners that have sufficient capacity. The timetable is not the key issue as long as frequency is secured and cargo can be shipped the same day. Based on the interviews, the increasing demand for freight capacity between PENTA ports will be solved with higher frequency. The future vessel size is more dependent on the development of passenger traffic and, due to the short distances in the Baltic Sea, ship sizes will remain approximately the same. However, some RoRo-vessels will become larger due to the increase in lane-metres. On the other hand, the loading and unloading of larger ships will probably take too long, if the current frequency of ships arriving and unloading is to be maintained.

According to the interviewees, vessel traffic between the Port of Turku and the Port of Stockholm will stay at the same level, even though capacity for cargo traffic is insufficient from time to time. Traffic between Helsinki and Tallinn has increased rapidly, which can lead to capacity problems in the future. Therefore smaller vessels are replaced with larger vessels or else vessel traffic increases. Road haulage in Finland is often done during the night. In an ideal situation, vessels would arrive in the afternoon between 12:00 and 15:00 and road transportation would start approximately at 18:00 after cargo handling has taken place. According to the logistics companies, the route between Naantali and Kapellskär has optimal frequency and sufficient capacity.

The main weakness in the vessel traffic between Sweden and Finland is that Tallink Silja and Viking Line depart at approximately at the same time. It would be beneficial for cargo traffic if there were more alternative departure times. The capacity is good at the moment but from time to time there is a lack of space on evening departures as there is during summertime when tourists are preferred and transport companies face difficulties getting trucks on-board. The routes between Estonia and Sweden already need an additional RoRo vessel. The route between Paldiski and Kapellskär has great potential to expand into a more utilised route because Paldiski is only 40 kilometres west of Tallinn. Thus, cargo traffic on this route will increase in the future but a new vessel is required.

The interviewees stress that there will always be demand for more capacity and higher frequency. Viking Line has already begun to renew its equipment, which is a positive signal for the whole transport industry. At the moment vessels are occasionally fully booked and there is not enough room for cargo shipments. Sometimes cargo has to seek alternative routes via other ports or wait for the next departure. According to the logistics companies, the most affordable alternative is always the first option on freight shipments. Even though RoRo-traffic between PENTA ports is currently fairly stable, container traffic in the Baltic Sea Region is set to experience major changes. At the same time, the number of ports will decrease and frequency between the remaining ports will increase. The interviewees are of the opinion that, for example, in Finland the ports of HaminaKotka and Helsinki are likely to be the only ports to handle containers in the future.

2.2.6 Sulphur directive

Based on the agreement which was made at the 58th meeting of the Marine Environment Protection Committee of the IMO (International Maritime Organisation) in October 2008, the sulphur content of marine fuels will be reduced. Since July 2010, the maximum allowed sulphur content in marine fuels in SECA countries that have ratified the revised IMO Annex VI, was reduced from 1.5 per cent to 1.0 per cent. The final limits for marine fuel sulphur content (0.1%) will be introduced in the SECA areas as of January 2015. The largest benefit of the sulphur reduction in the Baltic Sea area comes from the decrease in detrimental human health effects (IMO 2008).

Before the upcoming sulphur directive was publicly introduced, transport by sea in the BSR was expected to grow by 64% between 2003 and 2020. Road and rail traffic were predicted to grow by 26% (Baltic Maritime Outlook 2006). According to the interviews, the price of marine fuels is estimated to increase by 50 to 70%, leading to an increase in the costs of sea transports of up to 30%. On longer voyages – between Finland and Europe – the sulphur directive will increase the costs of sea freight, even up to 30% or 40%. This will result in the increased use of roads in the Baltic States and Sweden to avoid expensive shipping as road transportation from Finland to Europe is currently only 20% more expensive compared to the sea transportation. From the point of view of the shipping companies, the sulphur directive increases operating costs and the longest routes will suffer the most.

The interviewees are of the opinion, that the sulphur directive will reduce sea traffic especially on the longer routes of the Baltic Sea. Diminishing vessel traffic between Finland and Germany will be replaced by truck transportation via Sweden and on the Via Baltica. This would be divided 50% to southwest Finland, including the routes Turku-Stockholm and Naantali-Kapellskär; and 50% to the Helsinki-Tallinn route. Road capacity near Stockholm area as well as railroad between Stockholm and Gothenburg are already fully used but the potential to transport Finnish exports to Germany and Benelux via Sweden exists. By 2020, Estonia's road connections to Central Europe will be up-to-date. Nevertheless, alternative routes in 2015 will be

problematic due to capacity limits in Sweden and insufficient infrastructure in the Baltic States.

Currently 400,000 trailers are transported annually between Finland and the European countries but the effect of the sulphur directive will largely determine future volumes. More cost efficient routes for cargo shipments will be sought out and the whole freight industry may alter. The sulphur directive will have a major impact on trade, especially on Finnish trade, since the Baltic coastline is long and sea traffic is a necessity. According to logistics companies, even though the costs are high already, consumption itself will not diminish. Besides increasing transport costs, the sulphur directive will generates another threat for the Nordic countries: the relocation of factories to low-cost countries. As a result, the imbalance in foreign trade will increase and even whole industries could disappear. This especially concerns Finland because Sweden and Estonia can always use road or rail when transporting cargo to Europe.

2.2.7 Changes between different transport modes

In 2003, 48% of the total volume of internationally traded goods was carried by ship in the Baltic Sea Region. The prediction in 2006 was that shipping would become the leading mode of transport for Baltic Sea Region trade, carrying 54% of the total volume by 2020 (Baltic Maritime Outlook 2006).

According to the interviews, the search for cheaper transport alternatives and manufacturing in low-cost countries will continue. Traffic between PENTA ports will always require sea transportation but road and rail traffic cannot be displaced. Depending on the future developments of taxation on road traffic, new routes may emerge or traditional routes may decline. The development of toll-fees for heavy trucks in Germany and Poland will be key factors affecting road transportation to Central Europe. The interviewees also stressed that rail-shipping is not a very likely mode of transport in the future because different rail gauges cause extra work and the road-sea combination is more flexible when compared to rail-sea. Rail-shipping also requires longer distances in order to be economically feasible option. A cost-effective distance departing from Finland would be approximately 1000 kilometres south from North Germany.

2.2.8 Russian Baltic Sea ports

The developing Russian economy and construction work on the Russian Baltic Sea ports will have a tremendous effect on traffic in the Baltic Sea area. Saint Petersburg and Ust-Luga are Russia’s largest dry-bulk ports and they are also relatively close to the PENTA ports, which is why they are studied in this report.

In 2009 the Deputy Prime Minister of Russia Sergei Ivanov stated that Russia plans to upgrade its freight capabilities in its own Baltic seaports to reduce reliance on the Baltic States for cargo. In particular, the capacity of the port of Ust-Luga will be increased,

enabling Russian vessels to stop using ports in Lithuania, Latvia and Estonia. According to Ivanov, Russia will be fully removed from dependence on foreign ports in the foreseeable future (Baltic Reports 2009). According to Rosmorport, a Russian state-owned company for the development of maritime transport, sea traffic in Russia will rise from 540 million tonnes in 2011 to 700 million tonnes in 2015 and nearly 900 million tonnes by 2020. Most of the required expansion will take place in the Baltic Sea ports. By 2015, the capacity in the Port of Ust-Luga is expected to double due to the expansion of terminals for oil and petroleum products and the construction of a new container terminal. The Port of Saint Petersburg will add 20 million tonnes in new container-handling capacity. Another 30 million tonnes will be added by 2020, when the general purpose Bronka port, not far from Saint Petersburg, should be in operation. The Baltic Sea will remain Russia's main sea route for foreign trade in the coming years. Russia's Baltic Sea ports already handle nearly half of the imports arriving by sea. Approximately 30% of Russia's crude oil and petroleum product exports (112 million tonnes) were transported through Baltic ports in 2011, and the volume of such exports is expected to reach nearly 150 million tonnes by 2015 (Bank of Finland 2012).

According to the interviewed companies, Russia is a very challenging market area and doing business there is always risky. However, its huge potential combined with easy market entry attracts foreign companies. But, after a business start-up, unexpected regulations and legislation emerge and they are likely to make companies withdraw from the market. Cooperation is also difficult due to a lack of confidence and distrust. As previously discussed, Russia aims to manage foreign trade without any dependency on neighbouring countries. Currently Russia trades through Saint Petersburg, Ust-Luga, and Kaliningrad and via the Black Sea. The infrastructure required for total independence is not ready yet, but the building work is proceeding. In the future, shipping lines will go straight to Saint Petersburg, but based on the interviews this will take several decades. The growth of the Port of Saint Petersburg has already decreased the volumes of transit traffic in PENTA ports due to direct shipments to and from German ports. The expansion work of the Port of Ust-Luga is likely to decrease transit volumes, at least in Finland. New routes are also being developed departing from Saint Petersburg. Nevertheless, the Port of Saint Petersburg will always be a bottleneck because of its long, narrow, shallow, and one-way channel. Based on the interviews, Saint Petersburg can double or even triple its current capacity but that is the maximum. Container traffic, for instance, is expected to increase at least ten-fold but then Russia's own ports will become bottlenecks since they cannot handle that amount. Baltic ports, especially Tallinn, Riga, Helsinki and HaminaKotka, will always be needed.

The Russian equipment for roads has improved a lot in recent years and some logistics companies even prefer driving straight from Central Europe to Moscow as warehousing in Russia has improved greatly. Despite Russia's own statements regarding its dependency of foreign ports, Western countries still perceive it more as an opportunity than a threat in terms of doing business. The growth and prosperity of Saint Petersburg and its effects on traffic in the PENTA ports divided the interviewees' opinions. The representatives of the ports and the shipowners had the most positive images of the future, while the transportation companies were more sceptical. According to the logistics companies it will take some time to see the final effects of Russia's ambitious

construction works but at the moment it is not ready to operate on its own. A huge population combined with visa-regulations will play a significant role when future passenger traffic is estimated. Creating a ferry culture – as there is between Sweden and Finland –also takes time. However, the total amount of cargo traffic, especially containers, will unquestionably rise. Additionally, Moscow will always have a huge influence as it is the most significant economic zone in Russia.

2.2.9 Tax-free sales

The tax-free supported passenger traffic on routes via Åland plays an important role in today's seaborne transportation system. It could be even described as the backbone of the seaborne transport between Sweden and Finland. The interviewees are of the opinion that tax-free enabled shopping is the key factor supporting passenger traffic between Finland and Sweden. It is also the main income source for Viking Line and Tallink Silja. Future legislation on tax-free policy at the EU-level will have a huge impact on passenger traffic. It can even change the routes of cargo traffic, vessel layout and the whole business concept for travelling in the Baltic Sea.

If tax-free sales were to be abolished, it would affect transnational transport logistics and business. The profitable system of combining people and cargo in the cruise ferry sector would be gone, resulting in fewer departures, higher fares and a remarkable decrease in passenger traffic between Sweden, Åland and Finland. Surviving shipping companies would have to reconsider their strategy and develop new logistics solutions based on the most cost-effective way of transporting goods. This would include new routes and it would influence the type of vessels operating between PENTA ports. The eastern part of the Baltic Sea Region would become stronger, including an increase on passenger traffic to Tallinn, Riga and Saint Petersburg. At the same time, a decline in ferry capacity between Finland and Sweden would reinforce the further development of the Eastern route's ports, terminals and roads. The Western Route with its well-developed transport infrastructure wouldn't undergo full-size changes and the routeing of the main cargo flows would probably be the same. The main change would be in redirecting more traffic to the shortest and fastest route between Finland and Sweden (Mikołajczyk 2012).

The conducted interviews support the assumption that the expiry of tax-free shopping would have a major impact on sea traffic between Finland and Sweden. Shipowners would also have to investigate new business models in order to secure the future of the companies. The matter has been brought up in public every now and then without further action. If tax-free shopping is abolished, passenger traffic would undoubtedly decrease. This decrease would also have a major effect on cargo traffic and, in theory, the Naantali-Kapellskär route would become even more important than it is now since tax-free exemption does not concern Finnlink vessels. The biggest losers in this scenario would be the companies and individuals who economically benefit the most from the transport and logistics services that the duty-free exemption offers. Also individuals and companies using tax-free routes for regular shipments would be hurt. Since approximately a quarter of Åland's GDP comes from the tax-free supported transport

sector, it would undergo a massive breakdown and thus be the biggest loser of all. So called winners in this scenario would be ports and shipping companies located near the shortest possible sea routes between important strategic and geographical points. As a result, ports in south-west Finland and in the Stockholm area specialising in RoRo cargo handling would gain more traffic. In general, the ports in the eastern part of the Baltic Sea and Via Baltica route would benefit most from the abolishment of duty-free sales (Mikołajczyk 2012).

According to the interviewees, there are already signs in the changing nature of passenger traffic since people are able to buy low-price beverages from Estonia, Denmark and Germany. If tax-free sales are some day abolished, passenger traffic would diminish over 50% and the share of pure transport passengers would increase. This could occur at the earliest in ten years, but currently it is not expected to happen.

2.2.10 Other arguments about essential and possible future developments

This chapter presents the opinions of the interviewees on subjects not raised so far. From the point of view of transportation companies, ports act only as gateways and perform loading or unloading. The services ports are currently offering do not account for much when logistics companies select the optimal route for cargo, thus the general impression is that the need for services will increase in future. The owner of the cargo, operator or forwarding agent usually selects the most cost-efficient route which is highly dependent on geographical factors. Logistics companies also prefer early arrival times for vessels.

Collaboration between ports and cities will become more significant in the future since ports are not currently contributing very much to those who define a cargo's route. Other important tasks are to secure the competitiveness of the current routes and create settings for new connections to attract shipowners. The most important thing for a shipowner is to choose the right port from which to operate and have as high a frequency as possible. Good relations with financers, politicians and other decision makers can benefit a company's business remarkably, although these actions are not always in favour of what would be rational on a larger scale. Currently, there is also fierce competition between the shipping companies operating in the Baltic Sea region and the market is not stable, which will lead to changes in the future.

Due to the Transport Workers' Union in Finland, handling costs in ports can be even 20% to 25% higher compared to handling outside the port areas. This creates a demand for alternative ways to handle goods. This is only small part of the whole supply chain, which is currently under total modification because companies are trying to free capital by letting go of old warehouses. A general trend is that companies are closing down country-level warehouses and building bigger central warehouses in Central Europe. Possible new member states of the European Union – for instance Turkey where manufacturing costs are low – can alter the routes of cargo as well as the functionality of the route via Baltica. Since only a few companies dominate the transport business, the market is seen more as an oligopoly rather than a free market. Market entry is

challenging, existing actors compete among themselves, and external competition is very limited.

The infrastructure in PENTA ports differs greatly. However, according to the interviewees, the creation of infrastructure is relatively easy when it is required. A major threat in the future will be the traffic connections near the ports. This applies to all PENTA ports but least of all to Naantali and Kapellskär due to the small population centres near the port area. In general though, it takes too long to get out from port areas and city centres. Ports will also need more space in order to load and unload ships as fast as possible.

The interviewees are of the opinion that the green values, which companies, cities and countries are currently promoting, are more politics and public relations rather than real actions. The discontinued rail shipping company SeaRail, which operated between the Port of Turku and the Ports of Stockholm, is a good example of a more pro-environmental solution. Unfortunately the company could not afford to offer as low a price as its competitors and profits became too low. On the other hand SeaRail focused on the products of the paper and metal industry and a number of Finnish factories operating in these industries have recently been shut down. In order to make rail shipping profitable between PENTA ports, there would have to be large manufacturers a far distance away and good railway connections to ports. Companies around the city of Helsinki, for example, do not produce anything that would require railway transport and nothing that would require transport to Turku by rail. Nevertheless, environmental issues will have a huge effect on cargo traffic in the future. The only way to make companies act greener is through financial incentives or legislative measures.

Finally, the interviewees stress the political decisions made in the EU and IMO are a great threat for the whole transport industry. These decisions and directives are often related to environmental issues. The interviewees believe that most of the restrictions regarding maritime traffic should be diminished since business becomes too complicated for shipowners and they are forced to evolve in a way which does not favour ports. Payment policies including cargo costs, vessel calls, ice-breaking, etcetera are all key issues and the most cost efficient ports will prevail. Rising bunker costs, even without the sulphur directive, will also be hard to offset in the future. Margins are low already and reducing speed is not an option for vessels operating between PENTA ports – even though it would cut costs. Annual increases in pricing should also be very modest since freight traffic will always find the cheapest route available.

3 SCENARIOS

This chapter presents earlier future scenario studies. Current trends and global changes in direction are also presented as are three alternative scenarios for the PENTA project.

3.1 Previous studies

Wärtsilä has predicted trends and created scenarios for the future of global shipping in 2030. In this research the first step was to identify all key uncertainties which might have an impact on the shipping industry in the future. These five key uncertainties were trade and economic growth, responses to climate change and sustainability issues, geopolitical issues and global leadership, solutions to dealing with the scarcity of natural resources and the control of power. As a result, Wärtsilä introduced three possible scenarios for the future (Figure 3.1).

Rough Seas

In the world of Rough Seas, scarcity of resources is predominant. Climate change adds further stress. Cartels and bilateral agreements have overtaken free markets. Wealth is divided unequally among nations, resulting in tension. The entire logistics chain is optimised regionally and national governments control ports.

Yellow River

In Yellow River, China dominates the global arena economically, geopolitically and in shipping. China is no longer the world's cheapest manufacturing region. Instead, labour and resource-intensive manufacturing has moved to Africa and other Asian countries. Economic growth is significantly slower in the West and climate change is tackled only on a regional level – no global agreements exist.

Open Oceans

The world of Open Oceans is a strongly globalised one. Global mega-corporations and megacities have gained power over the nation state. Governments cooperate on the governance of climate issues and free trade protocols. Climate change is perceived as an opportunity, and innovating green solutions is a lifestyle. Highly optimised and integrated large scale logistics systems support global trade.

Figure 3.1. Three possible scenarios for the future of global shipping in 2030 (Wärtsilä 2010).

Wärtsilä created these scenarios in order to support their long-term strategic planning and to better serve their customers. The uncertainties used in this study apply to the PENTA project as well but they are partly too distant when traffic flows in the Baltic Sea are analysed. In 2008, the Baltic Sea Unit of the Swedish International Development Cooperation Agency (SIDA) and the Baltic Development Forum, in cooperation with the Centre for Baltic and East European Studies (CBEES), Södertörn University College, arranged an international seminar in Visby with the title "Vision of the Future: what can be achieved with a Baltic Sea Strategy?" Among the speakers Dr. Christian Ketels from Harvard Business School introduced two scenarios for the Baltic Sea Region that focus on economic factors. The first scenario – the Best Case Scenario – points out the importance of collaboration in the Baltic Sea Region in order to have

the best possible outcome for the future (Figure 3.2). In this scenario Russia addresses competitiveness and all the Baltic Sea states improve their position within Europe.

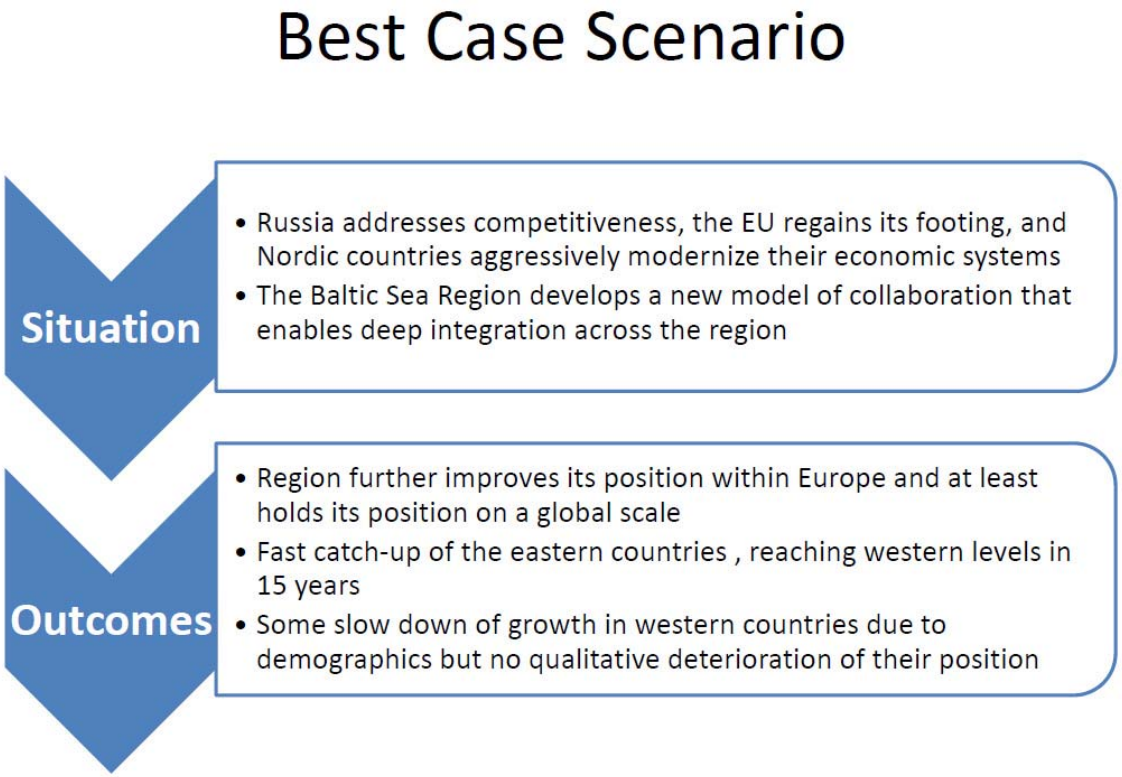

Figure 3.2. Best Case Scenario for the Baltic Region (Christian Ketels, SIDA 2008).

In the second scenario – Worst Case Scenario – Russia opts for economic nationalism and the whole Baltic Sea Region becomes a less important arena for cooperation. As a result, countries developing their economies are able to moderately catch-up with Western countries, but the whole region becomes financially less attractive and trade decreases.

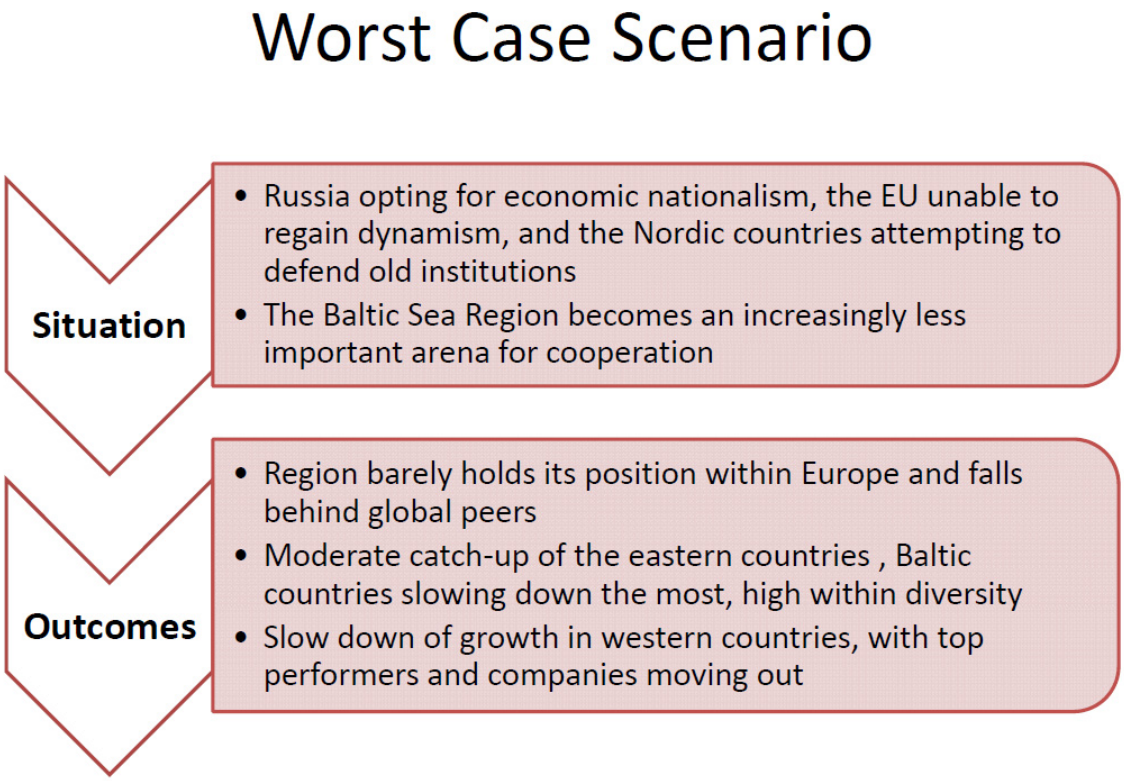

Figure 3.3. Worst Case Scenario for the Baltic Region (Christian Ketels, SIDA 2008).

In the same seminar Sweco Eurofutures AB, a Swedish engineering and design company which contributes to the sustainable development of societies, presented three possible scenarios for the future of the Baltic Sea. In this study the main factors affecting the scenarios were Russia, Energy, Environment, Demographic change, Education and Innovation and the North East Passage. The scenarios are named Yellow, Red and Green (see Figure 3.4).

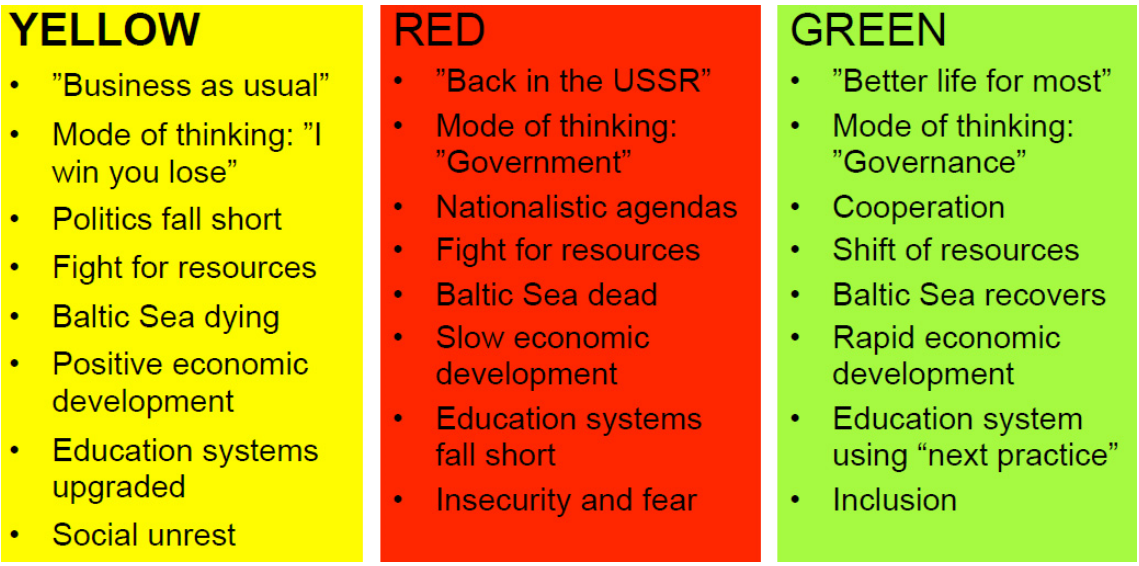

Figure 3.4. Sweco Eurofutures AB Pictures 2008 (SIDA 2008).

The scenarios created by Sweco Eurofutures AB also highlight the importance of co-operation in the Baltic Sea Region in order to maintain economic growth. In the worst case scenario the political and policy decisions were seen as short-sighted and leading to insecurity, resulting in governments and individuals acting in self-serving ways.

3.2 Current trends

The global changes in direction are called trends or megatrends. These broad and long-term trends are often affected by several smaller and parallel trends. Usually an attempt is made to identify trends while anticipating the future. The European Environment Agency (EEA) provides information, reports and data on environmental conditions and issues. The EEA has also identified the following megatrends in 2010 (Table 3.1).

Table 3.1. Global megatrends (EEA 2010).

Global megatrends
1. Increasing global divergence in population trends
2. Living in an urban world
3. Disease burdens and the risk of new pandemics
4. Accelerating technological change: racing into the unknown
5. Continued economic growth
6. From a unipolar to a multipolar world
7. Intensified global competition for resources
8. Decreasing stocks of natural resources
9. Increasingly severe consequences of climate change
10. Increasing environmental pollution load
11. Environmental regulation and governance: increasing fragmentation and convergence

Global megatrends can be seen in the transportation system within the BSR. Industrial production is increasingly being relocated from Europe to Asia and from Western Europe to Eastern Europe. The most significant changes in cargo traffic are currently the result of the growth of Russia, the Baltic states and Poland. Changes in the focus of the economy are also causing a trade imbalance, which is clearly visible in transportation between Europe and Asia. In the BSR, oil is the main export for Russia and consumer goods and cars are the main imports. Increasing environmental pollution is also forcing politicians to create new rules and regulations regarding the price of fuel and energy sources (Mäkelä et al. 2011).

In order to forecast the future volumes of cargo and passenger traffic between PENTA ports in 2020, three different scenarios were developed. Before the scenarios were developed the different variables affecting future operating environments were assessed and found to be: the price of energy increases continually, affecting transport costs and the performance of economies; tightening regulation and emission standards will affect

transport in the BSR; changes in the structure of economic life and unanticipated developments in different branches will change the content of exports and imports; the development of the Russian economy will affect, among other things, transit volumes via PENTA ports; and changes in country-level road infrastructure and logistics trends will also affect the development of ports.

3.3 Futures table method

In order to create logical scenarios of the future, all relevant factors affecting the operational environment have to be taken into consideration. The Futures Table Method (FTM) (Seppälä 2003) is a convenient approach which allows the scrutiny of multiple factors with different alternatives. The table is created so that all factors which are written in the first column represent the main variables to be examined. Alternative values or the results of the factors are written in the rows. FTM does not include basic assumptions which are expected to be static.

Table 3.2 represents ten factors affecting the operational environment in PENTA in 2020. Each factor and its related values were chosen based on the literature research and expert interviews. The factors also support the PESTE methodology – with the main emphasis on economic factors. The different values in the rows represent the alternatives for changes in the variable. Each factor has three alternatives for likely development. All alternatives are likely to come true.

In this context, the results of the futures table are based on the assessments of 16 experts. Different scenarios were created based on two group workshops, which were conducted at the PENTA steering group meeting and the workshop in Tallinn 17 and 18 April, 2012. All participants were asked to scale the values according to:

1. Most likely to happen
2. Likely to happen
3. Least likely to happen

The relevance of each factor was also questioned on a scale from 4 to 10, 4 being not relevant and 10 being very important. The results of the group work are presented in the following chapter.

Table 3.2. Futures table of the factors affecting traffic flows in BSR in 2020.

Factor	Value A	Value B	Value C	Relevance of the factor (4-10)
Economic growth in BSR	High (>3% / year)	Moderate (1,5% / year)	Low (<1,5% / year)	
Trade in BSR	Significance of Asia increases	Intra-EU trade stays dominant	Significance of Russia increases	
Sulphur-directive	Takes effect as planned in 2015	Postponement of a few years	Not fulfilled, new global directive after 2020	
Russia	Steady economic growth, no effect on PENTA ports	Strong economic growth, more traffic via PENTA ports	Strong economic growth, less traffic via PENTA ports	
Tax-free sales	Allowed on routes via Åland	The matter will be discussed	Tax-free sales are abolished	
Bunker costs	Close to 2012	Doubles	Multiple increase	
Mode of transport in BSR	Sea transport increases	Road transport increases	Rail transport increases	
Number of ports in BSR	Remarkable decrease	Minor decreases	No change	
Emphasis on safety and security	No significant changes	New regulations, good for business	New regulations, bad for business	
Environmental issues	Stronger focus, new legislations	Stronger focus, possibility to make profit with green values	Stronger focus, no real actions	
Something else, what?	Free comment	Free comment	Free comment	

3.4 Futures table results

The results of the futures table method are presented in the order of importance. The most important factor affecting future traffic flows in the Baltic Sea Region is economic growth (Figure 3.5). More than 50% of the respondents considered economic growth to be most likely moderate rather than high or low. Nearly 70% considered high economic growth as least likely to happen.

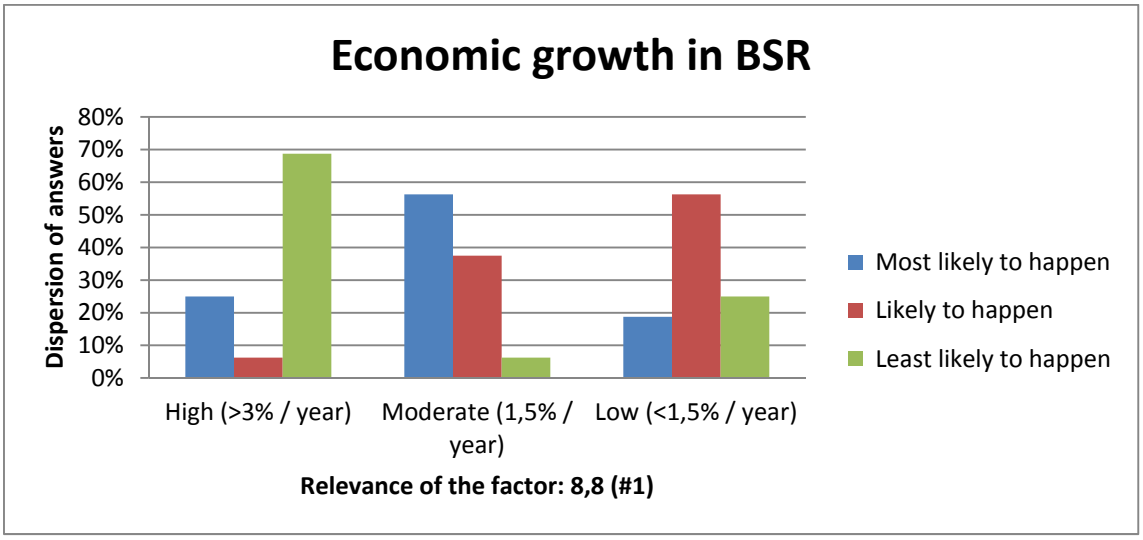

Figure 3.5. Economic growth in the Baltic Sea Region.

The rise of bunker costs – regardless of the upcoming sulphur directive – is the second most important factor affecting traffic flows in 2020 (Figure 3.6). Most of the respondents expected bunker costs to double by 2020 but even larger growth in costs is also possible.

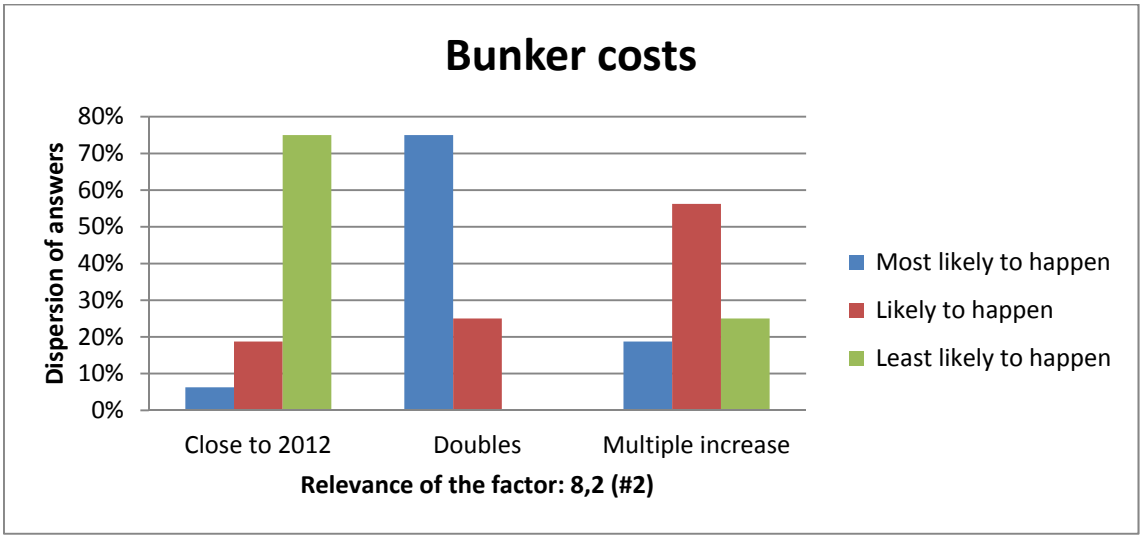

Figure 3.6. The rise in bunker costs.

The impacts of the sulphur directive produced different opinions depending on the background of the person. However, what people mainly agreed was that the sulphur directive will take effect as planned in 2015 and a new overridden directive is very unlikely (Figure 3.7). The sulphur directive was considered to be the third most important factor affecting future traffic flows.

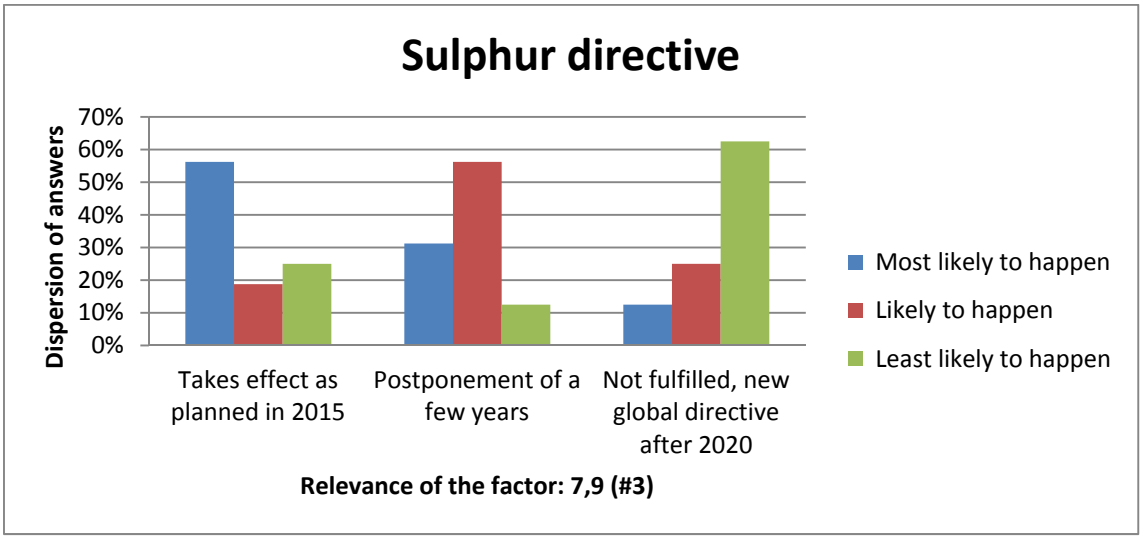

Figure 3.7. The sulphur directive.

Environmental issues are increasingly affecting companies whose operations cause emissions. Most of the respondents believe that environmental issues will have a stronger focus due to new legislation in the future (Figure 3.8). In general, new legislation equals more costs or barriers to a company's operation. A lack of real action was seen as unlikely.

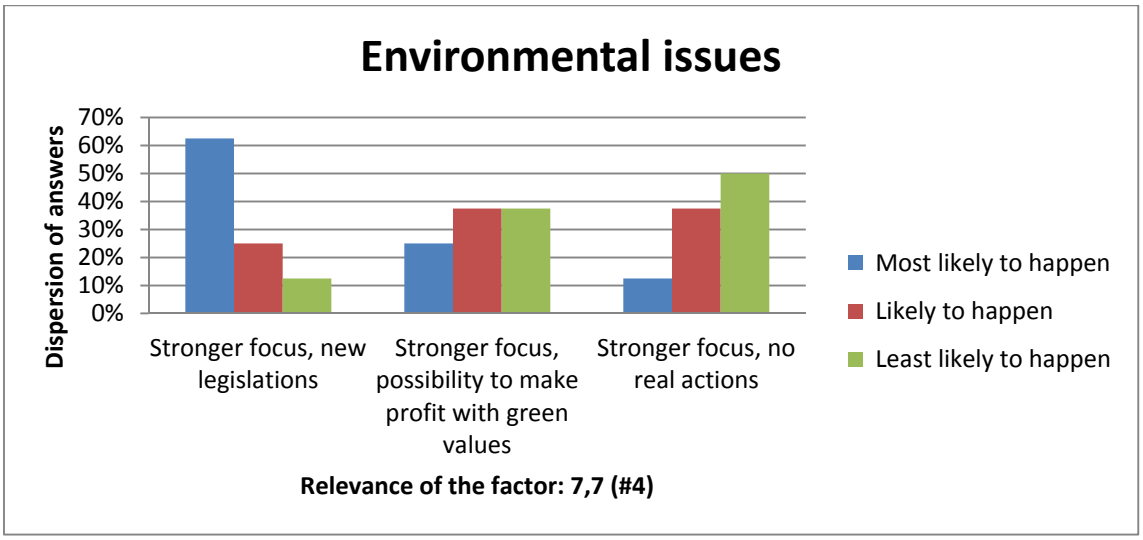

Figure 3.8. Emphasis on environmental factors in sea transportation.

The future of trade in the BSR was considered to be the fifth most important factor affecting traffic flows (Figure 3.9). The visibility of Russia as a trade partner is most likely to increase, whereas traffic between Baltic Sea countries and Asia is least likely to increase. The dominance of intra-EU trade divided opinion.

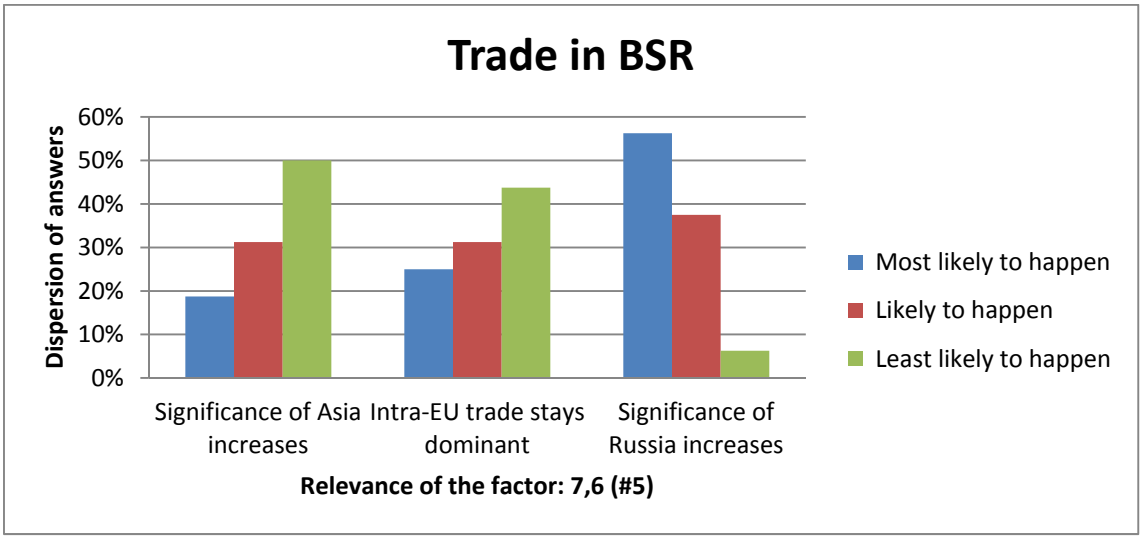

Figure 3.9. Trade in the Baltic Sea Region.

The mode of transport – sea, road or rail – is the sixth most important factor determining future traffic flows. Over 60% of the respondents believe that the relative share of road transport will increase compared to sea or rail transport (see Figure 3.10). Sea transport is also seen as increasing volume-wise but an increase in rail transport was seen as unlikely.

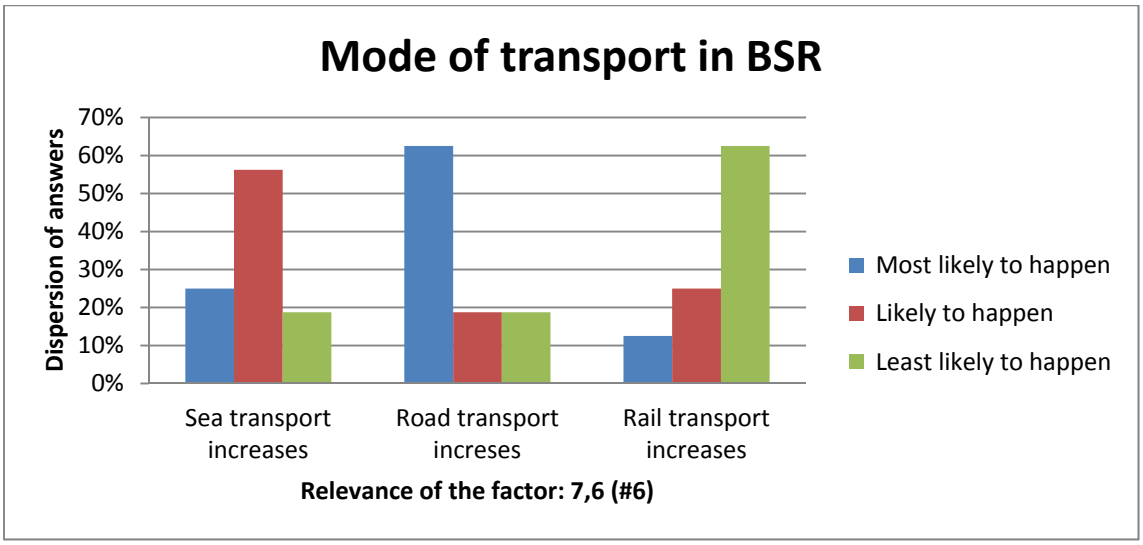

Figure 3.10. Changes in different transportation modes.

The growing Russian economy and its effects on PENTA ports divided opinion. In this case it was perceived that strong economic growth would increase traffic via PENTA ports rather than decrease it (Figure 3.11). The effect of the developing Russian economy was considered to be the seventh most important factor.

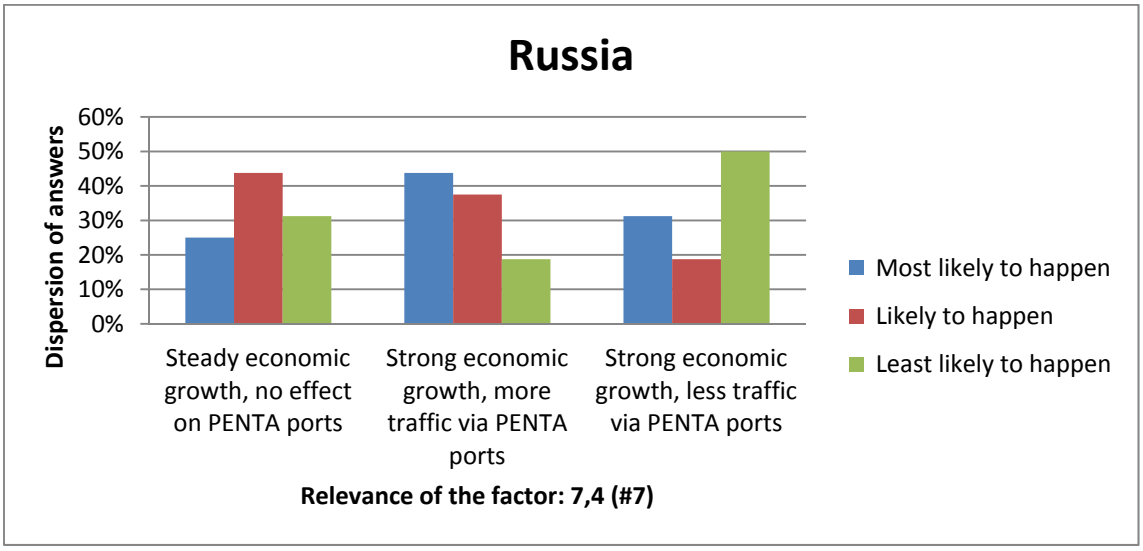

Figure 3.11. Effect of the Russian economy on the PENTA ports.

A future emphasis on safety and security affected many opinions as well. New regulations were seen as most likely to set barriers to the flow of business, but the option was not seen as producing any significant changes compared with the current situation (Figure 3.12). The emphasis on safety and security is the eighth most important factor.

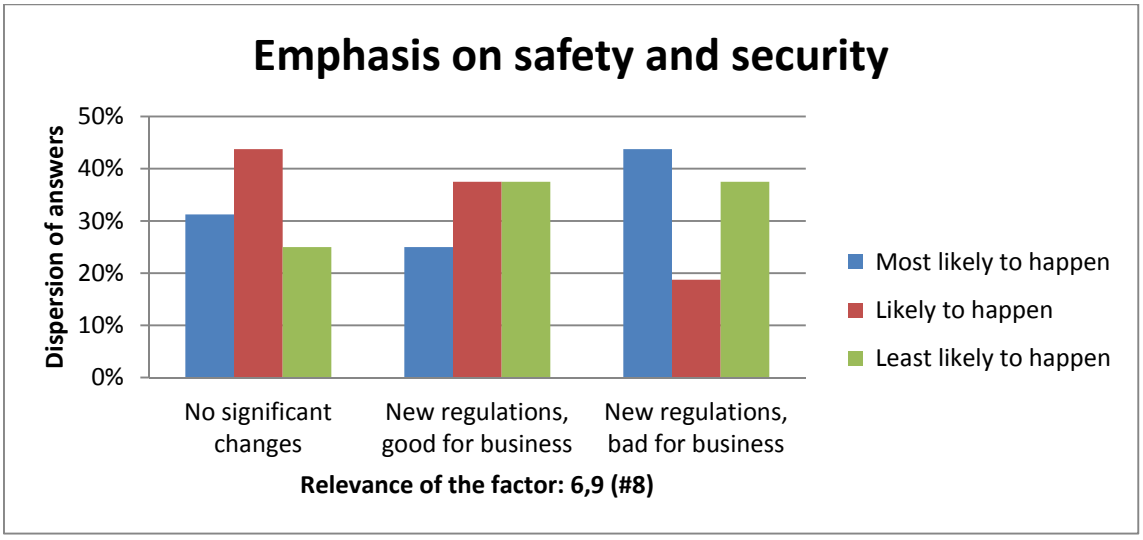

Figure 3.12. Emphasis on safety and security in sea transport.

The number of ports in the BSR is viewed as most likely to experience a minor decrease in the future (Figure 3.13). A remarkable decrease is highly unlikely but, on the other hand, the option where nothing changes is considered least likely to happen. The relevance of this factor affecting future traffic flows is the second last.

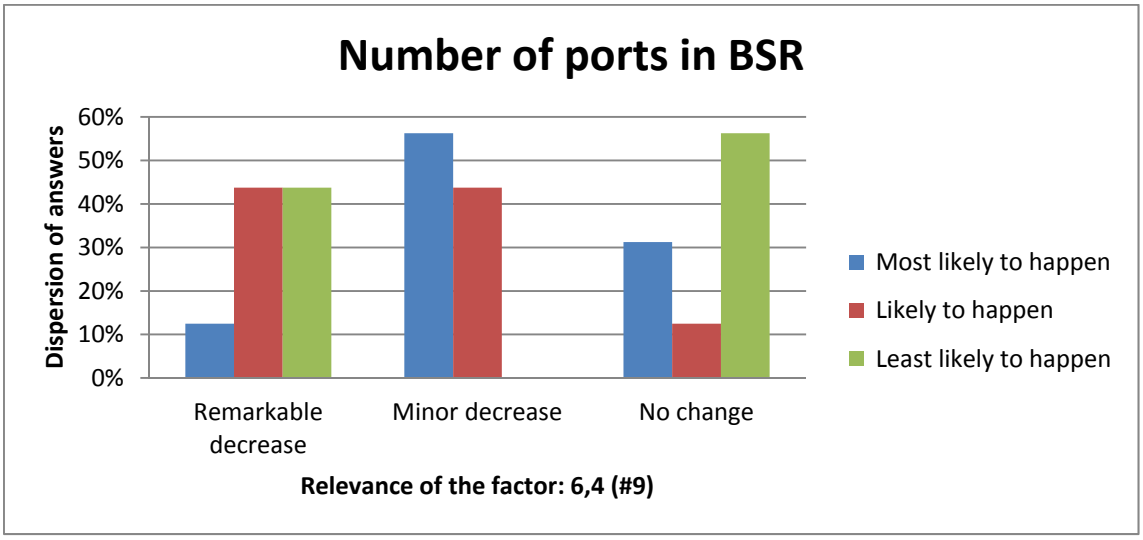

Figure 3.13. Number of ports in the Baltic Sea Region.

The tax-free enabled sales on routes via Åland play a crucial role in the ferry business. Even though the matter has been raised previously, its abolishment before 2020 is very unlikely (Figure 3.14). The relevance of tax-free sales is seen as the last factor that will affect future traffic flows.

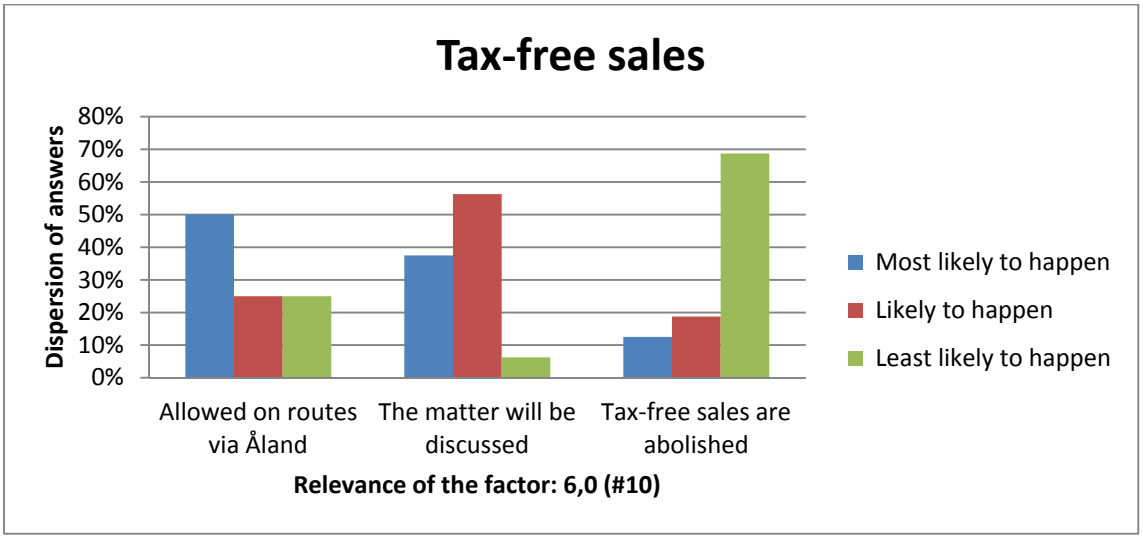

Figure 3.14. The future of tax-free sales.

3.5 Alternative scenarios

The following scenarios were developed according to the results of the futures table method. The first scenario is based on the variables which were considered to be most likely to happen. The second scenario includes the variables which were likely to happen and the third scenario includes the variables which were considered to be the least likely to happen. Key uncertainties – mainly economic growth, bunker costs and Russia – lay the groundwork for the scenarios.

3.5.1 Rising costs – no surprises

The first scenario (Table 3.3) could be described as the baseline scenario where future expectations are moderate, Russia acts as a wildcard, bunker costs continue to rise and the sulphur directive has taken effect and is increasing truck transportation and decreasing shipping. The outlook for the Russian economy is strong, which is expected to increase freight traffic in the Baltic Sea but decrease transit traffic via the PENTA ports. This is especially the opinion of the interviewed logistics companies.

Table 3.3. Rising costs – no surprises.

Rising costs - no surprises
1. Moderate economic growth in BSR
2. Bunker costs double
3. Sulphur directive takes effect as planned
4. Stronger focus on environmental issues with new legislations
5. Significance of Russia increases for trade in BSR
6. Relative share of road transport in BSR increases more than sea or rail transport
7. Growing Russian economy decreases traffic via PENTA ports
8. New safety and security regulations complicate business
9. Minor decrease in the number of ports in BSR
10. Tax-free sales still allowed on routes via Åland

The outcome of the first scenario suggests that ports and shipowners are facing hard times. The number of ports will decrease in the Baltic Sea Region and new legislation regarding the environment, safety and security will further decrease profits. Tax-free enabled ferry traffic on routes via Åland will maintain passenger flows at the current level.

3.5.2 Green concentration

The second scenario – green concentration – envisages a situation in which EU regulations on environmental aspects have tightened but companies have adapted to the regulations and values (Table 3.4). Due to the poor economic situation and high prices of energy and oil, the relative share of sea transportation has increased since it is the most cost efficient mode of transport but at the same time the number of companies operating has decreased. The growing Russian economy has not replaced intra-EU trade as the dominant trade route in BSR.

Table 3.4. Green concentration.

Green concentration
1. Low economic growth in BSR
2. Multiple increases in bunker costs
3. Sulphur directive takes effect as planned
4. Stronger focus on environmental issues, which benefits business
5. Intra-EU trade remains dominant
6. Relative share of sea transport in BSR increases more than road or rail transport
7. Steady Russian economy has no effect on traffic via PENTA ports
8. No significant new safety or security regulations
9. Remarkable decrease in the number of ports in BSR
10. The future of tax-free sales is debated

In this outcome, the traffic between the PENTA ports will increase slowly. However, slow economic growth in the BSR prevents a noteworthy increase in traffic flows but, due to the significance of these routes, the transported units remain at the current level. Finland, Sweden and Estonia manage to take advantage on the tightening environmental aspect and the steady economic growth of Russia neither increases nor decreases traffic between the PENTA ports. The number of ports decreases remarkably but at the same time sea and rail traffic increase, which is the result of a rising awareness of environmental effects. Regulations or directives affecting sea transportation do not increase, but the exemption of VAT sales on routes via Åland is debated.

3.5.3 Good times for shipping

The third scenario projects the most optimistic situation in which all the variables are in favour of the shipping industry (Table 3.5). The growing Russian economy has increased traffic via PENTA ports and the Baltic Sea Region has begun to act as a prominent partner for trade between Europe and Asia. The relative share of rail transportation has also increased and most importantly the sulphur directive has not been fulfilled according to the originally ratified decision.

Table 3.5. Good times for shipping.

Good times for shipping
1. **High economic growth in BSR**
2. **No significant increase in bunker costs**
3. **Sulphur directive not fulfilled as originally ratified**
4. **Significance of Asia increases in trade in BSR**
5. **Relative share of rail transport in BSR increases more than sea or road transport**
6. **Growing Russian economy increases traffic via PENTA ports**
7. **New safety and security regulations are good for business**
8. **No change in the number of ports in BSR**

The possibility of the scenario to occur completely is highly unlikely but some aspects may easily happen. Administrative procedures – including safety and security regulations – are likely to become stricter but the increase in electronic communication will ease daily operations by saving time. Without the full-scale adaptation of the sulphur directive, the number of ports will remain at their present level since smaller ports will not be forced to stop operating as shipping companies will not cease trading.

4 TRAFFIC FORECASTS

This chapter presents the traffic forecasts of the previously discussed scenarios. The transport history and the opinions of the interviewees are shown for each scenario (Figure 4.1) and focus on the following aspects: cargo volume, amount of the transported units, transit traffic, passenger traffic and vessel frequency. In this context the ports' traffic includes only liner traffic with other PENTA ports.

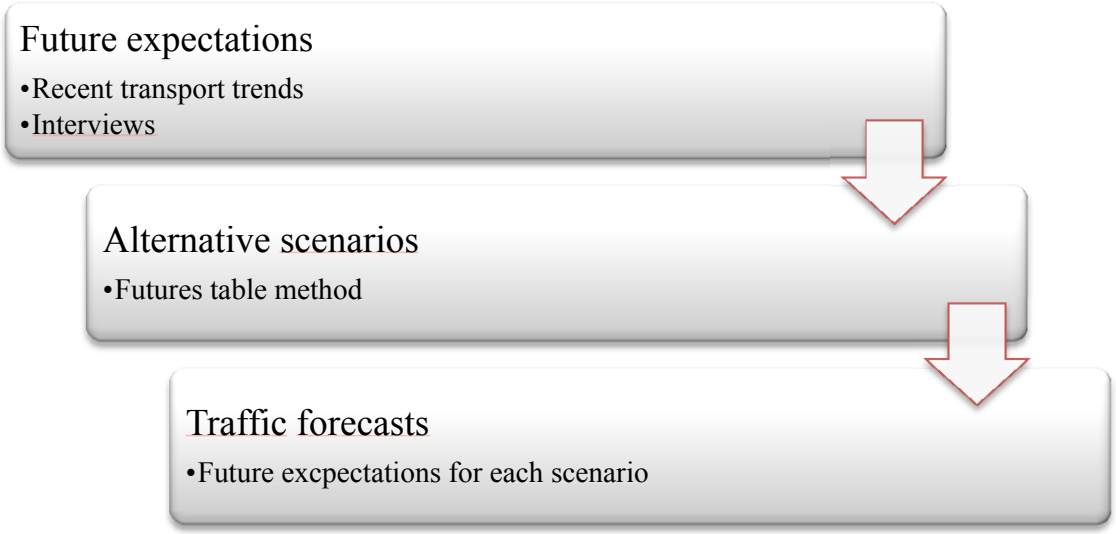

Figure 4.1. The creation of traffic forecasts.

4.1 Forecast in the "Rising costs – no surprises" scenario

In the first scenario the volume of total goods traffic rises steadily due to moderate economic growth in the Baltic Sea Region. The effects of the growing Russian economy are unpredictable but their influence on the transport system between the PENTA ports is slight. Transport between the PENTA countries and Russia remains at the current level. On a broader scale, freight is shipped increasingly straight from Europe to its final destinations and Russia's logistical solutions decrease its traffic via PENTA ports. In addition, Estonia's transit traffic with Finland or Russia does not increase.

The volume of unitised traffic increases in the Baltic Sea area whether it is on ships, trucks or trains. Vessels continue to carry the same cargo as they carry now but the share of fast moving consumer goods will grow. By 2020, the amount of transported trucks and trailers in the BSR is expected to increase by approximately 20%. Road transportation also increases due to the sulphur directive but this has no effect on the existing sea routes between PENTA ports. Tax-free enabled sales also continue to assist the existence of current sea routes. The only decrease in vessel frequency occurs between Estonia and Sweden, but the frequency between Finland and Estonia rises.

Sea faring costs in general will increase due to the sulphur directive and the growth in the price of oil. Passenger traffic between PENTA ports increases in the long run and

the number of ports in the BSR remains at the present level. The merging of port companies takes place and the significance of ports as a passage is emphasised.

Cargo traffic between Stockholm and Turku decreases moderately even though the amount of transported units remains unchanged. As for the route between Stockholm and Helsinki, the volume of cargo traffic increases slowly but the number of transported units remains at the present level. Freight traffic between the Port of Stockholm and the Port of Tallinn increases slowly for both total volume and units. Passenger traffic between Stockholm and Tallinn increases steadily whereas traffic between Stockholm and Helsinki is slightly reduced. Passenger flows between Stockholm and Turku increases to a small extent.

As for cargo traffic in the Port of Kapellskär, volumes between both destinations – Naantali and Paldiski – increase but the relative share of transported units is expected to increase faster. Passenger traffic between Kapellskär and Naantali increases moderately but the flows for Kapellskär-Paldiski remain very modest. The increase in cargo traffic is strongest on the route between the Port of Tallinn and the Port of Helsinki. This applies to both cargo volume and transported units, though the growth is stronger in the latter. Passenger traffic between Tallinn and Helsinki increases steadily.

4.2 Forecast in the "Green concentration" scenario

In the second scenario the growth in total goods traffic is low due to the poor economic situation in the BSR. The bunker costs are expected to increase and longer voyages are favoured due to a rise in the awareness of green issues. The strong economies of Sweden and Finland maintain their cargo traffic between PENTA ports. The share of transit traffic to and from Russia remains at the same level as it is today. Russia's logistic solutions work separately from those of the PENTA countries.

The costs of sea faring increase exceptionally but existing routes and the frequency of shipping between the PENTA ports remains at the current level. The sulphur directive takes effect as planned but, nevertheless, sea transportation increases due to it being more environmentally friendly. The number of ports in the BSR decreases remarkably and existing ports become the focus of certain types of cargo. New environmental regulations affect the ports' operation without reducing profits. Total passenger traffic between PENTA ports increases.

Traffic between the Port of Stockholm and the Port of Turku decreases notably, even though the number of transported units remains at the same level. Traffic flows between Stockholm and Helsinki decreases marginally for both volume and units. Freight traffic between Stockholm and Tallinn decreases as well, but the amount of transported units remains unchanged. Passenger traffic on the routes Stockholm-Turku and Stockholm-Helsinki experiences a small decrease but the passenger flow for Stockholm-Tallinn increases steadily.

The cargo volumes on the routes Kapellskär-Naantali and Kapellskär-Paldiski do not increase even though the number of transported units may rise. Passenger flows for Kapellskär-Naantali remain at the present level but the traffic between Kapellskär and Paldiski decreases. Cargo traffic between the Port of Tallinn and the Port of Helsinki continues to increase for both volumes and transported units. Passenger traffic remains high and experiences gentle growth.

4.3 Forecast for the "Good times for shipping" scenario

In the third scenario the total growth of goods traffic is high due to the improved economic situation in the Baltic Sea Region. The costs of sea freight have not increased significantly and the traffic growth between PENTA ports has been steady. Even though Asian traffic has an increased presence, cargo traffic between Russia and the PENTA countries is also increasing. The amount of transported units in the Baltic Sea Region grows approximately 30% above the 2012 level and transit traffic via PENTA ports increases more than estimated. Estonian transit traffic grows since transportation from Finland to Latvia and Lithuania increases. Estonia also exports more transit goods to Sweden and small amounts of freight to Norway and Denmark via Sweden.

In this scenario the implementation of the sulphur directive does not take place according to the original decision and the usage of all transport modes increases. Current sea routes remain in use and the low development of bunker costs does not force industries to seek alternative routes for transportation. The vessel equipment between PENTA ports becomes similar and passenger traffic increases. One visible change is the increasing amount of Russian passengers between Finland and Sweden, though the growth in passenger traffic between Estonia and Sweden is faster. The largest ports in the Baltic Sea Region continue to grow even though the amount of ports remains unchanged. Furthermore, the ports offer a wider range of services.

Cargo traffic between the Port of Stockholm and the Port of Turku shows an upward trend for both volumes and transported units. The cargo flows for Stockholm-Helsinki also increase volume-wise but not for units. On the Stockholm-Tallinn route cargo- and unitised traffic both increase as does that between Turku and Stockholm, although traffic between Helsinki and Stockholm remains at its current level. The most visible increase in passenger traffic from the point on view of the Port of Stockholm happens for Tallinn-Stockholm.

Cargo traffic on the routes Kapellskär-Naantali and Kapellskär-Paldiski both increase but the relative share of transported units increases even more. Passenger traffic between Naantali and Kapellskär increases as well but the flows on the route Paldiski-Kapellskär remain unchanged. The total goods volume as well as the amount of transported units increases strongly on the route Tallinn-Helsinki, but the relative growth in traffic between Estonia and Sweden increases even faster, while the considerable growth in passenger traffic between Finland and Estonia continues.

5 CONCLUSIONS

Predicting future operating environments as well as anticipated traffic flows is significant for ports in many ways. Having relevant information about likely events is essential if the right investment decisions are to be made in order to develop business. A clear outlook also enables ports to react and be proactive towards undesirable events. In addition to the ports, the correct investment decisions are important for shipowners and other parties in the supply chain.

This report is divided into three main sections. The first part presents future expectations based on transport history and the results of the interviews. Traffic flow trends are easy to identify by observing traffic history, but without knowledge about likely future events the creation of traffic forecasts would be inaccurate. The most important factors affecting future traffic flows in economic terms became very clear during the project. Based on these factors and the futures table method, three alternative scenarios describing the operating environment in the Baltic Sea Region in 2020 were developed. These are presented in the second part of the report. The third part described each scenario's future traffic flows.

"Rising costs – no surprises," is the most realistic scenario and it closely follows today's expectations. In this scenario economic growth in the BSR is moderate and bunker costs double. The sulphur directive takes effect as planned and the growing Russian economy increases trade in the BSR but decreases traffic via PENTA ports. The "Green concentration" scenario projects a situation in which EU regulations on environmental aspects have tightened, but companies have managed to adapt and do business with green values. The economic growth in the BSR is predicted to be low and bunker costs are expected to increase considerably. Nevertheless, environmental issues are promoted, which is why the relative share of sea transportation increases more compared to road or rail. The tightening of competition is expected to force smaller ports out of business, even though the Russian economy does not decrease traffic via PENTA ports. Intra EU-trade is still dominant but the future of tax free-sales, which has a remarkable effect on the transport system between PENTA ports, is debated. The third scenario describes the most optimistic prospect which is why it is named "Good times for shipping". In this scenario economic growth in the BSR is high and the increase in bunker costs is not significant. Policymakers also postpone the full implementation of the sulphur directive and the growing Russian economy increases traffic moving through PENTA ports. The number of ports in the BSR remains as it is today and the relative share of transport by rail increases more compared to sea or road transport.

In the first scenario the volume of total goods traffic between the PENTA ports rises steadily due to moderate economic growth in the Baltic Sea Region. The amount of transported trucks and trailers increases by approximately 20%. The relative share of road transportation increases most – due to the sulphur directive – but this has no effect on the existing sea routes between PENTA ports. In the second scenario the focus in on green values and this means the costs related to maritime traffic increase. The growth in total goods traffic is low due to the poor economic situation and because bunker costs have increased remarkably. Nevertheless, longer voyages are favoured due to a rising

awareness of green issues. In the third scenario economic growth is high and traffic flows increase. The costs of sea freight do not increase significantly and traffic growth between PENTA ports remains steady. The amount of transported units in the Baltic Sea Region grows by approximately 30% and the implementation of sulphur directive does not occur as ratified. The use of all transport modes increases.

Based on recent transport history, the outlook for the Port of Stockholm is steady. The only deficit in cargo traffic occurs on the route Stockholm-Turku, even though the number of transported units may increase. Freight traffic in terms of weight and units for Stockholm-Tallinn increases but remains modest for Stockholm-Helsinki. The future for passenger traffic departing from the Port of Stockholm is promising and the flows are set to increase, especially on routes to Turku and Tallinn. The future of cargo traffic in the Port of Kapellskär is bright as well. The volumes for the Kapellskär-Naantali and Kapellskär-Paldiski routes are also set to increase and the amount of transported units should increase even faster. Future passenger traffic to the Port of Kapellskär looks encouraging as well. However, most of the passengers are truck drivers, which limits the growth potential. For the Port of Tallinn, cargo traffic as well as the amount of transported units for Helsinki-Tallinn continues to increase, whereas the increase in freight traffic between Swedish ports remains low. Passenger traffic in the Port of Tallinn increases for all routes. The tremendous growth of cargo traffic in the Port of Helsinki continues as does the growth in passenger traffic for Helsinki-Tallinn. The flows for Helsinki-Stockholm will remain stable or face a minor decrease, especially for passenger traffic. In the Port of Turku, passenger traffic to the Port of Stockholm will increase, even though cargo traffic slowly decreases. The amount of transported units most likely remains at its present level. Finally, traffic flows between Naantali and Kapellskär increase in terms of tonnes, units and pax.

According to the interviews, cargo traffic in the Baltic Sea will increase strongly in the next 10 years. The future development of cargo traffic is strongly dependent on the growth of GDP in each country and the largest driving force behind the growing trade in the BSR is the increasing trade between Russia and Germany. The strong economies in Sweden and Finland will increase cargo traffic between the PENTA countries. The interviewees are of the opinion that by 2020 the volume of trucks and trailers transported between PENTA ports will increase by approximately 20% to 30% and the number of transported units will increase faster than the volume of goods. As for passenger traffic, the routes between Finland and Sweden have been stable for a while but the new ferry will increase people's interest in the Turku-Stockholm route. Passenger traffic between Helsinki and Tallinn is set to continue to increase but the cost structure and the price level in Estonia are key issues when future passenger traffic between the PENTA ports is analysed. The future for transit traffic in the PENTA ports is difficult to estimate but the prediction is that future cargo flows will be shipped increasingly straight from Europe to their final destinations. This presumably means that the transit share in PENTA ports will not rise anymore. However, conventional foreign trade will maintain the utilisation rate of ferries at a high level and possible capacity limitations will be solved with a higher frequency of crossings.

The sulphur directive is a subject which easily generates discussion and also divides opinions. In general, industrial enterprises, ports and shipowners perceive it as a major threat towards the competitiveness and foreign trade of nations in the Baltic Sea. The interviewees believe the sulphur directive will reduce sea traffic and increase truck transportation. The investigation of cost-efficient transport alternatives is a constant mission and currently it would seem that in 2015 road transportation from Finland to Germany will be cheaper than sea transportation.

The growing Russian economy as well as the developments in the Russian Baltic Sea ports will play an important role in the future of freight traffic. In general, most of the interviewees have similar opinions about likely future developments in the BSR but Russia's effect on traffic in the PENTA ports divides opinion. The shipowners and ports are of the opinion that the growing Russian economy and the rising significance of Saint Petersburg and Ust Luga will increase traffic via PENTA ports, whereas logistics companies stress that the current development will inevitably lead to a decrease in transported goods via Sweden, Finland and Estonia. In the short run, cargo traffic may increase, since the Russian supply chain is not ready to fully operate on its own. In the long run, cargo traffic via PENTA ports will decrease. Finally, the importance of green values will increase in the future. Rapid economic growth often causes an increase in emissions but high environmental values can also create a competitive edge. However, operating costs are often higher, too.

The Baltic Sea is a special area and its position and significance should be emphasised by the European Union. In general, the outlook for the traffic flows between the PENTA ports in 2020 is positive and the increase in transported units is expected to be faster compared to the increase in volumes transported. Passenger traffic is expected to increase as well but the reasons for people travelling between the ports may change. Even in the near future, new challenges for each member of the supply chain are expected and closer co-operation between different parties will thus become one of the main ways of keeping operations profitable.

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APPENDICES

Appendix 1: Interview form

PENTA

PENTA Project - WP2 interview

Date:
Time:
Venue:
Interviewee:
Interviewer:

The goal is to create a vision of the upcoming cargo and passenger flows between PENTA ports in 2020

1. Key factors for demand and drivers affecting port-to-port flows (PESTE Methodology)
    a. Stockholm
    b. Tallinn
    c. Helsinki
    d. Turku
    e. Naantali

2. Cargo traffic
    a. Most significant commodity groups in general cargo
    b. Customers and branch structure (Industry/Trade/Consumer)
    c. Future development of cargo traffic between PENTA ports

3. Unitized traffic
    a. Most significant commodity groups in unitized cargo
    b. Customers and branch structure (Industry/Trade/Consumer)
    c. Future development of unitized traffic (Containers, Trucks & Trailers, Rail waggons) between PENTA ports

4. Transit traffic
    a. Most significant commodity groups in transit cargo
    b. Customers and branch structure (Industry/Trade/Consumer)
    c. Future development of transit traffic between PENTA ports

5. Passenger traffic
    a. General development of passenger traffic in PENTA ports
    b. Future development of passenger traffic between PENTA port
    c. The most significant changes in passenger traffic between the best known port for the interviewee and other PENTA ports

6. Vessel traffic
    a. General development of vessel calls in PENTA ports
    b. Future development of vessel traffic between PENTA ports
    c. The most significant changes in vessel calls in the best know port for the interviewee

7. Other arguments of essential and possible future developments in cargo or passenger traffic between PENTA ports
    a. Role of St.Petersburg
    b. The number of liner shipping companies operating between PENTA ports
    c. Changing timetable while operating between PENTA ports
    d. Other issues

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Appendix 2: Interviewees

Person	Company	Position	Date	Place	Interviewer
Ain Tulvi	PROLOG	Member of the Board	12.3.2012	Tallinn	Reima Helminen
Alvar Tõruke	DSV Transport AS	Logistics Director	12.3.2012	Tallinn	Reima Helminen
Andres Hunt	AS Tallink Grupp	Member of the management board	29.3.2012	Tallinn	Tõnis Hunt
Anne-Marget Niemi	Turku Touring	Director of Tourism	15.8.2011	Turku	Anssi Lappalainen
Bjarne Karlsson	Schenker Oy	Director, International Land Transport	11.10.2011	Helsinki	Anssi Lappalainen
Christer Backman	Finnlines Plc	Executive Advisor	9.9.2011	Naantali	Anssi Lappalainen
Christian Ramberg	Port of Turku	Managing Director	1.7.2011	Turku	Anssi Lappalainen
Erik Ringmaa	Port of Tallinn	Chief Commercial Officer	3.2.2012	Tallinn	Tõnis Hunt
Eve Tuomola	Port of Helsinki	Office Manager	30.8.2011	Helsinki	Anssi Lappalainen
Göran Palsson	DHL Freight (Sweden) Ab	Head of Nordics	11.1.2012	Telephone	Maria Mustonen
Hannu Lakso	DSV Road Oy	Division Director, Central Europe	19.10.2011	Vantaa	Anssi Lappalainen
Harri Tamminen	Viking Line Abp	Freight Director	2.9.2011	Turku	Anssi Lappalainen
Henrik Widerståhl	Ports of Stockholm	Head of Marketing	11.11.2011	Stockholm	Janni Jensen
Jarmo Lilja	Suomen Kaukokiito Oy	Regional Director	7.9.2011	Turku	Anssi Lappalainen
Kari Peltonen	Oy FinnLink Ab	Line Manager	24.8.2011	Naantali	Anssi Lappalainen
Kim Södeström	Tallink Silja Oy	Area Director	9.9.2011	Turku	Anssi Lappalainen
Krister Sigfrids	SeaRail Oy	Executive Director	1.9.2011	Turku	Anssi Lappalainen
Kristo Vrager	Schenker AS	Director, Air and Ocean	29.3.2012	Tallinn	Reima Helminen
Lennart Stjärnström	Stjärnströms Int. Ab	Operations Manager	17.1.2012	Telephone	Maria Mustonen
Marina Hasselblatt	Tallink Silja Oy	Sales Manager, Cargo Services	9.9.2011	Turku	Anssi Lappalainen
Markku Onniselkä	Eckerö Line Ab oy	Freight Director	16.9.2011	Helsinki	Anssi Lappalainen
Markus Nyman	Oy Kuehne + Nagel Ltd	Managing Director	5.12.2011	Vantaa	Anssi Lappalainen
Meelike Paalberg	Itella Logistics OÜ	Country Manager	15.2.2012	Tallinn	Tõnis Hunt
Mihael Hagström	Schenker Oy	Director, Sales and Marketing	12.9.2011	Turku	Anssi Lappalainen
Patrik Larsson	DSV Road Ab	Business Area Manager Baltic	11.1.2012	Telephone	Maria Mustonen
Pekka Stenqvist	DHL Freight (Finland) Oy	Head of West Europe Traffic & National Production	17.11.2011	Vantaa	Anssi Lappalainen
Roland Forssman	Kuehne + Nagel Ab	Traffic Manager Stockholm	19.1.2012	Telephone	Maria Mustonen
Thomas Käll	DSV Road Ab	Business Area Manager, Finland	11.1.2012	Telephone	Maria Mustonen
Yrjö Vainiala	Port of Naantali	Port Director	31.8.2011	Naantali	Anssi Lappalainen

Appendix 3: Traffic between the PENTA ports

Stockholm - other ports												
	2010				2005				2000			
CARGO TRAFFIC	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**
Cargo traffic in total (including transit traffic)												
Export	313 856	0	116 444	820 012	285 069	0	78 108	951 872	288 527	0	117 140	967 315
Import	307 707	7 319	165 073	804 392	300 877	460	173 497	1 007 821	334 818	14 194	147 042	1 009 985
In total	**621 563**	**7 319**	**281 517**	**1 624 404**	**585 946**	**460**	**251 605**	**1 959 693**	**623 345**	**14 194**	**264 182**	**1 977 300**
Transit traffic												
Export	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Import	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
In total	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
UNITIZED TRAFFIC	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**
Unitized traffic in total (including transit traffic)												
Export	313 856	0	116 444	820 012	285 069	0	72 226	951 872	288 527	0	117 140	967 315
Import	307 707	0	127 135	804 392	300 877	0	70 053	1 007 821	334 818	0	126 615	1 009 985
In total	**621 563**	**0**	**243 579**	**1 624 404**	**585 946**	**0**	**142 279**	**1 959 693**	**623 345**	**0**	**243 755**	**1 977 300**
Containers (Pcs)												
Export	141	0	0	0	10	0	0	225	10	0	0	174
Import	56	0	0	110	9	0	0	526	0	0	0	190
In total	**197**	**0**	**0**	**110**	**19**	**0**	**0**	**751**	**10**	**0**	**0**	**364**
Trucks & Trailers (Pcs)												
Export	19 438	0	10 811	46 673	19 329	0	5 837	44 714	19 464	0	19 328	47 742
Import	19 710	0	11 167	43 200	19 265	0	7 959	43 299	20 799	0	22 036	47 738
In total	**39 148**	**0**	**21 978**	**89 873**	**38 594**	**0**	**13 796**	**88 013**	**40 263**	**0**	**41 364**	**95 480**
Rail waggons (Pcs)												
Export	0	0	0	1 968	0	0	0	5 263	0	0	0	4 874
Import	0	0	0	1 944	0	0	0	5 226	0	0	0	4 886
In total	**0**	**0**	**0**	**3 912**	**0**	**0**	**0**	**10 489**	**0**	**0**	**0**	**9 760**
PASSENGER TRAFFIC	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**
Passengers (Pcs)	2 408 556	0	849 938	3 247 709	2 487 817	0	554 369	2 754 506	2 587 793	0	442 659	3 976 115
VESSEL TRAFFIC	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**	**Helsinki**	**Naantali**	**Tallinn**	**Turku**
Vessel calls	724	3	355	1 729	720	1	348	1 846	725	1	386	2 309
Sources: The Ports of Stockholm, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.												

Kapellskär - other ports									
	2010			2005			2000		
CARGO TRAFFIC	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**
Cargo traffic in total (including transit traffic)									
Export	1 036 215	173 112	0	1 097 086	213 415	80 713	881 112	138 168	0
Import	1 029 102	253 911	0	1 009 677	219 550	59 004	860 831	125 140	0
In total	**2 065 317**	**427 023**	**0**	**2 106 763**	**432 965**	**139 717**	**1 741 943**	**263 308**	**0**
Transit traffic									
Export	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	0
Import	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	0
In total	**N/A**	**N/A**	**0**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0**
UNITIZED TRAFFIC	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**
Unitized traffic in total (including transit traffic)									
Export	1 036 215	173 112	0	1 097 086	213 415	80 713	881 112	138 168	0
Import	1 029 102	253 911	0	1 009 677	219 550	59 004	860 831	125 140	0
In total	**2 065 317**	**427 023**	**0**	**2 106 763**	**432 965**	**139 717**	**1 741 943**	**263 308**	**0**
Containers (Pcs)									
Export	0	0	0	0	0	0	0	0	0
Import	0	0	0	0	0	0	0	0	0
In total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Trucks & Trailers (Pcs)									
Export	66 561	13 544	0	65 243	16 698	4 516	50 535	9 441	0
Import	57 641	20 594	0	53 971	18 229	2 684	43 890	8 634	0
In total	**124 202**	**34 138**	**0**	**119 214**	**34 927**	**7 200**	**94 425**	**18 075**	**0**
Rail waggons (Pcs)									
Export	0	0	0	0	0	0	0	0	0
Import	0	0	0	0	0	0	0	0	0
In total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PASSENGER TRAFFIC	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**
Passengers (Pcs)	178 364	36 008	0	188 463	208 760	698 272	96 450	19 109	0
VESSEL TRAFFIC	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**	**Naantali**	**Paldiski**	**Turku**
Vessel calls	1 013	544	0	995	662	233	1 017	308	0

Sources: The Ports of Stockholm, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.
NB: Figures of Paldiski include both Paldiski South Harbour (member of the Port of Tallinn) and Paldiski North Harbour (private-owned).

Tallinn - other ports

	2010					2005					2000				
CARGO TRAFFIC	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**
Cargo traffic in total (including transit traffic)															
Export	1 455 250	122 252	9 469	178 512	6 763	857 789	230 900	95 227	200 527	283	430 298	0	235 855	321 980	32 665
Import	1 346 414	75 347	44 640	118 287	34	1 220 921	229 825	8 399	81 561	8 544	695 751	0	41 706	272 852	2
In total	**2 801 664**	**197 599**	**54 109**	**296 799**	**6 797**	**2 078 710**	**460 725**	**103 626**	**282 088**	**8 827**	**1 126 049**	**0**	**277 561**	**594 832**	**32 667**
Transit traffic															
Export	N/A	0	6 355	50 229	N/A	95 800	0	53 962	118 712	N/A	43 174	0	231 230	30 630	1 068
Import	N/A	0	0	0	N/A	0	0	0	0	N/A	0	0	0	0	0
In total	**N/A**	**0**	**6 355**	**50 229**	**N/A**	**95 800**	**0**	**53 962**	**118 712**	**N/A**	**43 174**	**0**	**231 230**	**30 630**	**1 068**
UNITIZED TRAFFIC	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**
Unitized traffic in total (including transit traffic)															
Export	1 371 468	122 252	N/A	128 283	215	729 551	230 900	N/A	81 815	86	380 351	0	N/A	291 350	325
Import	1 345 829	75 347	N/A	118 287	0	1 204 582	229 825	N/A	81 561	120	677 437	0	N/A	272 852	0
In total	**2 717 297**	**197 599**	**N/A**	**246 570**	**215**	**1 934 133**	**460 725**	**N/A**	**163 376**	**206**	**1 057 788**	**0**	**N/A**	**564 202**	**325**
Containers (Pcs)															
Export	1 439	N/A	N/A	N/A	8	1 302	N/A	N/A	N/A	0	1 282	0	N/A	1 655	48
Import	1 017	N/A	N/A	N/A	0	711	N/A	N/A	N/A	55	761	0	N/A	2 090	0
In total	**2 456**	**N/A**	**N/A**	**N/A**	**8**	**2 013**	**N/A**	**N/A**	**N/A**	**55**	**2 043**	**0**	**N/A**	**3 745**	**48**
Trucks & Trailers (Pcs)															
Export	117 676	10 150	N/A	11 350	N/A	81 147	17 606	N/A	7 658	17	51 539	0	N/A	11 726	49
Import	118 847	5 880	N/A	10 922	N/A	91 274	15 928	N/A	5 932	0	54 541	0	N/A	10 730	0
In total	**236 523**	**16 030**	**N/A**	**22 272**	**N/A**	**172 421**	**33 534**	**N/A**	**13 590**	**17**	**106 080**	**0**	**N/A**	**22 456**	**49**
Rail waggons (Pcs)															
Export	N/A	N/A	N/A	N/A	N/A	7	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A
Import	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A
In total	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**7**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0**	**N/A**	**N/A**	**N/A**
PASSENGER TRAFFIC	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**
Passengers (Pcs)	6 967 055	15 097	N/A	973 355	N/A	6 086 919	146 226	N/A	709 240	N/A	6 227 349	0	N/A	479 579	N/A
VESSEL TRAFFIC	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**	**Helsinki**	**Kapellskär**	**Naantali**	**Stockholm**	**Turku**
Vessel calls	3 903	272	13	461	53	7 734	598	6	430	74	5 915	0	60	434	58

Sources: The Port of Tallinn, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.

NB: In this context the route between Tallinn and Kapellskär is the route between Paldiski South Harbour and Kapellskär.

Helsinki - other ports						
	2010		**2005**		**2000**	
CARGO TRAFFIC	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**
Cargo traffic in total (including transit traffic)						
Export	1 346 414	305 862	1 220 921	298 532	695 751	333 075
Import	1 455 250	311 793	857 789	281 403	430 298	291 128
In total	**2 801 664**	**617 655**	**2 078 710**	**579 935**	**1 126 049**	**624 203**
Transit traffic						
Export	2 767	1 644	7 917	2 122	6 951	2 884
Import	39 987	10 554	1 405	13 290	1 608	8 636
In total	**42 754**	**12 198**	**9 322**	**15 412**	**8 559**	**11 520**
UNITIZED TRAFFIC	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**
Unitized traffic in total (including transit traffic)						
Export	1 345 829	305 726	1 204 582	298 377	677 437	330 563
Import	1 371 468	311 067	729 551	280 524	380 351	287 486
In total	**2 717 297**	**616 793**	**1 934 133**	**578 901**	**1 057 788**	**618 049**
Containers (Pcs)						
Export	1 017	N/A	711	9	761	0
Import	1 439	N/A	1 302	10	1 282	10
In total	**2 456**	**N/A**	**2 013**	**19**	**2 043**	**10**
Trucks & Trailers (Pcs)						
Export	118 847	19 429	91 274	19 024	54 541	20 667
Import	117 676	19 116	81 147	18 387	51 539	20 246
In total	**236 523**	**38 545**	**172 421**	**37 411**	**106 080**	**40 913**
Rail waggons (Pcs)						
Export	N/A	N/A	0	N/A	N/A	N/A
Import	N/A	N/A	7	N/A	N/A	N/A
In total	**N/A**	**N/A**	**7**	**N/A**	**N/A**	**N/A**
PASSENGER TRAFFIC	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**
Passengers (Pcs)	6 967 055	2 350 405	6 086 919	2 517 759	6 227 349	2 675 106
VESSEL TRAFFIC	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**	**Tallinn**	**Stockholm**
Vessel calls	5 291	about 720	N/A	about 720	N/A	about 720

Sources: The Port of Helsinki, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.

Turku - other ports									
	2010			2005			2000		
CARGO TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Cargo traffic in total (including transit traffic)									
Export	0	802 406	34	53 546	1 014 868	8 544	6 053	1 048 837	2
Import	0	820 392	6 763	70 853	962 384	283	4 171	1 004 807	32 665
In total	**0**	**1 622 798**	**6 797**	**124 399**	**1 977 252**	**8 827**	**10 224**	**2 053 644**	**32 667**
Transit traffic									
Export	0	6 028	0	2 069	8 354	1	13	3 439	0
Import	0	6 298	44	7 790	45 776	0	187	16 815	2
In total	**0**	**12 326**	**44**	**9 859**	**54 130**	**1**	**200**	**20 254**	**2**
UNITIZED TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Unitized traffic in total (including transit traffic)									
Export	0	801 716	0	53 544	1 014 383	120	5 157	989 049	0
Import	0	805 156	215	70 853	929 430	86	3 961	936 048	325
In total	**0**	**1 606 872**	**215**	**124 397**	**1 943 813**	**206**	**9 118**	**1 925 097**	**325**
Containers (Pcs)									
Export	0	105	0	2	526	55	N/A	190	0
Import	0	48	8	0	225	0	N/A	174	48
In total	**0**	**153**	**8**	**2**	**751**	**55**	**N/A**	**364**	**48**
Trucks & Trailers (Pcs)									
Export	0	42 694	N/A	2 816	43 629	0	337	44 718	0
Import	0	46 292	N/A	3 990	45 556	17	228	47 742	49
In total	**0**	**88 986**	**N/A**	**6 806**	**89 185**	**17**	**565**	**92 460**	**49**
Rail waggons (Pcs)									
Export	0	1 952	N/A	N/A	5 290	N/A	N/A	4 760	N/A
Import	0	1 983	N/A	N/A	5 276	N/A	N/A	4 757	N/A
In total	**0**	**3 935**	**N/A**	**N/A**	**10 566**	**N/A**	**N/A**	**9 517**	**N/A**
PASSENGER TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Passengers (Pcs)	0	3 003 146	N/A	611 768	2 619 023	N/A	73 374	3 440 438	N/A
VESSEL TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Vessel calls	0	1 735	47	N/A	2 090	64	N/A	2 118	55

Sources: The Port of Turku, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.

Naantali - other ports									
	2010			**2005**			**2000**		
CARGO TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Cargo traffic in total (including transit traffic)									
Export	1 029 233	1 416	44 640	981 189	2 345	8 399	855 803	9 637	41 706
Import	1 034 195	0	9 469	1 104 973	0	95 227	878 051	2 553	235 855
In total	**2 063 428**	**1 416**	**54 109**	**2 086 162**	**2 345**	**103 626**	**1 733 854**	**12 190**	**277 561**
Transit traffic									
Export	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A
Import	N/A	N/A	N/A	N/A	N/A	N/A	1 245	N/A	N/A
In total	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**1 245**	**N/A**	**N/A**
UNITIZED TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Unitized traffic in total (including transit traffic)									
Export	1 022 523	N/A	N/A	973 149	N/A	N/A	846 582	N/A	N/A
Import	1 032 957	N/A	N/A	1 103 628	N/A	N/A	865 631	N/A	N/A
In total	**2 055 480**	**N/A**	**N/A**	**2 076 777**	**N/A**	**N/A**	**1 712 213**	**N/A**	**N/A**
Containers (Pcs)									
Export	N/A	N/A	N/A	N/A	N/A	N/A	2	N/A	N/A
Import	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A
In total	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**2**	**N/A**	**N/A**
Trucks & Trailers (Pcs)									
Export	58 502	N/A	N/A	53 575	N/A	N/A	43 655	N/A	N/A
Import	68 602	N/A	N/A	66 095	N/A	N/A	49 797	N/A	N/A
In total	**127 104**	**N/A**	**N/A**	**119 670**	**N/A**	**N/A**	**93 452**	**N/A**	**N/A**
Rail waggons (Pcs)									
Export	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Import	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
In total	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
PASSENGER TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Passengers (Pcs)	171 054	N/A	N/A	121 301	N/A	N/A	94 102	N/A	N/A
VESSEL TRAFFIC	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**	**Kapellskär**	**Stockholm**	**Tallinn**
Vessel calls	1 012	0	18	N/A	N/A	N/A	N/A	N/A	N/A
Sources: The Port of Naantali, MARTINA-database, Finnish Maritime Administration, The Finnish Transport Agency.									

University of Turku
CENTRE FOR MARITIME STUDIES

FI–20014 TURUN YLIOPISTO

http://mkk.utu.fi

Turun yliopisto
University of Turku