

The Competitiveness of Global Port-Cities:

The Case of Helsinki - Finland






Please cite this paper as:

Merk, O., Hilmola, O-P, Dubarle, P. (2012), "The Competitiveness of Global Port-Cities: the Case of Helsinki", OECD Regional Development Working Papers, 2012/08, OECD Publishing
http://dx.doi.org/ 10.1787/5k92z70x5v7g-en

OECD Regional Development Working Papers, 2012/08

Olaf Merk, Olli-Pekka Hilmola, Patrick Dubarle

JEL classification: R41, R11, R12, R15, L91, D57

OECD REGIONAL DEVELOPMENT WORKING PAPERS

This series is designed to make selected OECD studies on regional development issues available to a wider readership. Authorship is usually collective, but principal authors are named. The papers are generally available in their original language, either English or French, with a summary in the other if provided.

This work is published on the sole responsibility of the author(s). The opinions expressed and arguments employed herein do not necessarily reflect the official views of the OECD or of the governments of its member countries.

Comment on the series is welcome, and should be sent to gov.contact@oecd.org or the Public Governance and Territorial Development Directorate, 2, rue André Pascal, 75775 PARIS CEDEX 16, France.

OECD Regional Development Working Papers are published on
www.oecd.org/gov/regional/workingpapers

Applications for permission to reproduce or translate all or part of this material should be made to: OECD Publishing, rights@oecd.org or by fax +33 1 45 24 99 30.

© OECD 2012

© OECD 2012

Photo credits (from left to right): © Mikael Kaplar/Studio POiNT, © Skyfoto, © Heikki Nissinen

ABSTRACT

This working paper offers an evaluation of the performance of the Port of Helsinki, as well as an analysis of the port's impact on its territory and an assessment of relevant policies and governance. It examines declining port performance in the last decade and identifies the principal factors that have contributed to it. In addition, the report studies the potential for synergies between the Helsinki and HaminaKotka ports. The study also considers the effect of these ports on economic and environmental questions. Specifically, the paper outlines the impact of the Helsinki port's operations, and shows how its activities spill over into other regions. The report also assesses major policies governing the port, as well as transport and economic development, the environment and spatial planning. These policies include measures instituted by the Helsinki Port Authority and local, regional and national governments. Governance mechanisms at these different levels are described and analysed. Based on the report's findings, proposed recommendations aim to improve port performance and increase the positive effects of the port on its territory.

JEL classification: R41, R11, R12, R15, L91, D57

Keywords: ports, regional development, regional growth, urban growth, inter-regional trade, transportation

FOREWORD

This working paper is one in a series of *OECD Working Papers on Regional Development* published by the OECD Public Governance and Territorial Development Directorate. It is the third case study of the *OECD Port Cities Programme*. This paper was written by Olaf Merk (Administrator, Regional Development Policy Division), Olli-Pekka Hilmola (Lappeenranta University of Technology) and Patrick Dubarle (Consultant). It was directed by Olaf Merk, under the responsibility of Joaquim Oliveira Martins (Head of the Regional Development Policy Division). The publication was edited by Caitlin Connelly.

The paper can be downloaded on the OECD website: www.oecd.org/regional/portcities.

Further enquiries about this work in this area should be addressed to:

Olaf Merk (olaf.merk@oecd.org) of the OECD Public Governance and Territorial Development Directorate.

TABLE OF CONTENTS

ABSTRACT 3
FOREWORD 4
EXECUTIVE SUMMARY 8
POLICY RECOMMENDATIONS 9
1. PERFORMANCE 10
2. IMPACT 24
3. POLICIES AND GOVERNANCE 29
BIBLIOGRAPHY 36

Tables

Table 1. Growth rates per commodity category in main ports in Finland 12
Table 2. Outbound (shipped) containers from Helsinki and HaminaKotka seaports (2006-09) 14
Table 3. Overlaps in commodities handled by the ports of Helsinki and HaminaKotka 20
Table 4. Employment and value added in main Finnish ports 24
Table 5. The maritime cluster in Finland 26
Table 6. Main co-patent regions in shipping (with Helsinki; 2005-07) 27

Figures

Figure 1. Throughput volume of major ports in Finland (mln tonnes, 2010) 10
Figure 2. Container throughput in major ports in Finland (TEUs, 2010) 11
Figure 3. Port profiles of major Finnish ports (2010) 11
Figure 4. Growth rates 2001-2010 of major Finnish ports 13
Figure 5. Helsinki share of eastbound and total transit volumes of Finnish ports 13
Figure 6. Development transit traffic containers for Helsinki and Hamina Kotka 14
Figure 7. Number of trucks and semi-trailers handled in Helsinki and other Finnish ports 15
Figure 8. Railway freight market in Finland 17
Figure 9. Railway transportation volumes and market share in Finland 17
Figure 10. Transportation flow balance between Europe and Russia 19
Figure 11. Overlapping links of Helsinki and Kotka ports 21
Figure 12. Overlapping links of Helsinki and Hamina ports 21
Figure 13. Overlapping links Kotka and Hamina ports 22
Figure 14. Shares of Helsinki and southern Finland in world wide patents in shipping 26
Figure 15. Shares of Helsinki and rest of southern Finland in national patents in shipping 27

Boxes

Box 1. The Helsinki-Tallinn Route....22
Box 2. Main manufacturers and logistics companies using the Port of Helsinki....25
Box 3. Competence cluster programmes: the case of maritime activities....30
Box 4. Logistics research and training in Helsinki....30
Box 5. Rail Baltica....31
Box 6. Green programmes for the Baltic Sea....34

LIST OF ACRONYMS AND ABBREVIATIONS

CoE	Centres of Expertise
EU	European Union
EUR	euros
IMO	International Maritime Organization
R&D	research and development
ROPAX	Roll-on/Roll-off Passenger
RORO	roll-on/roll-off
TEN-T	European Union Trans-European Transport
TEU	Twenty-foot equivalent unit
VTMIS	Vessel Traffic Management and Information Service

EXECUTIVE SUMMARY

Over the last decade, the Port of Helsinki's **growth performance has been disappointing**. The port's annual average growth rate was negative (-0.5%) over 2001-10, in contrast to 1.8% average growth rate of all Finnish ports over this period. Declining growth in Helsinki coincides with a significant r loss of transhipment traffic since 2004 (from 26.2% of total Finnish transhipment in 2004 to 3.8% in 2010). However, the Port of Helsinki continues to be the leading national port in roll-on/roll-off (RoRo) traffic (*i.e.* trucks and semi-trailers), in addition to the third largest port and second largest container port.

Due to high port specialisation in Finland, there is **limited competition** between Helsinki and other ports in southern Finland. The other large diversified port in Finland, HaminaKotka, competes with Helsinki only on container traffic, which represents less than 30% of the goods handled by both ports. Within this segment, the maritime connections of both ports overlap significantly, indicating that these ports are considered one functional port by most shipping lines.

Port-related activities in Helsinki have **considerable economic impact**. They generate employment (2.9% of total regional jobs) and are the source of regional value added (2.9%), but port-related activities are even more important to regional economies in other port-cities in Finland, such as Rauma and Kotka. In addition, the Port of Helsinki is important for exporting and importing firms across Finland for the tourist sector and for a strong Finnish maritime cluster. Moreover, Helsinki has a relatively large share of shipping patents, which could be related to the presence of its port.

The port also has **environmental effects** on the city-region due to Helsinki's specialisation in RoRo traffic and the low share of rail traffic (5%) in the hinterland modal split. The remarkable relocation of cargo traffic to a new port area (Vuosaari) at the periphery of the city, away from the centrally located South and West Terminals, was meant to relieve congestion and direct environmental harm to the city centre. However, a considerable share of the cargo traffic by truck (at least 25%) continues to use the South and West terminals.

Helsinki's port policy is aligned to business interests, but Helsinki's **business policy is only loosely aligned with port-related activities**. The port prioritises service for the region's main businesses, but has not focused on keeping or capturing more transit traffic to and from Russia. Maritime and port-related activities are not clear economic priorities of the city-region; for example, they are not part of the main sectors involved in the Helsinki Centre of Expertise, which promotes regional development goals in Finland.

The Port of Helsinki, like most ports in Finland, is part of the city administration. A change in legislation, currently under review by parliament, would oblige all ports in Finland to become **limited companies**. This could professionalise the managing structure of the ports. As limited companies, the ports could still serve as revenue sources for the cities that own them, but with roles that exceed their local boundaries (and the specialised nature of most Finnish ports).

POLICY RECOMMENDATIONS

Stimulate a stronger **implication of port-related activities in the regional development programmes** for Helsinki region. This could take the form of more interaction in the regional Centre of Excellence, Culminatum Oy, and closer co-operation between business and universities in logistics.

Develop measures to **increase the share of railway traffic in the hinterland modal split** of the Port of Helsinki. Consider the extension of the current dry port-network of the Port of Helsinki with Oulu to other parts of Finland, such as western and eastern Finland.

Stimulate **co-operation in the metropolitan region** of Helsinki, *e.g.* with respect to the location of future logistics and distribution centres and freight traffic planning.

Stimulate **co-operation between ports in southern Finland**, regarding common marketing, operational issues (*e.g.* empty container handling), strategic planning and co-ordination of port specialisations.

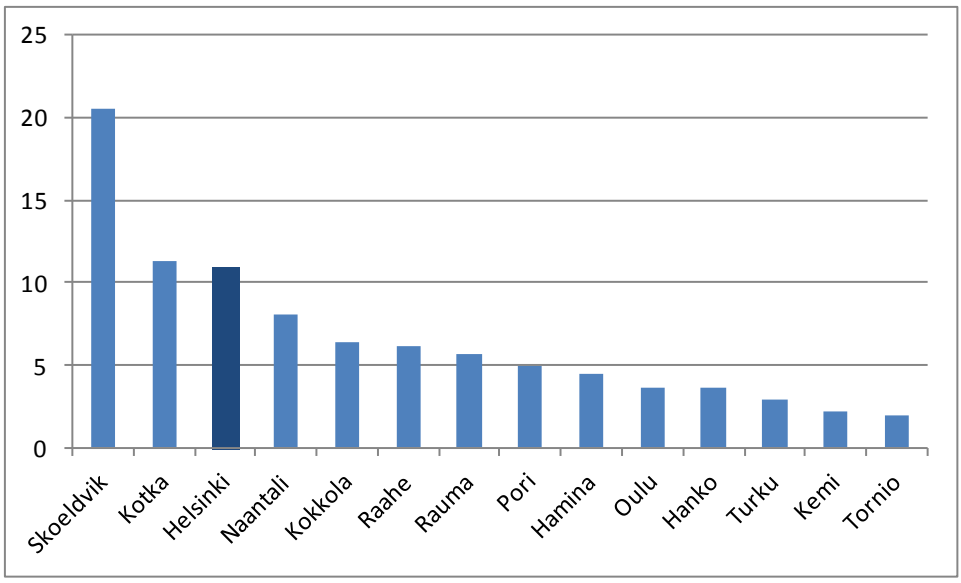
1. PERFORMANCE

1.1 Performance of the Port of Helsinki

Helsinki is the third largest port in Finland and the second largest container port. In 2010, it handled 10.9 million tonnes of goods, which represents 11% of total throughput in Finnish ports. The largest port in Finland in terms of tonnage is Skoeldvik, a port that exclusively handles oil (Figure 1). The second largest port, Kotka, merged with the Port of Hamina in 2011. The resulting Port of HaminaKotka is the largest container port in Finland, with Helsinki second and Rauma third (Figure 2). These three largest container ports in Finland (all located in southern Finland) together represent 87% of total container throughput in ports in Finland.

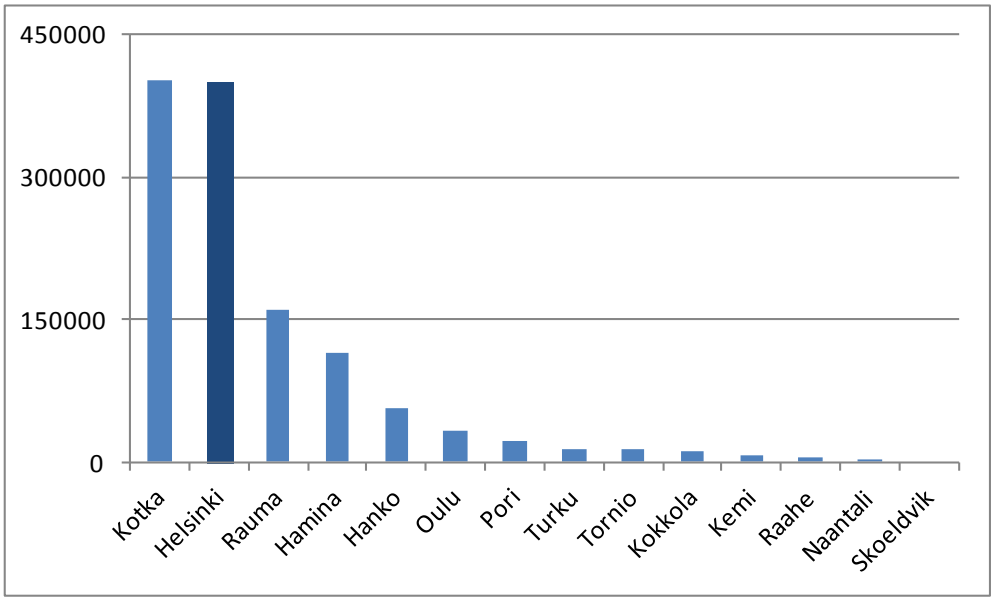
The Port of Helsinki is highly specialised in roll-on/roll-off (RoRo) traffic, in a context of highly specialised ports in Finland. Finnish ports have more throughput in dry bulk, RoRo and forestry products than EU 27 ports, but less traffic of liquid bulk and containers (Figure 3). Many ports in Finland are highly specialised: its largest port, Skoeldvik, only handles liquid bulk, and several other large ports are also dominated by one type of commodity – either dry bulk (Kokkola, Raahe and Pori) or forestry products (Rauma). Helsinki's specialisation in RoRo, representing 57% of port throughput, makes this port the most important in Finland. In addition, container traffic represents a large share of the port's total throughput (29%), and in 2010 it also handled dry bulk (7%), liquid bulk (3%), forestry products (2%) and other goods (1%). Helsinki terminated its oil harbour functions (on the Laajasalo site) in 2011, and coal is only transported through this port for local use by Helsinki's energy plants. The Port of Helsinki's focus on unitised cargo (containers and RoRo) is a strategic decision for the port. Of the ports in Finland, Kotka has the most balanced profile of commodity categories.

Figure 1. Throughput volume of major ports in Finland, mln tonnes, 2010



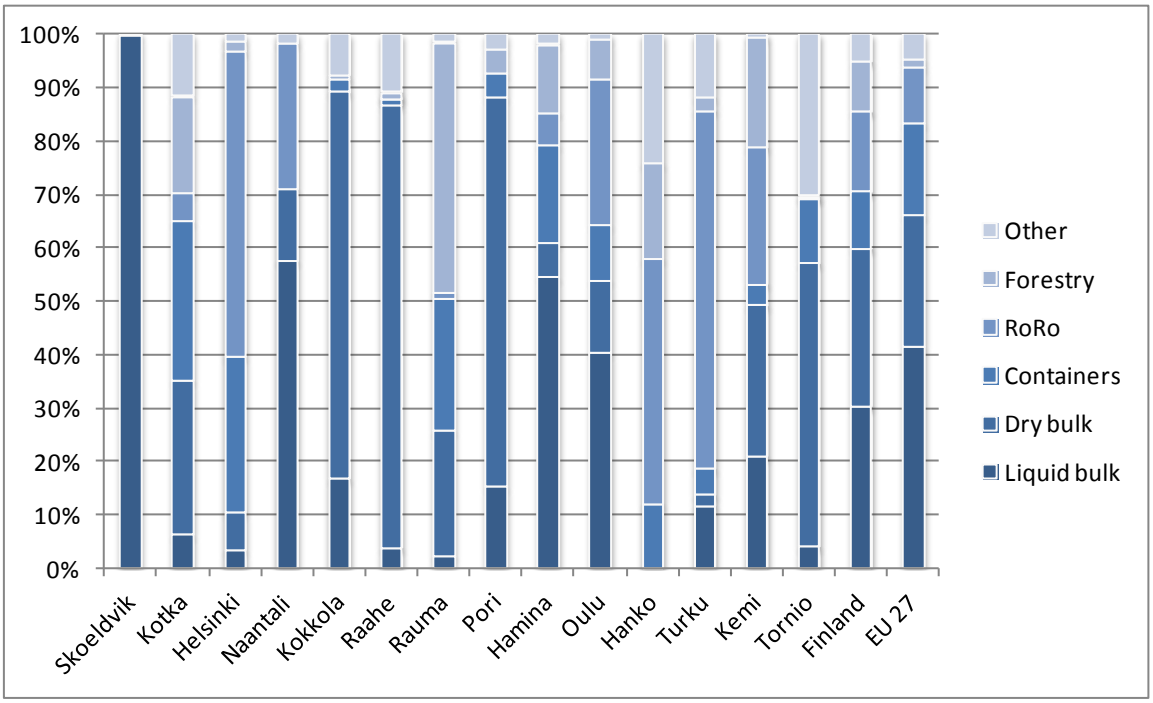
Source: Eurostat

Figure 2. Container throughput in major ports in Finland, TEUs, 2010



Source: Eurostat
Note: TEU stands for twenty-foot equivalent unit, a standard measure for containers

Figure 3. Port profiles of major Finnish ports, 2010



Source: Author's own elaborations based on Eurostat data

Growth rates

The Port of Helsinki's average annual growth rate over the last decade has been negative (-0.5%), unlike other major Finnish ports. Ports in Finland grew on average by 1.8% per year over 2001-10, but the largest Finnish ports have had higher growth rates (Table 1). For example, the Port of Kotka, Helsinki's main competitor, grew by 4.4% during this period. The Port of Helsinki's growth rate has been negative and below the national average in all commodity types except RoRo-traffic. In RoRo, traffic volumes grew by 4.9% per year, slightly above the national average (4.1%). However, containers, Helsinki's second most important commodity category had an average negative growth rate of 2.4%; the competing ports Kotka and Rauma grew by 11.1% and 9.7% per year in this category. Helsinki experienced similar declining performance in dry bulk and liquid bulk. Throughput volumes in forestry products have been declining over the last decade in Finnish ports, but the major ports for forestry (Rauma, Kotka, Hanko and Kemi) have all perfomed better than Helsinki, with the exception of Hamina. Consequently, Helsinki lost market shares to other ports in southern Finland, such as Kotka.

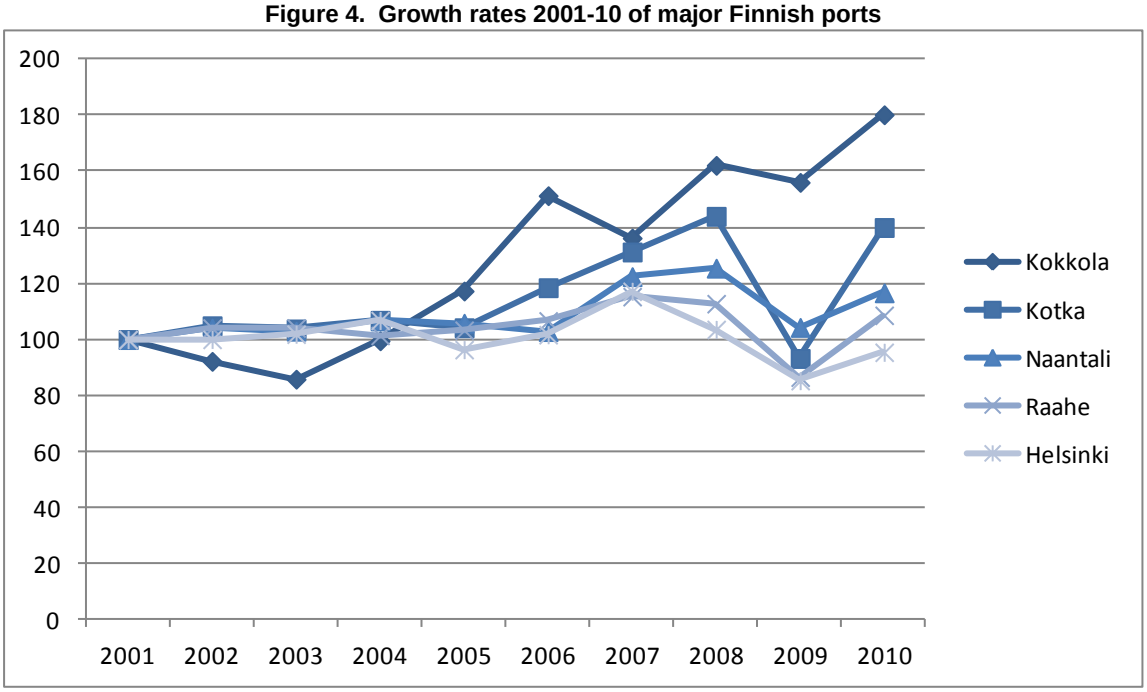
Table 1. Growth rates per commodity category in main ports in Finland

	Total	RoRo	Containers	Dry bulk	Liquid bulk	Forestry products
Finland	**1.8%**	4.1%	2.0%	2.4%	2.2%	-3.3%
Helsinki	**-0.5%**	4.9%	-2.4%	-5.0%	-6.0%	-7.0%
Kotka	**4.4%**	388.9%	11.1%	2.4%	-4.4%	-1.7%
Naantali	**1.9%**	3.7%	n.a	1.6%	2.3%	-11.1%
Kokkola	**8.9%**	-11.1%	12.5%	15.9%	0.6%	-8.8%
Raahe	**1.0%**	n.a.	38.2%	1.2%	1.1%	146.7%
Rauma	**0.7%**	4.5%	9.7%	1.4%	-3.6%	-1.5%
Pori	**0.1%**	n.a.	-7.1%	3.7%	1.9%	-7.1
Hamina	**-0.4%**	12.4%	1.3%	2.9%	7.4%	-7.9%

Source: Author's own elaborations based on Eurostat.
Note: The ports included in the total for Finnish ports are Hamina, Hanko, Helsinki, Inkoo, Kaskinen, Kemi, Kokkola, Kotka, Koverhar, Loviisa, Naantali, Oulu, Parainen, Pietarsaari, Pori, Raahe, Rauma, Rautaruukki/Raahe, Skoeldvik, Tornio, Turku, Uusikaupunki, Vaasa and Finland inland ports.

Most of this relative decline took place between 2004 and 2008. Until 2004, the growth performance of Helsinki matched, if not exceeded, those of other large Finnish ports. Negative growth over 2004-05, moderate growth over 2005-07 and decline over 2007-08, inversed this position of Helsinki into a growth laggard. The economic crisis had a less severe impact for the Port of Helsinki than for ports such as Kotka, but this effect was only temporary: the ranking of major ports in Finland in terms of growth was the same in 2010 as in 2008, with Kokkola and Kotka as the fastest growing ports, Nantaali and Raahe with more moderate growth, and Helsinki with no growth (Figure 4).

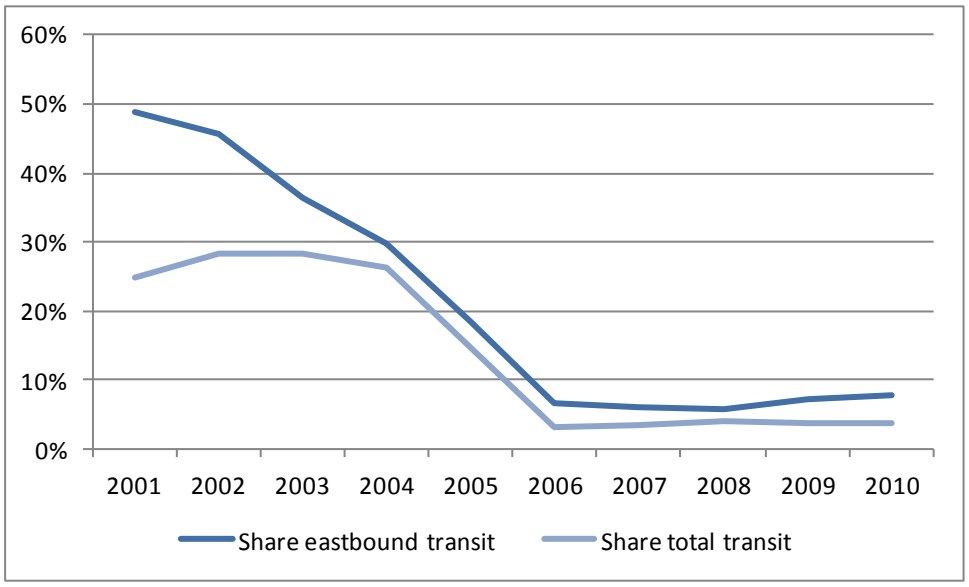
Figure 4. Growth rates 2001-10 of major Finnish ports



Source: Author's own elaborations based on Eurostat data.

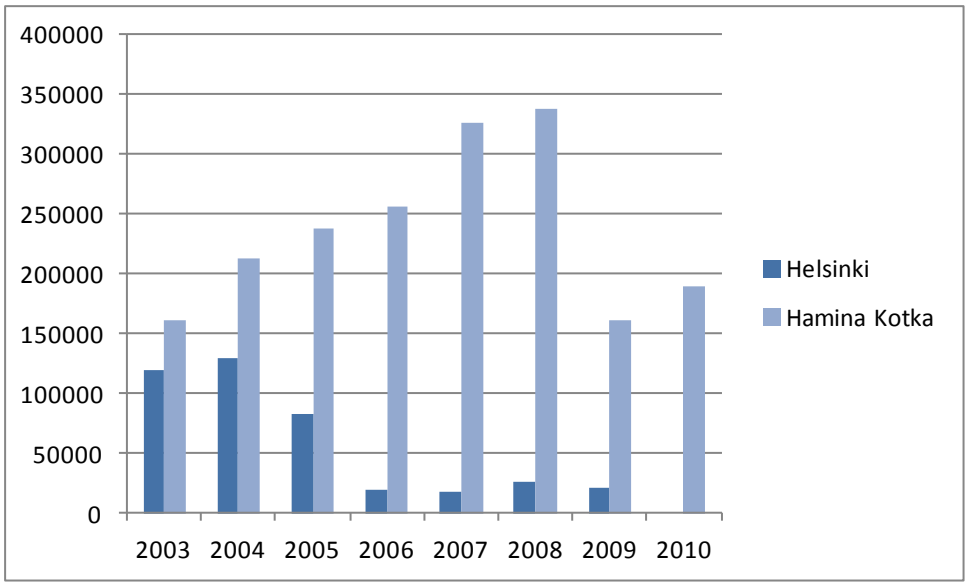
Declining growth in Helsinki coincides with a spectacular loss of transit traffic since 2004. The share of the Port of Helsinki in total Finnish transit was 26.2% in 2004, but decreased within two years to 3.3% (in 2006) and has since remained low, stalling at 3.8% in 2010. Eastbound transit traffic through Helsinki also decreased, from a share of 48.7% in 2001 to 6.5% in 2006, growing slightly to 7.8% in 2010 (Figure 5). The Port of HaminaKotka's increasing shares with absolute numbers increasing until 2008 and recovering in 2010) correlate with Helsinki's declining transit shares (Figure 6).

Figure 5. Helsinki share of eastbound and total transit volumes of Finnish ports



Source: Finnish Transport Agency (2011)

Figure 6. Development transit traffic containers for Helsinki and HaminaKotka



Source: Finnish Transport Agency (2011)

Regaining transit traffic would be difficult for the Port of Helsinki (and is not on their agenda) due to the port's competitive disadvantage in this area compared to competitors. Firstly, the warehousing costs in Helsinki are significantly higher than in other seaports; as a result, warehouses are often less accessible (10-30 km) from the Helsinki seaport neighborhood of Vuosaari, compared to port-site warehouses on other seaports in Finland. Secondly, because the port of HaminaKotka is closer to the Russian border crossing point, this port benefits from a lead-time and is thus better suited for transhipments to Russia.

Helsinki still holds the leading position in domestic container handling (despite HaminaKotka's temporary first place in 2007-08). In addition, import and export containers originating from Finland are more balanced than those from Russia. For example, St. Petersburg and HaminaKotka still have up to a 50% share of empty containers on outgoing flows, while Helsinki's share of empty containers ranges from 15-30% (Table 2). Although the domestic Finnish container market alone does not show impressive growth figures, it entails less risk and great balance flow. Also, if full TEUs were taken into consideration, the difference between Helsinki and HaminaKotka's total TEU handlings would be smaller.

Table 2. Outbound (shipped) containers from Helsinki and HaminaKotka seaports, 2006-09

Helsinki, Shipped	2006	2007	2008	2009
Full TEU	170,307	156,576	156,576	126,119
Empty TEU	33,494	47,914	47,914	49,495
Total	203,801	204,490	204,490	175,614
Empty TEU (%)	16.4%	23.4%	23.4%	28.2%

HaminaKotka, Shipped	2006	2007	2008	2009
Full TEU	215,222	201,845	205,308	138,035
Empty TEU	84,299	170,287	184,914	68,957
Total	299,521	372,132	390,222	206,992
Empty TEU (%)	28.1%	45.8%	47.4%	33.3%

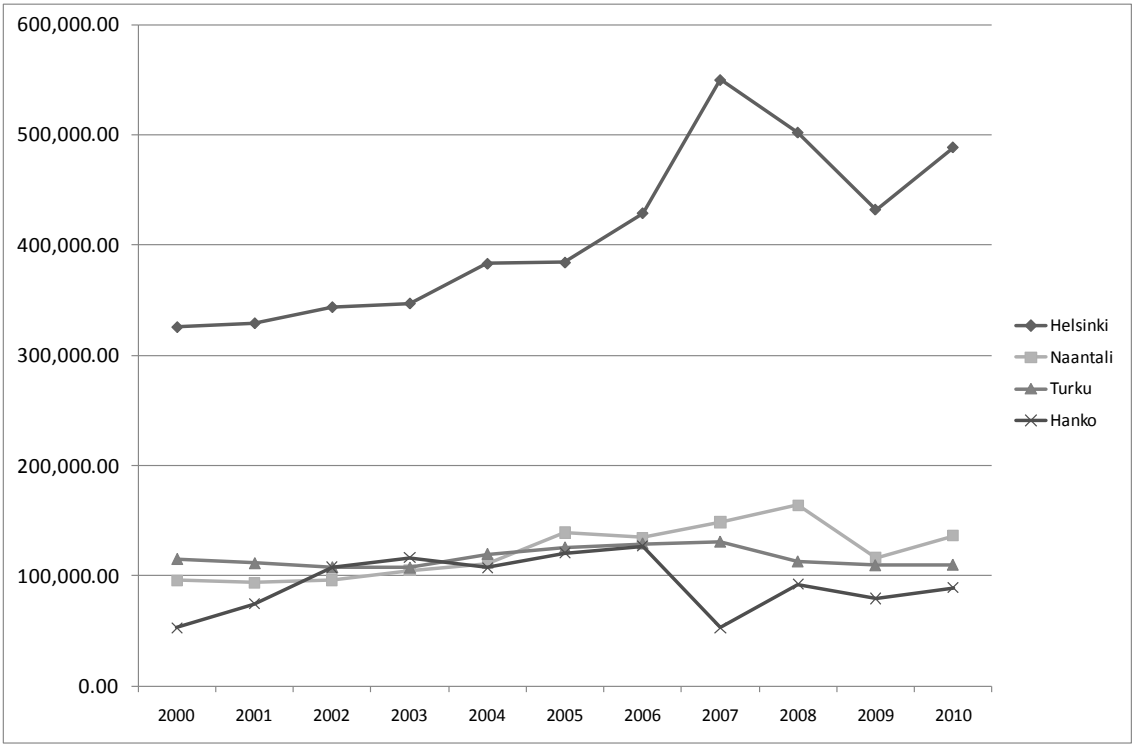
Source: Containerisation International (2008, 2009, 2010).

Strong orientation towards RoRotraffic

The Finnish logistics sector is highly oriented towards use of trucks and/or semi-trailers (RoRo traffic). Given the position of Finland as a European peninsula, and of most of its European trade partners on the coast of the Baltic Sea, Finland's focus on RoRo has clear benefits. RoRo traffic guarantees robustness in deliveries: in case of strikes, rerouting needs, or malfunctioning of machinery in ports, RoRo-traffic is more consistent and reliable than container traffic. Moreover, RoRo shipments require only a one-time loading of cargo (with further forwarding via semi-trailer, for example), while container transport requires several loadings and unloading. RoRo shipments are also more economically attractive for shorter distance where road transport is not carbon taxed.

The Port of Helsinki has a prominent position and good prospects in handling RoRo traffic in Finland. Finnish seaports currently handle 850 000 units per annum of trucks and semi-trailers. The Port of Helsinki is the clear dominant Finnish port in this activity, with three other seaports – namely Naantali, Turku and Hanko – following from a distance (Figure 7). RoRo traffic has special importance, primarily due to its profitability. It is typically coupled with passenger traffic, a high volume business, and thus produces substantial economical results. The prospects of Helsinki in this segment are good: it has a long history of good connectivity to Germany and Sweden, and Estonian volumes have grown to very significant position within last two decades. Recent developments include the emergence of a Russian passenger and cargo operator St. Peter Line, with numerous weekly connections from Helsinki to St. Petersburg and Stockholm. Overall, the Port of Helsinki appears to have all the requirements for successful RoRo traffic in the future: volume, connectivity, frequency and appropriate price levels.

Figure 7. Number of trucks and semi-trailers handled in Helsinki and other Finnish ports, 200010



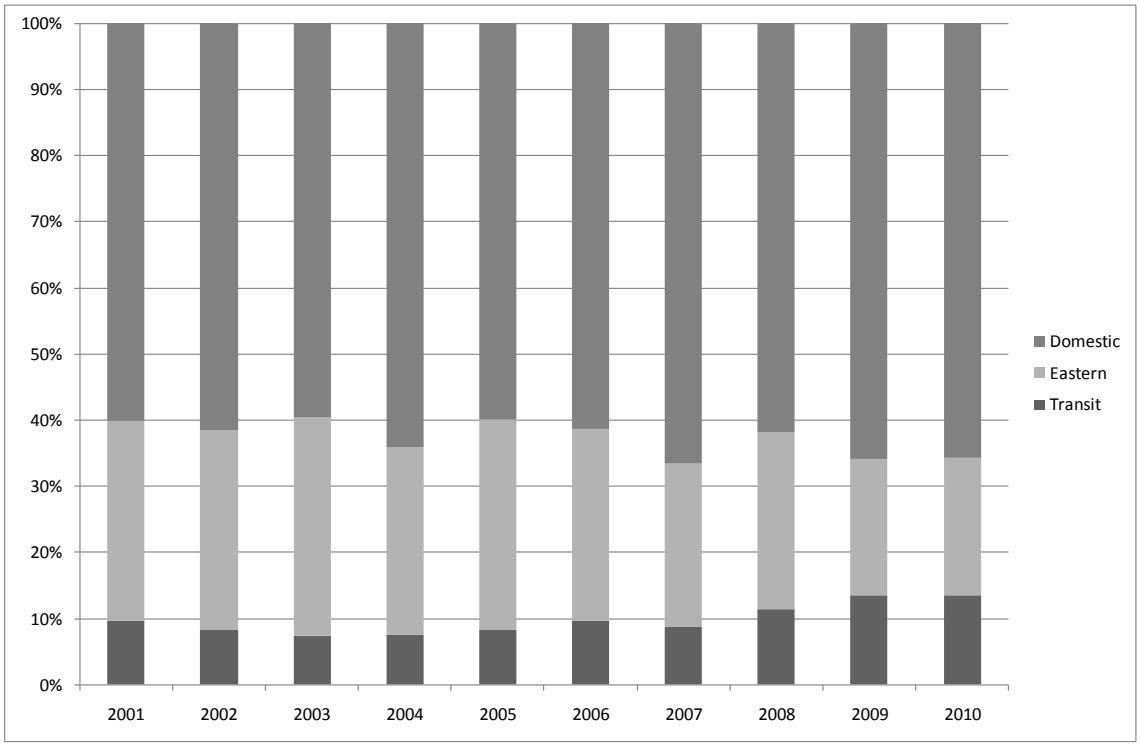
Source: Finnports (2011).

Limited intermodal traffic

Geographical issues and the remote position of Finland could explain why railway packages by the European Union (EU) have not fostered competition in Finnish railway markets (analysed thoroughly in Mäkitalo & Hilmola [2010]). Although the EU has taken bold steps to open up international freight and passenger transports in the EU area, these actions have not led to more competition in the Finnish railway market, as Sweden is the only EU member country connected to Finland. Furthermore, this connectivity is in the very northern part of Finland, at a distance of 740 km from Helsinki. The population in this northern area is also small, making passenger transport there financially unattractive for competing rail companies. The same challenge exists for industrial products: with Sweden's industry hub located in the south, where most of the population lives, transport of industrial products over rail between Finland and Sweden is limited. In addition, Sweden's use of European gauge width (1 435 mm) and Finland's use of a modification from old Tsarist Russian standards (1 524 mm) poses challenges to interoperability of Finnish and Swedish railway systems. The costs of adapting wagons to the different gauge width and intermodal arrangements, in addition to limited business opportunities, discourage international transport for new entrants in railway industry.

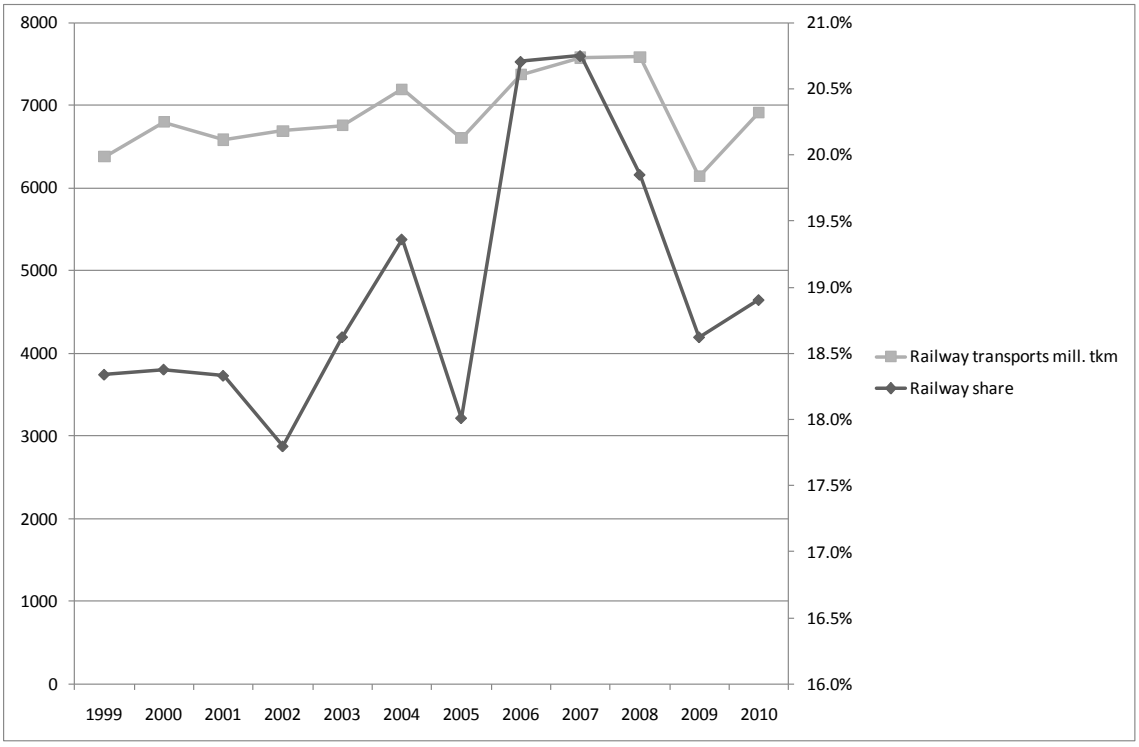
International railway connection from Finland could be commercially viable in one direction: to Russia. These two neighbouring countries have a long tradition of collaboration in the railway sector, with volumes varying from moderate to high (currently at 12 million tonnes). While volume was higher in the early 2000s, different custom tariff increases have especially decreased volume of Finnish roundwood import (*e.g.* roundwood import decreased from 17 million cubic meters in 2005 to just above 6 million cubic meters by 2009) (Lorentz & Hilmola, 2010). Even if volumes and activity exist in railway industry to Russia, containers and RoRo is still unbalanced: a very minimal amount of transport is eastbound (from Finland to Russia), and most of the volumes that are westbound are raw materials. The country-level agreement that railway transportation (traction) remains a privilege of national actors (Finnish VR and Russian RZD) also presents a challenge (Laisi, 2010). Even if the domestic Finnish market is lacking new entrants, there is considerable competition in Russian railways (Laisi, 2010). For example, Nurminen Logistics and EKE Group own more than 1 000 wagons each, and gain significant revenue from the railway sector. Their wagons, along with 2 000 other Russian wagon leasing companies' rolling stock, are used in international traffic to Finland (*e.g.* in imports or transit).

Figure 8. Railway freight market in Finland



Source: Author's own elaboration through VR (2005, 2010)

Figure 9. Railway transportation volumes and market share in Finland



Source: Author's own elaborations based on data from different sources, including Transport Agency (2011), Statistics of Finland (2011) and VR (2010)

The domination of bulk transports in the domestic transportation market also limits freight railway transportation. With the paper industry as the largest segment of domestic railway transport, the rare use of containers for Finnish operating manufacturing units (*e.g.* with end products) has affected railway solutions for general cargo (Koskinen *et al*., 2009). The government-owned railway company VR has very modern and efficient transportation solutions and wagons, but are case specific, like for paper rolls. Rolling stock for general cargo, particularly containers and RoRo, does not achieve the needed scale, quality and depth for efficient services (Hilmola, 2008). According to reports, VR currently uses lower total amounts of wagons in serving customers (increasing the so-called rolling stock utilisation), but this does not necessarily lead to higher availability or better service.

Limited intermodal transport in Finland might also be connected to the rolling stock market. Because Finnish standards differ from European ones, used second-hand wagons could only be purchased from old Soviet bloc countries (appropriate for gauge widths of 1 520 mm). However, due to country specific standards and regulation for noise, safety and technical designs, these wagons could not be used in the Finnish railway network. As a result, new entrants need to buy brand-new rolling stock to start the operations, increasing their capital needs, including significant initial investments of EUR 10-20 million. In Finland, only a few companies are interested in entering railway markets, but some have gained (or are about to gain) safety certificates to start operations (Trafi, 2011). None of these companies, however, currently have their own rolling stock; thus the Ministry of Transport and Communications has yet to grant permission for anyone to operate in the Finnish railway network.

Future developments

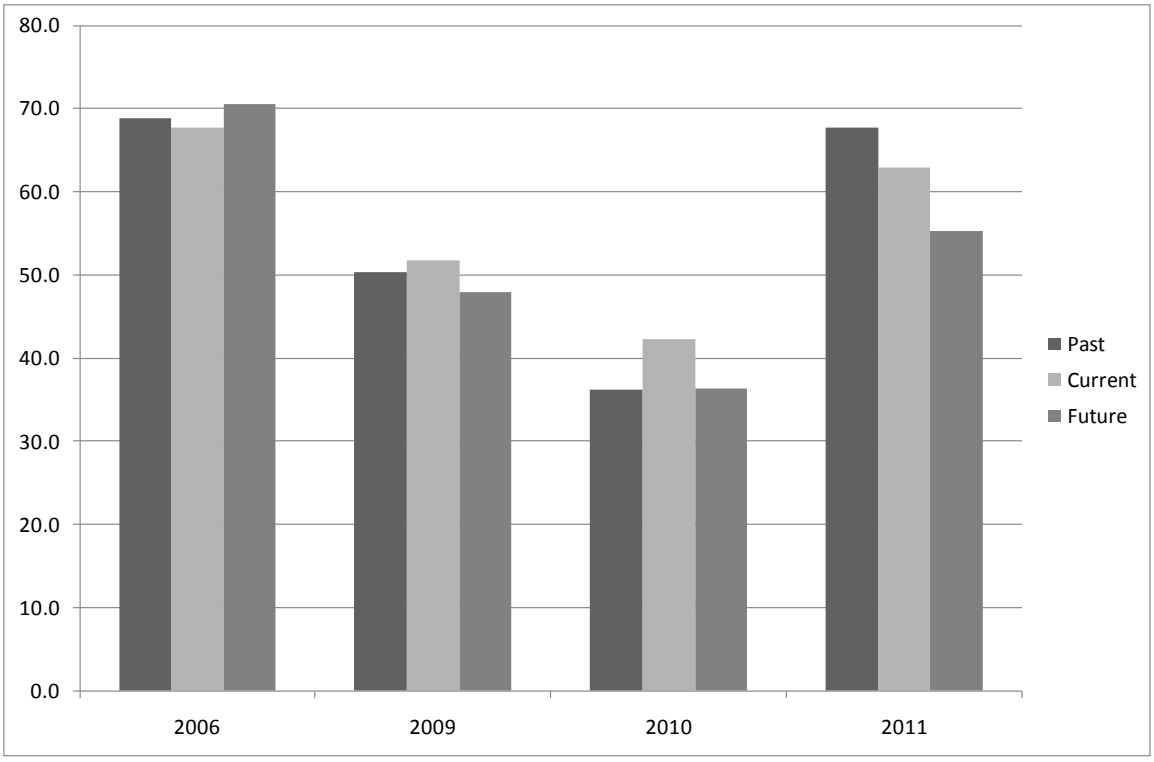
Restructuring in the manufacturing sector could favour the position of the Port of Helsinki. Traffic is no longer exclusively between Europe and Russia; Swedish and Finnish companies have increasing operations in Russia (Hilmola, 2011b). For example, Nokian tires (Finland) has a large manufacturing facility in St. Petersburg, while Volvo (Sweden) assembles trucks in the middle of the European part of Russia, Kaluga. In addition, Swedish Ikea has enlarged its network in Russia considerably, and numerous other Finnish companies have manufacturing units in Russia *(e.g.* Valio and Atria in dairy products, and a number of other metal industry manufacturers, such as Rautaruukki, PKC Group and Reka). In a globally networked economy, no manufacturing unit lives in isolation; components and sub-assemblies from Europe and Asia will be needed, while some part of their production will be exported. This supports RoRo traffic in the Helsinki seaport. In the St. Petersburg area, several major car brands (*e.g.* Ford, GM, Nissan, Suzuki, Hyundai, and Toyota) also engage in manufacturing activity. Although Russian factories have experienced limited success on the global scale, their operations could increase in quality and quantity, and thus drive higher transportation logistics needs (concluded also in Korovyakovsky and Panova, 2011). Not surprisingly, RoRo transports increased by 65% in St. Petersburg seaport (in its First Stevedoring Company) during 2010 (St. Petersburg Sea Port, 2011).

Container handling seaports for Russian volumes (excluding St. Petersburg) are relatively small and geographically distant from the Gulf of Finland. For example, Novorossiysk and Vostochniy seaports in Russia each handled roughly 400 000 TEUs in 2008. Considering the ratio of the Russian population or GDP to its overall container import volumes, TEU amounts could potentially double or even with Russia's future population of 141 million (Rosstat, 2010). Finland is in a good position for transiting at least part of these volumes, given the close proximity of Russia's second largest city and the residence of most of the Russian population in the European side of Russia. Still, the position of Finnish ports cannot be taken for

granted given the ambitious programmes to build new Russian ports in the Gulf of Finland (*e.g.* in Ust-Luga).

Survey responses from Finnish and Swedish manufacturers with significant material flows at their disposal indicate larger-scale change (Figure 5). In 2006, these companies reported that the Russian market would be served primarily from European factories (balance is approximately 70%; on average 85% of flows are eastbound, while 15% are westbound). However, the level of westbound dominance declined considerably during 2009 and 2010. The most recent survey indicats that companies still think that Russian-originating flows will increase in the future.

Figure 10. Transportation flow balance between Europe and Russia



Note: Transportation flow balance (positive indicates more transport from Europe) between Europe and Russia among respondent companies during four different surveys (2006-2011). n = 127 (survey completed during years 2006, 2009, 2010 and 2011 for the most significant Finnish and Swedish companies with material flows, retail also included).

1.2 Synergies

Synergies between ports in southern Finland

Ports in close proximity are often both highly interlinked and competing. Ports do not function in isolation; they are part of a supply chain with many different, often geographically dispersed, actors. A resulting worldwide trend toward port regionalisation is thus changing relations among ports. In recent decades, a hub and spoke network has formed in Europe, creating clear dependencies between different ports. Within this context, analysis of synergies between Helsinki and its main competitor, the port of HaminaKotka, sheds light on overlaps in commodities handled in the two ports and their different maritime connections.

An analysis of the main commodities handled by the ports of Helsinki and HaminaKotk show that these two ports compete mainly for container traffic, representing less than 30% of the goods they handle. Traffic size is similar for these ports only in the container category. For other commodities, there may be competition, but one port is always substantially stronger in that category (*e.g.* Helsinki in RoRo and coal; and HaminaKotka in refined oil, ores, forestry products and iron and steel products) (Table 3).

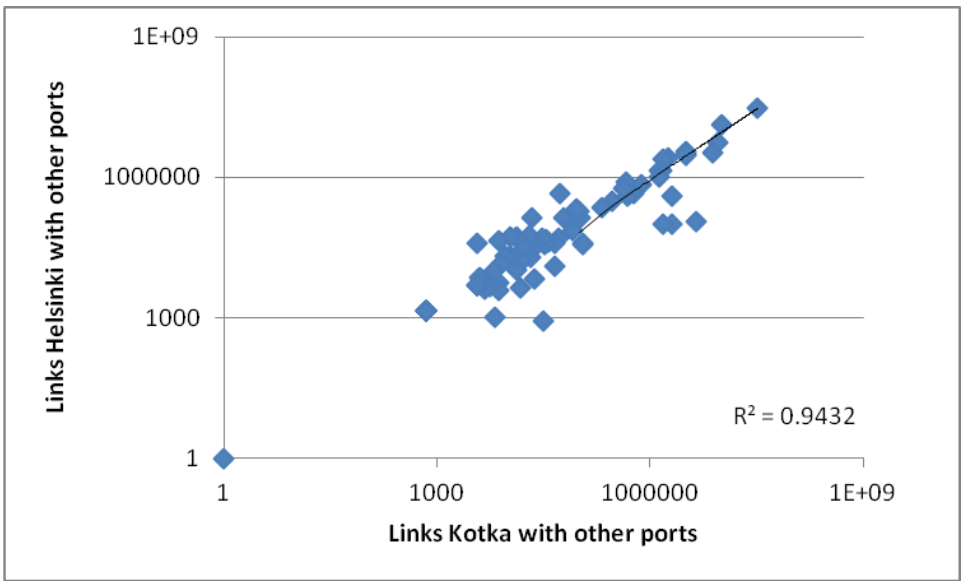
Table 3. Overlaps in commodities handled by the Port of Helsinki and HaminaKotka

Commodity	Hamina Kotka	%	Helsinki	%	Ratio HaminaKotka vs. Helsinki
Total RoRo	**891**	**5.6%**	**6272**	**57.3%**	**0.14**
- Road goods vehicles and trailers	5	0.0%	3422	31.3%	0.00
- Unaccompanied vehicles, semi-trailers	323	2.0%	2708	24.7%	0.12
Containers	**4177**	**26.4%**	**3193**	**29.2%**	**1.31**
Total bulk	**6729**	**42.5%**	**1150**	**10.5%**	**5.85**
- Coal	31	0.2%	699	6.4%	0.04
- Ores	296	1.9%	0	0%	
- Refined oil	1036	6.5%	373	3.4%	2.78
Other general cargo	**4022**	**25.4%**	**336**	**3.0%**	**11.97**
- Forestry products	2613	1.7%	187	16.5%	13.97
- Iron and steel products	1267	8.0%	126	1.2%	10.06

Source: Author's own elaborations based on Eurostat data.

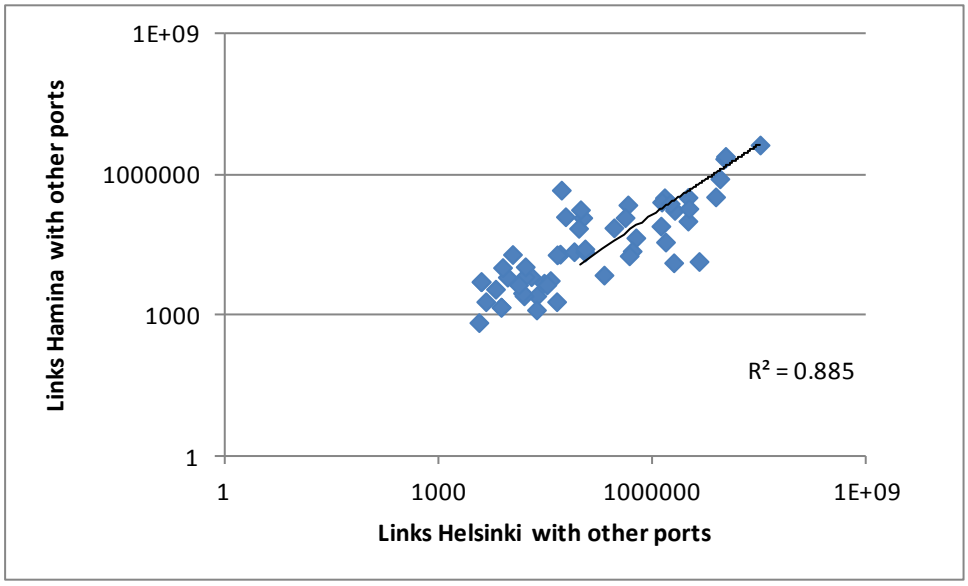
The maritime connections of the Port of Helsinki largely overlap with those of Hamina and Kotka. This can be concluded from an analysis of all the direct and indirect connections of these ports with other ports in the world, as expressed by vessel movements between ports, weighted for the cargo volume. The most important ports for Helsinki (with regards to container traffic) are also the most important ports for Kotka and Hamina (*e.g.* ports of Hamburg, Bremerhaven, St. Petersburg, Rotterdam, Riga, Muuga and Antwerp). The maritime connections of Helsinki show a very large correlation with those of Kotka and Hamina, but overlaps between Hamina and Kotka in 2006 were even higher (Figures 11-13).

Figure 11. Overlapping links of Helsinki and Kotka ports



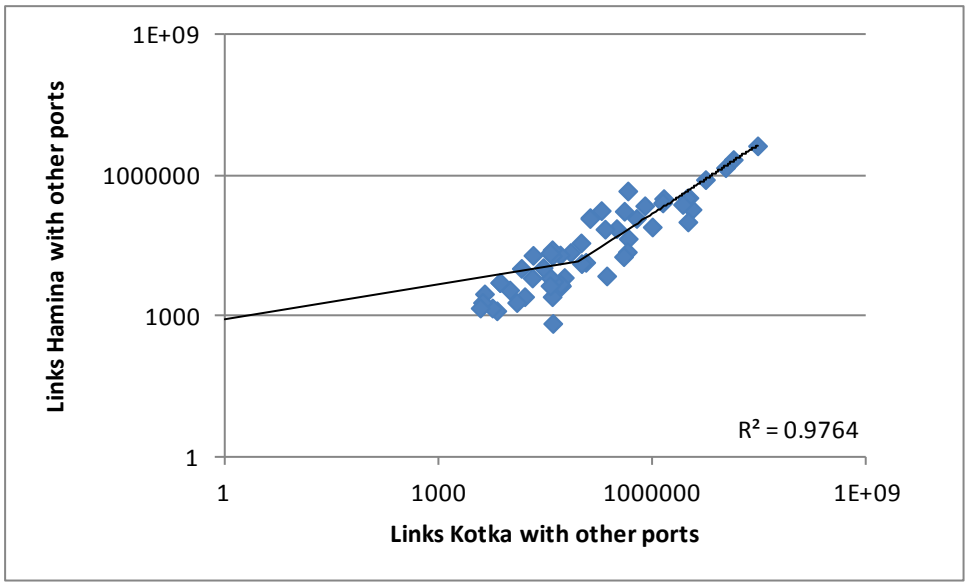
Source: Author's own elaborations based on LMIU database

Figure 12. Overlapping links of Helsinki and Hamina ports



Source: Author's own elaborations based on LMIU database

Figure 13. Overlapping links Kotka and Hamina ports



Source: Author's own elaborations based on LMIU database

Synergies between Helsinki and Tallinn

At a time where transit trade from Helsinki to Russia is declining, the link between Helsinki and Tallinn is becoming increasingly important (Box 1). The region of Helsinki (Uusimaa) , consisting of 28 municipalities, accounts for 28% of the population, 37% of GDP, and 32% of labour force. Including the region of Tallinn in Estonia results in a transborder region with considerable opportunities for growth given the complementarities of the two sides of the Gulf of Finland and pressures for homogenous business regulations (both countries belong to EU). Wages in Tallinn are 50% of Helsinki. Manpower costs may be lower in other region in Estonia. Many (often large) companies have headquarters and management functions in Helsinki and Uusimaa, and their plants in Estonia (*e.g.* ABB[1]). Consequently, the ferry traffic between Helsinki and Tallinn is developing steadily. Passenger growth has exploded over the last decades and has facilitated the emergence of "the twin city" of Helsinki-Tallinn, with increased commuting and outsourcing.

Box 1. The Helsinki-Tallinn Route

During 2002–10, the volume of seaborne cargo traffic between Finland and Estonia increased significantly, while trade volume between Finland and Estonia remained nearly constant. This indicates that the route via Estonia is increasingly used in the Finnish foreign trade. Because Helsinki and Tallinn are the main ports for cargo traffic between Finland and Estonia, the role of the Helsinki-Tallinn route as a sea leg in the hinterland connections of Finland has increased.

- The growth of cargo volume on the Helsinki-Tallinn route is estimated to continue at the rate of 10% per year for the next two years. In the long run, cargo volume growth depends on the economical and industrial development of the former Eastern European countries.

- The year-round fast and reliable connections on the Helsinki-Tallinn route have made it possible for service and logistics companies to reconsider their strategies to accommodate both side of the Gulf of Finland (*e.g.* laundry and delivery services). The adoption of this new logistical approach has stimulated other companies to seek opportunities to combine Helsinki and Tallinn in their services.

- If International Maritime Organization (IMO) sulphur regulations are enforced, the Helsinki-Tallinn route will become a main route for the Western European markets (in addition to the route via Sweden). The cargo volumes on the Helsinki-Tallinn route may be multiplied due to the regulations.

- The Ropax (roll-on/roll-off passenger) concept – the transportation of passengers and wheeled cargo in the same vessel – is seen as the only economical profitable solution on the Helsinki-Tallinn route, with cargo and passenger traffic supporting each other.

- The trucks (vehicle combinations) will remain the main mode of transport on the Helsinki-Tallinn route because general cargo is the main commodity on the route. IMO's sulphur regulations and the changes in the structure of the Finnish industry may create prerequisites for railroad transport in the hinterland connections of Finland.

Source: Sundberg, P., A. Posti and U. Tapaninen (2011), *Cargo Flow Study on the Helsinki Tallinn Route*, University of Turku.

2. IMPACT

2.1 Economic and social impact

Employment and value added

Port-related activities are sources of regional value added and employment. Based on a business survey using questionnaires, annual statistics and input-output studies, Helsingin Satama (2007) estimated the value added of activities related to the Port of Helsinki to be EUR 1.35 billion in 2007. This represents 5.3% of the City of Helsinki's GDP, 2.9% of the value added for the Helsinki metropolitan region and 1.0% of Finland's total national GDP. Four-fifths of this value added was related to cargo traffic, and the other fifth to passenger traffic. Port-related activities represent a considerable share of employment in Helsinki: 4.3% of the city employment and 1.9% of the metropolitan employment (Helsingin Satama, 2007). Direct port-related employment accounted for 11 800 jobs in 2007, and indirect employment for an additional 6 000 jobs. This indirect employment is related to intermediate product purchases by the port and port-related businesses, with particularly large effects in tourism-related sectors.

Based on different economic impact studies on ports in Finland, the employment effects in Helsinki are comparable to other port-cities in Finland, but the value added (as share of regional GDP) is lower. While methodologies may differ among these studies, thus requiring caution when comparing their outcomes, the studies still give a rough indication of the economic impact of port activities in Finland. The share of direct port-related employment (in total regional employment) is similar to or slightly lower in Helsinki than in other ports in Finland, such as Pori, Hamina and Rauma (Table 4). The only exception is Kotka, where the share of port-related employment is twice as large. This difference is smaller when indirect employment is also taken into account: the employment share is larger in Helsinki than in Hamina, but still smaller in Helsinki than in Kotka. The position of Helsinki is more distinctive for share of port-related value added (of total regional value added). Port-related activities represent 3% of regional GDP in Helsinki, but 8% to 23% for the other ports. If considering HaminaKotka as one port (as is the case since 2011), its value added and the value added of related economic sectors represent 30% of regional GDP.

Table 4. Employment and value added in main Finnish ports

	Helsinki	Hamina	Kotka	Pori	Rauma
Direct port-related employment as share of regional employment	1.9%	2.3%	3.9%	1.9%	2.5%
Total port-related employment as share of regional employment	2.9%	2.8%	4.5%	-	-
Direct port-related value added as share of regional GDP	2.9%	14.3%	16.0%	8.4%	22.5%

Source: Helsingin Sataman, 2007; Holma and Yliskylä-Peuralahti, 2007; Turun Yliopisto, 2007.

The Port of Helsinki is also important to exporting and importing firms in Finland. Around a third of all Finnish foreign trade is transported through the Port of Helsinki. Imports consist merely of consumer durables and semi-finished products; export comprise of forestry and metal industry products, foodstuffs, textiles and glassware. Finland is very dependent on the import of most raw materials needed in several industries; there is no self-sufficiency within any important sector. Because of its geography, Finnish maritime transport is by far the most important transport mode for imports and exports: 75% of imports and 89% of exports were transported by ship in 2008. This key role for Finnish industries can be illustrated by an overview of the Finnish manufacturing sector using the Port of Helsinki (Box 2) and the logistics cluster concentrated around the port. This area next to the Vuosaari port houses logistics service providers'

incoming and outgoing cargo loading and unloading, containerisation and recontainerisation, short-term storage and other logistics operations.

Box 2. Main manufacturers and logistics companies using the Port of Helsinki

A number of medium-sized and relatively large companies using Helsinki and Vuosaari seaports or airports are located in Vuosaari. These companies include ABB marines (engines for marine), Paulig (coffee and spices), ABB (electrical products) and Biohit (diagnostics for medical industry, pipettes). Companies located in Vantaa include Fazer (chocolates), HK Scan (meat products), Okmetic (silicon wafers) and Vaisala (measurement devices). Orion (pharmaceuticals) and Fläkt Woods (air blowers) are located in Espoo, while Sinebrychoff (beer and drinks) is based on Kerava. The distance between these companies and the port is about 15-30 km. Companies located in a radius of 50-120 km from Vuosaari, include Ensto (electrical products) in Porvoo and big companies like Kone (elevators), Konecranes (container lifts) in Hyvinkää and Nokia (mobile phones) in Salo. Lahti-based companies such as Hartwall (beer), Peikko group (construction materials), Kemppi Ltd (welding devices) and Upo (white goods) can also be included in this group.

The tourist sector has strong ties to the Port of Helsinki. Finland's tourism sector currently employs around 130 000 people, and accounted for 3.8% of Finland's GDP in 2007. Though tourists can travel to many destinations in the country, Helsinki remains a magnet. Set on the sea with many parks and gardens, the city is easily accessible by air or sea. It offers many sidewalk cafés, outdoor cultural activities in summer, architectural style and good hotel infrastructure. While the most important transport hub is the Helsinki Vantaa airport (hosting 13 million passengers in 2007, including 10 millions international visitors), a number of passengers are using domestic inland connections and the port to access the city[2]. Foreigners coming to Finland via the Port of Helsinki spend EUR 239 million in Finland annually. International cruise ship traffic accounted for 360 000 passengers in the port in 2009.[3] Many cruise vessels visit Helsinki on their way to St Petersburg, and close to 300 cruise calls take place in Helsinki every year (mooring at the quays in the South and West Harbour). A 2007 cruise passenger study indicated that 85% of the 260 000 cruise passengers visiting Helsinki went ashore and spent an average of EUR 128 in 2007 (Helsinki Cruise Network (2007), cited in CTUR 2011). According to this study, cruise traffic that year thus generated approximately EUR 28 million.

The port-city of Helsinki is also well represented in a strong maritime cluster in Finland, organised around a number of industries and institutions. This cluster includes turnkey suppliers of marine industries, shipbuilding and offshore industries, part of the finance and insurance sector, the maritime public sector, certain interest groups and associations, port operators and cargo equipment manufacturers, port authorities, shipping companies, and other shipping and related business. The combined turnover of all these activities was EUR 13.2 billion in 2006, representing about 7.5% of the national GDP (Table 5). At that time, this cluster employed 43 000 people in activities directly related to the maritime business and housed about 2 880 companies (Niini, 2010). About 40% of companies within the maritime cluster are located in the Helsinki region; 708 maritime companies are registered in Helsinki, 203 in Vantaa and 170 in Espoo.

Table 5. The maritime cluster in Finland

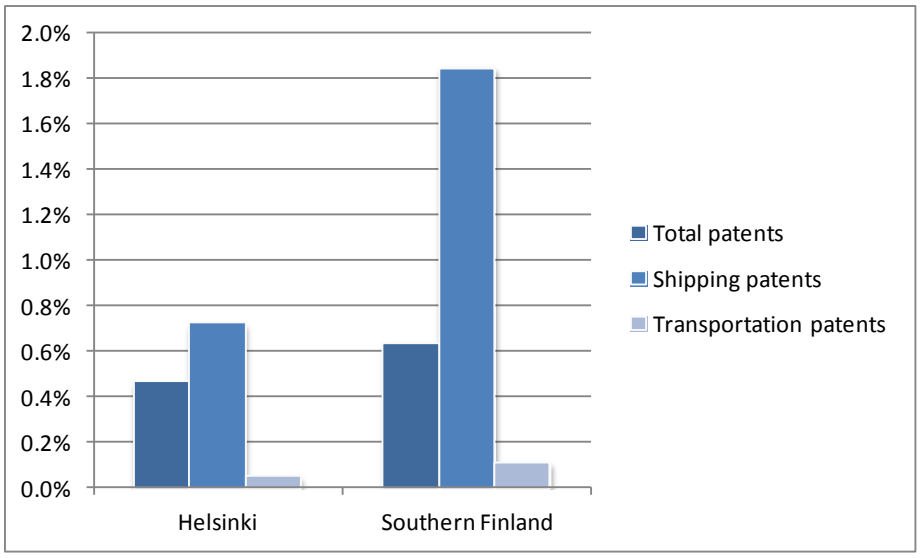
Cluster component	Number of companies	Turn-over EUR million	Employees
Shipbuilding	5	1 350	5 000
Other marine industries	196	10 640	31 900
Shipping companies	66	2 460	9 560
Other shipping-related business	57	3 120	15 360
Ports	30	240	900
Port operators	28	530	4 460
Manufacturers of cargo equipment	3	1 860	2 370

Source: Niini, 2010

Port-related innovation: The case of shipping patents

Helsinki has a relatively large share of patents in shipping, which could be related to the presence of its port. Patent applications generated by inventors residing in Helsinki represented 0.47% of total patent applications in the world (and 0.64% for southern Finland) in 2005-07 These shares are higher for shipping-related patents: inventors from Helsinki are responsible for 0.73% of these patent applications worldwide, and 1.85% of these patents in southern Finland (Figure 14). The Helsinki region's relatively high share of shipping patents (a specialisation shared by other regions in southern Finland but not extended to the entire transportation sector) is more clear from a national perspective: southern Finland accounts for 93% of patent applications in shipping but only 64% of patents overall (Figure 15). Varsinais-Suomi region, where the university city of Turku is located, has the largest share of shipping patents. Although southern Finland is by far the most dominant region with respect to shipping patents, some innovative inter-regional co-operation takes place with regions that are not located in southern Finland. A ranking of the most important regions for developing shipping co-patents with Helsinki (*e.g.* Pohjois-Savo in central Finland and Satakunta in western Finland) shows that the most important co-patenting region for Helsinki is the neighbouring southern region of Itä-Suomi (Table 6).

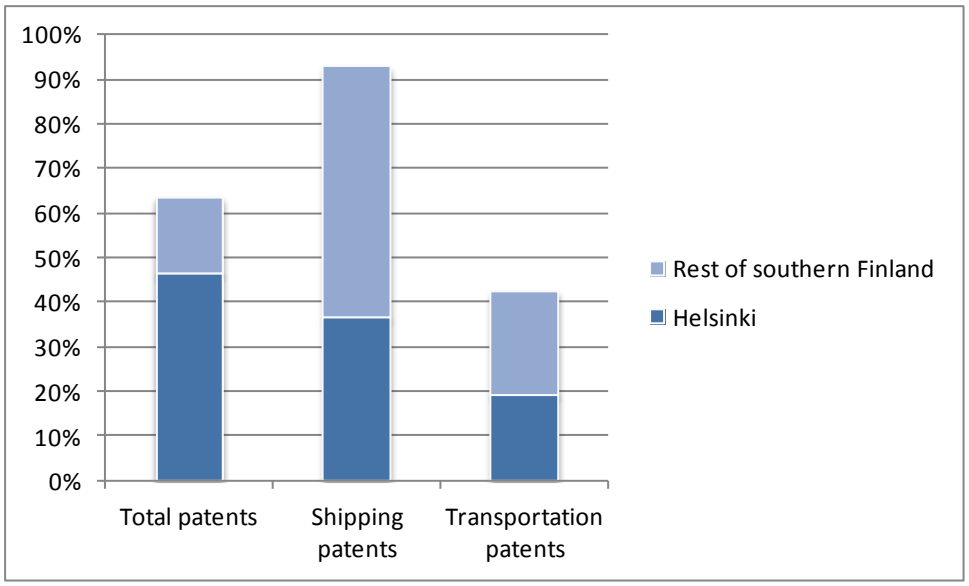
Figure 14. Shares of Helsinki and southern Finland in worldwide shipping patents ,2005-07



Note: Helsinki is defined here as the region of Uusimaa; Southern Finland is defined as Etelä-Suomi (which includes Uusimaa).

Source: Own elaborations based on OECD Patent Database.

Figure 15. Shares of Helsinki and the rest of southern Finland in national shipping patents ,2005-07



Note: Helsinki is defined here as the region of Uusimaa; Southern Finland is defined as Etelä-Suomi (which includes Uusimaa).

Source: Own elaborations based on OECD Patent Database.

Table 6. Main co-patent regions in shipping, with Helsinki, 2005-07

Region	Main city	Share of co-patents
Itä-Uusimaa	Porvoo	22.4%
Pohjois-Savo	Kuopio	17.6%
Satakunta	Pori	15.3%
Varsinais-Suomi	Turku	7.1%
Päijät-Häme	Lahti	4.7%

Note: Helsinki is defined here as the region of Uusimaa.

Source: Own elaborations based on OECD Patent Database.

The port as revenue source

The Port of Helsinki brings in additional municipal revenues (*e.g.* about EUR 92 million in 2007). This corresponds to a wider trend of Finnish ports as municipal revenues sources. Rönty *et al*. (2011) concluded that in previous decades, seaports of Helsinki, Hanko, Turku and Naantali paid millions of euros annually to each city as compensation payment (in most of the cases these payments have been extremely stabile, experiencing only small fluctuations). As an exception, the seaports of Hamina and Kotka, both operating as their own limited companies (owned by municipalities), did not support their city owners; however, the Port of Kotka has made some very minor payments to the city during this decade.

2.2 Environmental impact

Helsinki is strongly specialised in RoRo-traffic, raising concerns about its environmental sustainability. Roughly 5% of hinterland transport from the Port of Helsinki in 2010 was by rail according

to the Helsinki seaport authorities; in several other European seaports, such as Gothenburg, Hamburg and Bremen, this share is considerably higher. In the Port of Göteborg, more than 20 inland multimodal terminals support its railway operations (Port of Gothenburg, 2011). In Helsinki only one terminal, Oulu Terminal (Oritkari), located approximately 600 km from Helsinki, handled approximately 12 000 RoRo units in 2009 (Henttu, 2011). Currently other RoRo destinations are transported exclusively on the roads. Statistics from the Finnish Transport Agency over 2006-08 indicate that very significant volumes to Helsinki come from distant cities such as Turku, Seinäjoki, Tampere, Mikkeli, and Joensuu. Seaports all over the world are increasingly active in establishing inland railway terminals. In order to stimulate rail freight, a deregulated and functioning railway market, along with appropriate investments, is needed to shift volumes from road to rail (*e.g.* in the Hamburg port area, more than 80 different railway companies contribute to hinterland transports).

A large share of the environmental impact is still in the city centre. Although the relocation of the cargo port to Vuosaari was intended to improve this, a considerable share of RoRo traffic use the West and South terminals located in the city centre. In 2010, the Port of Helsinki estimated that approximately 25% of the RoRo traffic to Helsinki (230 thousand units) was not going through the Vuosaari port, but to the Western and Southern terminals; other experts estimate that this number might be even higher. In its most recent annual report, the Estonian Tallink Group estimated that its 100 thousand units of cargo traffic in 2009-10 almost all went through the West Terminal area, along with nearly 3.8 million passengers (Tallink, 2010).[4] Volumes of another main passenger operator, Viking Line Group (2010) are not available at seaport level, but the most recent annual report suggests that roughly 70% of the 128.7 thousand cargo units (for a 14-month accounting period) were handled in Helsinki seaport through its South Terminal (translating to 77 000 units). In addition, the Eckerö Line has a daily connection to Tallinn through the West Terminal.[5] A new passenger operator St. Peter Line, that might compete with Tallink Group and Viking Line Group for international cargo traffic in the future, is also now located in the West Terminal of Helsinki seaport.

3. POLICIES AND GOVERNANCE

3.1 Port and regional economic development

The strategy of the port is closely aligned to the interests of Finnish business: to effectively facilitate Finnish foreign trade. Accordingly, Finnish exports closely resemble the goods categories in the Port of Helsinki. In contrast to other Finnish ports, the focus in Helsinki is not on transshipment; as previously mentioned, east-bound transit traffic has decreased dramatically without raising concern for the port authority of Helsinki. In addition to foreign trade, the Port of Helsinki also plays an important role in tourism for Finland.

The support of the central government is key for the maritime sector. With an interest in maintaining shipping competitiveness and ensuring domestic employment in the sector, the government has introduced a tonnage taxation system. Intended to decrease manning costs, this system exempts a shipping company from tax withholdings and reimburses the employer's payments. Originally applied to cargo vessels, the system was extended to cover passenger vessels at the end of 2007. As such, government support to maritime transport amounts to about EUR 95 million per year. However, the maritime sector is not the central government's primary concern according to its general development strategy. The Finnish National Reference Framework, for example, does not emphasise maritime transport. Within the 2007-13 framework, a large share (59.2%) of EU funding for mainland Finland (EUR 1.2 billion) is allocated for research and technological development, innovation, and entrepreneurship, with only 5.2% in tourism and 3.5% in transport.[6]

Regional development goals are promoted through Centres of Expertise, but the centre in Helsinki does not focus on ports or maritime industries. These Centres of Expertise (CoE) have been established to further economic specialisation and boost regional development; they seek to capitalise on local assets and know-how and promote collaborative public-private projects often housed in a local technology center or science park. The Finnish government supports these activities through its National Cluster Programme, which includes a government maritime cluster programme (Box 3). Within the framework of the CoE 2007-13, 13 centers are operational, including one targeting the Helsinki region. The company Culminatum Innovation Oy Ltd[7] runs this Helsinki centre and is responsible for preparing a science and technology strategy for the region and a common development strategy for the universities and associated business operations. The centre's sectoral focus include digibusiness, digital content, ubiquitous computing, nanotechnology, food processing, health, living, tourism, experience management, wellbeing, regional development and cluster development. Surprisingly, maritime activities are not on the list, despite the dominance of maritime industries in Helsinki and the focus of the previous CoE programme (1999-2006) on maritime activities designed for the region.

The Port of Helsinki is relatively passive in dealing with Culminatum activities. Though the port can take advantage of research developed in other regions, proximity is important for innovation. The Port of Helsinki does not fully utilise the research and development (R&D) assets available in logistics and maritime research at the Aalto University (Box 4) and does not sufficiently interact with the consortium. Other ports in the world are increasingly co-operating with specialised R&D institutes and thus becoming ports of knowledge.

Box 3. Competence cluster programmes: the case of maritime activities

The Government Maritime Cluster Programme aims to stimulate development, training and applied research in the maritime industry, shipping and related business, and to improve the visibility of the maritime cluster. The programme surveys and identifies international growth-oriented business opportunities and new internationally competitive core competence bases with growth potential. The following steps outline the strategy of the Maritime Cluster Programme:

1. Promoting the creation of innovative products and services: The Programme focuses on activating the R&D operations of businesses and on measures that encourage enterprise growth. Networks are of major significance to the cluster's operations. A special characteristic of project activities within the industry is networked operations, through which the cluster is reinforcing networked companies' competence, research and product development. The various parts of the maritime cluster and other sectors are being encouraged and stimulated to co-operate in R&D with the maritime industry, in order to reinforce the cluster's value chains and for the more effective implementation, commercialisation and utilisation of Finnish innovations throughout the cluster.

2. Promoting the growth of companies and networks, and the generation of new business: The programme aims to maintain and increase development activity within companies. The maritime cluster surveys and identifies growth opportunities within shared value chains and junctures between sectors. It is also making the preparations required to maintain the conditions for competitiveness as the economy recovers. Using company-specific business analyses, the cluster provides companies with a clear picture of their development potential.

3. Promoting the internationalisation of companies: The Maritime Cluster Programme coaches companies in adopting an international perspective and analysing their potential for operating in the international market. The national operations of the programme's centres of expertise, regions and cluster reinforce the nationwide networking of businesses and experts in the most strategic areas. The maritime cluster encompasses five centres of expertise: Lappenrantaa innovation Ltd (Southeast Finland Centre of Expertise), Technology Center Oy Merinova Ab (Western Finland Centre of Expertise), Pro Metal Oy (Raahe Region Centre of Expertise), Prizztech (Satakunta Centre of Expertise) and Koneteknologiakeskus Turku Oy (Southwest Finland Centre of Expertise).

Source: OKSE.

Box 4. Logistics research and training in Helsinki

Logistics in Aalto University School of Economics focuses on operations management and supply chain management including both theoretical and application-oriented research. Currently the research projects have been built around the following themes: a) benchmarking supply networks, b) longitudinal industrial benchmarking, c) logistics networks research, d) market microstructure and channels e) capability-based strategies for technology, marketing and supply-chain management, f) service modularity, g) business models and e-business, and h) supply-chain sustainability.

Other institutions are delivering research and development services. They include the Finnish Maritime Association, whose research is focused on promotion of waterborne traffic, safety and environmental issues, and exploitation of the possibilities generated by information technology). The VTT Technical research center also has a strong department on transport and maritime technologies. The Maritime Safety Training Center located in Lohja (not far from Helsinki) also has research capabilities.

3.2 Transportation policy

Rail transport represents a limited share of hinterland traffic. The Finnish railways lack much interest in this traffic, and there is relatively little demand: main economic activity is in southern Finland, where distances are close to each other (thus more convenient for trucks), while activities in the rest of Finland are dispersed and thus without the volumes necessary for rail traffic.

Main actors in Finland that could initiate freight railway transport and intermodal hinterland transport are seaports like the Port of Helsinki. In this regard, Helsinki holds an interesting position: as the largest domestic RoRo and one of the largest container seaports it could increase the environmental sustainability of the Finnish transportation industry by implementing a dry port network similar to the one developed by the Port of Göteborg. Currently, Helsinki has thus type of arrangement only with Oulu; still, this arrangement is not ideal, as loading in Helsinki takes place in the Pasila area (near the city centre and close to former port areas) but is not best suited for the Vuosaari (located further to the east). A similar dry port-arrangement could be extended to Tampere in the west of Finland (*e.g.* Seinäjoki or Kokkola) and eastern Finland (*e.g.* Kouvola or Mikkeli). This type of connection with Tampere has been on the national railway company's agenda several times and proposed in several projects (*e.g.* KombiSuomi) (Käppi *et al*., 2010).

Helsinki is in a unique position, given its general cargo flows' origin from all over Finland and its dominant position in RoRo. Helsinki could improve its railway volume from the current 5% of overall hinterland transport to 15-20%. The railway logistics area planned next to the Vuosaari port could facilitate this improvement. The plans include possibilities for loading containers, trailers and freight tracks, as well as rail connection to the main railway line via the port, a direct connection to the port for cargo transport equipment and a direct contact with the road system.

The development of international rail traffic also offers new possibilities for Finland. Connecting Helsinki to Rail Baltica (See Box 5) would fundamentally change the logistics choices in the Baltic Sea region. Direct train services via Rail Baltica could provide an alternative route for Russian trade and transit. Cities and regional actors in the Helsinki metropolitan region have taken an active role in promoting further utilisation of the railway connection. In particular, the City of Helsinki has initiated an international project preparation team to generate the Rail Baltica growth corridor. This initiative aims to improve city-region competitiveness through focused actions and strategy development resulting in better utilisation of transport corridors and logistic service development.

Box 5. Rail Baltica

Rail Baltica is one of the priority projects of the European Union Trans-European Transport (TEN-T). The project intends to link Finland, Estonia, Latvia, Lithuania and Poland and also improve the connection between central and eastern Europe and Germany. Rail Baltica enables a shift of the regions' major freight transport (currently directed towards Russia and then north via heavy trucks) from road to rail. Furthermore, it would create a convenient passenger connection. Rail Baltica could be a sustainable alternative to the planned Via Baltica motorway which has been environmentally controversial.

3.3 Spatial planning and the relocation of the port

One of the biggest accomplishments in spatial planning of port-city functions has been the building of a new commercial port in Vuosaari 16 km from downtown Helsinki, while maintaining passenger terminals (South and West Harbour) in the city centre. Originally opposed to moving the port, the port authority began to support the plan when a private investor threatened to build a nearby port that would take over much of the traffic. Sunk investment was minimal, as infrastructure in the old port sites was old

and already depreciated. The changed nature of the cargo over the years (from bulk to unitised cargo) also would have necessitated significant re-investments.

The transfer of cargo-related harbour operations from the inner city to Vuosaari has released land in the Jätkäsaari area (West Harbour), now being redeveloped as a new maritime inner-city district. The existing passenger harbour will remain, but Jätkäsaari will become a residential and workplace area. Designed to be an urban flavoured and distinctive part of Helsinki's city centre with street-front shops and sidewalk cafés, Jätkäsaari is being planned according to sustainable development principles, with energy effective solutions for all buildings. By the mid 2020's, this area will be home to 16 000 residents and 6 000 jobs.

The central government was a partner in the decision to move the goods harbour from the inner city to the Vuosaari site, as part of a government strategy to develop transport connections in Helsinki metropolitan region and decongest the area, the most important in Finland. This investment allowed the major part of the cargo traffic to Vuosaari, estimated at 3 600 trucks per day, to shift away from the city centre and to the outskirts, helping to decongest downtown Helsinki. The central government also financed part of the operation as a result of an agreement with the City of Helsinki. The price tag of the Vuosaari seaport was estimated at EUR 400 million, depending on which elements are included in the calculation[8].

Decongesting the city was a driver of relocating the cargo port, yet a lot of RoRo traffic still uses the ferry terminals in the South and West terminals. This terminal use is inevitable to some extent: cargo activities are necessary to maintain the high frequency of ferry traffic and the low cost of passenger tickets. Still, the benefit of using the inter-city port is limited: if the amount of cargo is too large, it is more efficient to transport this load to pure cargo ships in Vuosaari port. Finding the balance is a future challenge. The relocation of the port has also changed regional dynamics. Vantaa's opposition to the relocation of the port for fear of being reduced to a warehouse city led to competition between Helsinki and Vantaa in the 1990s; since then, Vantaa has embraced the new port with recognition that a large part of its economy (25% of local employment) depends on logistics. Many logistics companies in Vantaa are port clients with seamless access to both airport and the port via Ring Road 3. Although Vuosaari has some space for warehouses and logistics, the areas in Vantaa around the ring road better suit these activities.

The location of the cargo port in Vuosaari liberated the South Port site. As part of World Design Capital Helsinki 2012, the City of Helsinki is organising an international competition for ideas on how to use this available area. Competition entrants must create a comprehensive ideas plan for future development of the entire shore area of the South Harbour. The South Harbour forms Helsinki's marine national landscape; essential to its identity are the central location of the South Harbour, the area's cultural history and the passenger ports.

While the move to Vuosaari could be a success, the size of the port (122 ha in Vuosaari, 0 ha in South Harbour, 22 in West Harbour) remains modest compared to many other ports in Europe (even taking into account tonnage differences). In Vuosaari, the city district offers a variety of residences with waterfront surroundings, recreational areas and a diverse range of services. However, expansion of the port is limited by the neighbouring golf course and protected areas. Warehousing facilities in the port are too expensive for many companies that need to transfer their good to the airport or other areas. Port authorities must devote more attention to this issue and to the establishment of plans for the future.

3.4 Green policies

The Port of Helsinki aims to be a pioneer in environmental issues and a good neighbour in every sense. The port has made large ecological investments to accompany the Vuosaari port project located closed to a Natura 2000 site. Widely recognised as an international best practice in green port management,

these investments led the Port of Helsinki to receive the 2010 Award on Societal Integration of Ports of the European Sea Port Organisation (ESPO). In particular, the Port of Helsinki requires that its partners take environmental issues into account. Environmental matters are incorporated in the port's Integrated Management System based on ISO 14001 requirements. The annual environmental programme incorporates the sustainable development action plan objectives of both the Port and the City of Helsinki. Given that the Baltic Sea and the Gulf of Finland are threatened by several pollutants, the Port and the City of Helsinki have been active partners in several environmental protection international projects (*e.g.* CLEANSHIP and SuperGreen projects) (See Box 6).

All activities in the port are regulated by environmental permits. These permits require the port to estimate air emissions from port operations (ship, traffic and machinery). For this purpose, the port is endowed with an air quality station to monitor air quality in the area; 11 of these stations are located throughout the Helsinki Metropolitan Area. Pollutant compounds include carbon, nitrogen and sulphur and particles. For the concentrations of NO, NO_2, SO_2 and fine particles, five mean values are measured hourly. Because of the Baltic Sea special emission control area, the content of sulphur in used fuel must be below 1%; when the ship is berthed for more than two hours, the content of sulphur used in the fuel should be less than 0.1%, according to EU directives. Environmental permits also set limits to the noise produced by vessels and port operations. Because discharge into the sea is prohibited (including discharge of treated water from sewage treatment plants), the Port of Helsinki provides waste management services: the Vuosaari port site has a treatment unit for received waste water. Port of Helsinki reports the amount of waste collected in the port area, the quality of waste, types of waste disposal and energy consumption yearly to environmental authorities.

Despite the environmental efforts of port and city, the modal split of port hinterland traffic is not very green. In Vuosaari, trailers and trucks dominate the traffic from the harbour to various destinations in the country. Investment and capacity of the railway line to capture part of this traffic seems low. Despite obvious advantages in reducing the ecological footprint, this transport mode is not receiving much attention. The Port and the Ministry of Transport need to better value railway advantages and devote more time and money to a sound plan for increasing rail share in the transport of goods from the harbour.

Box 6. Green programmes for the Baltic Sea

The Port of Helsinki is playing an active role in Baltic Sea shipping or CLEANSHIP, an EU funded programme to reduce ship-borne pollution on the Baltic and in its port and port cities. HELCOM (Helsinki Commission) countries have already proposed to the International Maritime Organisation the designation of the Baltic Sea as a control area under Annex IV to MARPOL 73/78 to ban discharges of untreated sewage from passenger ships. The project is part of the EU's strategic action plan to improve the condition of the Baltic Sea region, aiming to make it a model region for clean shipping. Another international programme with a significant environmental protection dimension is the Central Baltic Interreg IV, which funds cross-border co-operation between Estonia and Finland. With total allocation from the European Regional Development Fund of EUR 100 million, this programme aims to promote a safe and healthy environment.

The concept of green corridors (*i.e.* SuperGreen) was launched by the EU in early 2010. This concept denotes long distance freight transport corridors where advanced technology and co-modality (collaboration between different transport modes) are used to achieve energy efficiency and reduce environmental impacts. The programme is supported by the EU DG-TREN within the 7th Framework Programme and run by a diverse consortium of partners (terminal operators, infrastructure operators, cargo owners, industry/consultant, NGOs, environmental organisations, R&D institutions) that provide the analytical power for an interdisciplinary approach of problems and suggest solutions. The consortium evaluates a series of green super-corridors, including one called Edelweiss, which connects the Nordic Triangle (St Petersburg/Helsinki/Turku/Stockholm/Copenhagen) to the north of Italy (Milan, Genova) through Germany (Hamburg/Ulm).

3.5 Port governance

In Finland, transport infrastructure is controlled by municipalities, the state or their respective private companies. In the road transportation market, there are over 11 thousand companies, mostly small-sized (with one or two trucks) (SKAL, 2010), and nearly 80% are privately owned and maintained (Saranen, 2010). In some main highway investments, public-private partnership forms are currently used (Saranen, 2010). However, in other modes, the situation is different. Almost all of the railway network (99%) is owned and maintained by a governmental agency, the Finnish Transport Agency. The railway sector has only one operating company, VR Group, which is entirely owned by the government. Finland has approximately 50 seaports (mostly due to its long coastal line), and about 30 of are significant to the transportation system; with very few exceptions, these seaports are under municipality influence and ownership (Neste Oil plc. has two major oil ports in its private ownership, but 50.1% of the company itself is owned by the Finnish state; some minor sea ports like Olkiluoto private sea port, Inkoo Shipping and Kantvik Shipping also exist). Most significant airports (25 total) are owned by the state, and operated and maintained by Finavia plc., which is controlled by the Ministry of Transport and Communications.

Ports are an important part of the municipalities' infrastructure networks. Their ownership and governance models in Finland range from traditional municipal departments to enterprise and company structures and privately owned ports. The Port of Helsinki operates as an administrator according to the landlord principle, requiring the port to invest in the infrastructure, maintain the port area, and to administer and lease the land area. The port does not own the land but rents land area through the city real estate office. In the Vuosaari cargo harbour, all buildings are privately owned. In passenger harbours, all buildings are owned by the Port of Helsinki.

While the Port of Helsinki is part of the city administration, it functions like a limited company and does not receive money from the city; although the board is composed of politicians, it generally does not interfere in port business. Still, the optimality of this structure is in question, raising the need to

professionalise the board, organise shared governance and improve the strategy design process. In the present configuration, the obligation to disclose public decisions is a problem, as strategic secrets are quickly disclosed.

Parliament is currently reviewing a change in legislation that would oblige all ports in Finland to become limited companies, 100% owned by their local authorities. The EU strongly encourages this change. The Ministry of Transportation is working on a master plan on ports and will take follow-up initiatives. However, the relatively large number of ports in Finland may pose am issue. For many municipalities, the port and its economic impacts are significant, making it unlikely for a municipality to close its port even in the current economic downturn. The supporting basic infrastructure is key to ensuring a port's competitiveness with other ports and alternative modes of transport. Given the size of the country, the number of ports in Finland (30) seems high and raises issues of critical mass. The recent merging of the Ports of Hamina and Kotka[9] might herald change and reveal a new emerging trend in favour of port partnerships.

Port and logistics activities illustrate the necessity of a metropolitan approach. The Port of Vuosaari is located at the edge of the City of Helsinki, and many of the logistics companies using the port are located near the airport in Vantaa or elsewhere. In addition, the hinterland of the port is concentrated in the metropolitan area of Helsinki, though serves other Finnish regions as well. OECD Reviews on Helsinki and Finland have stressed the need for a metropolitan approach in order to co-ordinate development opportunities at a regional level. Several of the challenges for port-city development in Helsinki exist at this level and confirm earlier findings.

BIBLIOGRAPHY

AuT (Autoalan Tiedotuskeskuksen) (2011), *The Finnish Information Centre of Automobile Sector: New Registration by Vehicle Group 1960-2010*, http://www.autoalantiedotuskeskus.fi/, accessed September 2011.

Chiodo, A. J. and M. T. Owyang (2002), "A Case Study of a Currency Crisis: The Russian default of 1998", *The Federal Reserve Bank of St. Louis Review*, Vol. 84, No. 6, pp. 7-18.

Containerisation International (2008), *Yearbook 2009*, Informa Publishers, UK.

Containerisation International (2009), *Yearbook 2010*, Informa Publishers, UK.

Containerisation International (2010), *Yearbook 2011*, Informa Publishers, UK.

CTUR (2011), Second CTUR Thematic Journal; Topics and Case Studies on "Economic and social benefits", Cruise Traffic and Urban Regeneration (CTUR) Thematic Network, URBACT II European Programme

Finnish Customs (2008), *Itään Suuntautuva Maantietransito Vuonna 2008* (East Directed Road Transit Transport in 2008), Finnish Customs, Helsinki, Finland.

Finnish Customs (2009), *Itään Suuntautuva Maantietransito Vuonna 2009* (East Directed Road Transit Transport in 2009), Finnish Customs, Helsinki, Finland.

Finnish Customs (2010), *Itään Suuntautuva Maantietransito Vuonna* 2010 (East Directed Road Transit Transport in 2010), Finnish Customs, Helsinki, Finland.

Finnish Transport Agency (2011), Annual Maritime Statistics, portal.liikennevirasto.fi/sivu/www/f/liikennevirasto/tilastot/liikennemaarat/ulkomaan_meriliikenne, accessed September 2011.

Finnports (2011), Finnish Port Association – Sea Harbour Statistics, www.finnports.com/statistics.php, accessed August 2011.

Gazprom (2011), "Heads of Gazprom, Statoil and Total Discuss Implementation of Shtokman Project", Press release of Gazprom, Moscow, Russia, 8 July, www.gazprom.com/press/news/2011/july/article115065/, accessed August 2011.

Hilmola, O-P. (ed) (2008), "Railway Wagon Market Analysis and New Multi-Purpose Wagon Solution for Freight Transports – Finnish Manufacturing Perspective", Research Report 194, Department of Industrial Engineering and Management, Lappeenranta University of Technology, Lappeenranta.

Hilmola, O-P. (2011a), "Container Sea Ports and Network Connections within the Gulf of Finland", *International Journal of Business Performance and Supply Chain Modelling*, Vol. 3, No. 4, pp. 316-334.

Hilmola, O-P. (2011b), "North European Companies and Major Eurasian Countries – Future Outlook on Logistics Flows and Their Sustainability", *International Journal of Shipping and Transport Logistics*, Vol. 3, No. 1, pp. 100-121.

Hilmola, O-P., U. Tapaninen, E. Terk and V-V. Savolainen (2007), *Container Transit in Finland and Estonia – Current Status, Future Demand and Implications on Infrastructure Investments in Transportation Chain*. Centre for Maritime Studies, University of Turku, Turku.

Henttu, V. (2011), "Regional Survey Study from Dry Port Concept in South-East Finland". Research Report 230, Department of Industrial Management, Lappeenranta University of Technology, Lappeenranta.

Henttu, V. and S. Multaharju (2011), "Transshipment Costs of Intermodal Transport in Finnish Context". Research Report 234, Department of Industrial Management, Lappeenranta University of Technology, Lappeenranta

Holma, E., Yliskylä-Peuralahti, J. (2009), "The regional economic impacts of the ports of Pori and Rauma" (in Finnish), Centre for Maritime Studies, University of Turku

Korovyakovsky, E. and Y. Panova (2011), "Dynamics of Russian Dry Ports", *Research in Transportation Economics*, doi:10.1016/j.retrec.2011.08.008, pp. 1-10.

Koskinen, P., O. Chistokhvalova and O-P. Hilmola (2009), "Intermodal and Non-Containerized Supply Chain Connecting Northern Europe to North America", *World Review of Intermodal Transportation Research*, Vol. 2, No. 4, pp. 311-325.

Kämärä, A. (2010), *Russian Port and Railway Sectors: Development in 2008-2009*. Centre for Maritime Studies, University of Turku, Turku.

Käppi, M., T. Mäkelä, A. Saarialho and P. Salo (2010), *KombiSuomea Rakentamassa* (Building Combined Transport in Finland), Yleinen Teollisuusliitto, Helsinki.

Laisi, M. (2010), "Business Environment and Future Opportunities in Russian Railway Freight Market", Research reports of the Finnish Transport Agency 18/2010, Finnish Transport Agency, Helsinki.

Lampinen, R. (2006), "Agreement on 'Connecting Railway Traffic' between Finland and Russia", Presentation for the Workshop on Agreements on Cross-Border Rail Transit, Ministry of Transport and Communications, Finland, 13 July, http://ec.europa.eu/transport/rail/ws/doc/cross-border-agreement-fi.pdf, accessed August 2011

Lorentz, H. and O-P. Hilmola (2010), "Dynamic Nature and Long-Term Effect of Events on Supply Chain Confidence", in Reiner (ed.), *Rapid Modelling and Quick Response*, Springer, New York, pp. 275-288.

Lättilä, L. and O-P. Hilmola (2012), "Forecasting Long-Term Demand of Largest Finnish Sea Ports. *International Journal of Applied Management Science*, Vol. 4, No. 1, pp. 52-79.

Maggio, G. and G. Cacciola (2009), "A Variant of the Hubbert Curve for Oil Production Forecasts", *Energy Policy*, Vol. 37, No. 11, pp. 4761-4770.

Mäkitalo, M. and O-P. Hilmola (2010), Analysing the Future of Railway Freight Competition – A Delphi Study in Finland", *Foresight*, Vol. 12, No. 6, pp. 20-37.

Märkälä, M. and J. Jumpponen (2009), Transit Traffic Route Selection – A Comparison of the Transit Routes to Russia from a Company Viewpoint", *World Review of Intermodal Transportation Research*, Vol. 2, No. 4, pp. 264-278.

Niini, M. (2010), "Situation of the Finish Maritime Cluster 2010", Roundtable of the European Maritime Clusters, Wassenaar, 8 November.

Ports of Bremen and Bremerhaven (2011). *Ports Handbook 2011*. Port of Bremen/Bremerhaven.

Port of Gothenburg (2011), "Rail Services", http://viewer.zmags.com/publication/d129d0fd#/d129d0fd/16, accessed August 2011.

Port of Hamburg (2011). *Port of Hamburg Handbook 2011*, Hafen Hamburg Marketing e.V., Hamburg.

Rosstat (2010), *The Demographic Yearbook of Russia 2010*, Federal State Statistics Service, Moscow.

Ruutu, S. (2008), "National Sea Transportation Demand and Capacity Forecasting with System Dynamics". M.Sc. Thesis, Helsinki University of Technology, Helsinki.

Rönty, J., M. Nokkala and K. Finnilä (2011), "Port Ownership and Governance Models in Finland – Development Needs and Future Challenges", VTT Working Papers 164, VTT, Helsinki.

Saranen, J. (ed.) (2010), "Intermodal Transportation in Emergency Situation in the Gulf of Finland", Research Report 223, Department of Industrial Management, Lappeenranta University of Technology, Lappeenranta.

SKAL (2010), "Yrityskoko Luvanvaraisessa Tavaraliikenteessä Vuonna 2010" (Company Size in Licence Based Road Freight Transports in 2010), figure available online at www.skal.fi/tietoa_kuljetusalasta/tutkimukset/tilastot, accessed August 2011.

St. Petersburg Sea Port (2011), "Cargo Handling at First Stevedoring Company during 2010", www.en.seaport.spb.ru/press/release/247/, accessed August 2011.

Statistics of Finland (2011). "Statistics of Finnish Transport and Tourism", www.stat.fi/til/lii.html, accessed August 2011.

Sundberg, P., A. Posti and U. Taipaneen (2011), *Cargo Flow Study on the Helsinki Tallinn Route*, University of Turku, Turku.

TAF (Taxpayers' Association of Finland) (2010), "Taxpayers' Association of Finland – Statistics of Municipality Tax Rates", www.veronmaksajat.fi, accessed August 2011.

Tallink (2010), *As Tallink Grupp: Annual Report 2009-2010*. Tallinn, Estonia.

Tervala, J. (2009), "Evaluation of the Transport Projects of the Kolari and Sokli Mining Projects", Publications of the Ministry of Transport and Communications 34/2009, Ministry of Transport and Communications Helsinki, Finland.

Transport Agency (2011), Transportation Statistics of Finland, http://portal.liikennevirasto.fi/portal/page/portal/f/liikennevirasto/tilastot, accessed August 2011.

Turun Yliopisto (2007), “The economic impacts of the ports in the Kymenlaakso region” (in Finnish), Turun Yliopisto

Viking Line Group (2010), *Viking Line Annual Report: November 1, 2009 – December 31, 2010*, Viking Line, Mariehamn.

VR Group (2005), *VR Annual Report 2005*, VR Group, Helsinki.

VR Group (2010), *2010 Annual Report*, VR Group, Helsinki.

NOTES

[1] ABB AS is a global company and a major supplier of products and systems for power transmission, process and industrial automation.

[2] Passenger traffic exceeded 9 million passengers in 2009. Passenger flows were the highest between Helsinki and Tallinn with 6.4 millions passengers in 2009, an increase of 1% compared to the previous year. Traffic with Stockholm is also important with 2.4 million passengers.

[3] See Port of Helsinki Annual Report 2009.

[4] Tallink also has some routes to Sweden through Helsinki (called Silja subsidiary). The figure in cargo units is about 140-150 thousand through the Helsinki seaport.

[5] The RoRo amounts are lower in this shipping line, as it has only one operating passenger ship to the western terminal; the second one is solely dedicated to RoRo transport and operates through Vuosaari.

[6] The central government is also strongly involved in maritime safety. International co-operation and agreements play an important role in ensuring vessel safety. One example of European Union (EU)-level co-operation is the decision to accelerate the introduction of double-hull tankers. The Ministry of Transportation and Communications has been an active participant in the development of the Vessel Traffic Management and Information Service (VTMIS) for traffic using the international waters of the Gulf of Finland. In the VTMIS system introduced in 2004, Finland, Russia and Estonia co-operatively monitor shipping in the Gulf of Finland, and the vessels themselves have a reporting obligation.

[7] The company is owned by the Uusimaa Regional Council, the city authorities of Helsinki, Espoo and Vantaa, and the universities, polytechnics, research institutes and business community of the region

[8] However, this includes only the immediate infrastructure in the seaport. In addition, the expenses for a railway tunnel and road tunnel leading to the new port amounted to nearly EUR 290 million, with the tunnel cost considerably over budget due to problems in drilling and stone quality. Investments in a fairway are estimated to cost EUR 200-300 million, and private parties (such as warehouses and manufacturing) have invested roughly EUR 400 million in the area. Overall, the investment is about EUR 1.3 billion.

[9] Hamina and Kotka ports were owned by two limited companies, so it was relatively easy to merge them.