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DEVELOPMENT OF REGULAR LINER TRAFFIC BETWEEN HANKO AND PALDISKI THROUGH TRUCK DRIVERS SATISFACTION SURVEY

– Case: DFDS and ferry Sailor

TURKU AMK
TURKU UNIVERSITY OF APPLIED SCIENCES

BACHELOR'S THESIS | ABSTRACT

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Regular liner sea traffic is an important part of intermodal transportation in Europe. Due to geographical position, a great part of Finnish import and export goes through the sea. When the Sulfur Directive came into force on the 1st of January 2015, The Port of Hanko is the southernmost port in Finland, got good cost and environmental benefits due to the shortest sea voyage to other Europe Ports.

This thesis explores the development possibilities for regular liner traffic between The Hanko Western Harbour in Finland and The Paldiski Northern Port in Estonia. The focus of the study is on the trucks and semi-trailers, which are transported on the ropax ferry Sailor. The aim is to examine how drivers satisfy with the Hanko–Paldiski route and identify ways to develop the service.

The thesis is commissioned by logistics company and port agent Oy Victor Ek Ab with the consent of Hanko–Paldiski route operator freight shipping company DFDS. This study is made by qualitative-quantitative method where are used statistical data from secondary sources and primary data from interviews of drivers.

The theoretical part consists of the analysis of Finnish sea traffic statistics. The implementation of this study is made by conducting a customer satisfaction survey and processing its results. The survey was made in an interview form.

The results of the survey were described to DFDS General Operations Manager. The route problems from the perspective of truck drivers were interesting and unknown for the shipping company.

KEYWORDS:

Regular liner sea traffic, sea traffic between Finland and Estonia, Hanko–Paldiski route, ropax vessel, interview of drivers

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Dania Kerzheneva

HANGON JA PALDISKIN VÄLISEN LINJALIIKENTEEN KEHITTÄMINEN REKKAKULJETTAJIEN TYYTYVÄISYYSKYSELYN AVULLA

- Case: DFDS ja lautta Sailor

Säännöllinen merilinjaliikenne on tärkeä osa intermodaalikuljetusta Euroopassa. Suomen maantieteellisen sijainnin vuoksi suurin osa maan tuonnista ja viennistä kulkee meritse. Hangon satama on Suomen eteläisin satama. Kun 1.1.2015 Rikkidirektiivi tuli voimaan, Hangon satama sai hyviä kustannus- ja ympäristöhyötyjä lyhyimmän merimatkan vuoksi verrattuna muihin Euroopan satamiin.

Tässä opinnäytetyössä tutkitaan Suomen Hangon Länsisataman ja Viron Paldiskin Pohjoissataman välillä olevaa säännöllistä merilinjaliikenteen kehitysmahdollisuutta. Tutkimuksessa keskitytään kuorma-autoihin ja puoliperävaunuihin, joita kuljetetaan ropax aluksella Sailor. Tutkimuksen tavoitteena on selvittää kuinka tyytyväisiä kuljettajat ovat Hanko-Paldiski reittiin ja löytää kehitysmahdollisuuksia.

Opinnäytetyön toimeksiantajat ovat logistiikkayritys ja satama-agentti Oy Victor Ek Ab ja Hanko-Paldiski reittin operaattori DFDS. Opinnäytetyössä käytetään kvalitatiivista ja kvantitatiivista menetelmää, eli käsitellään tilastotietoja sekundaarilähteistä ja kuljettajien haastatteluista.

Teoreettinen osa tutkimuksesta koostuu Suomen meriliikenteen tilastojen analyysistä. Tutkimusta toteutettiin suorittamalla asiakastyytyväisyyskysely ja käsittelemällä sen tuloksia. Kysely tehtiin haastattelun muodossa.

Kyselyn tulokset ovat nyt tiedossa DFDS operatiiviselle päällikölle. Reitin ongelmat rekkakuljettajien näkökulmasta ovat mielenkiintoisia ja olleet tuntemattomia varustamolle.

ASIASANAT:

Säännöllinen merilinjaliikenne, meriliikenne Suomen ja Viron välillä, Hanko-Paldiski reitti, ropax alus, kuljettajien haastattelu

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1 INTRODUCTION

Regular liner sea traffic between Finland and Estonia is part of the intermodal transport and connects Finland with the Baltic countries and Central Europe. It is well known that ferries from Helsinki to Tallinn depart daily. They carry both passengers and trucks and semitrailers with cargo at the same time. There is another regular sea traffic from Finland to Estonia. It is a ferry route between The Western Harbour of Hanko and The Northern Port of Paldiski, which was opened in 2011. The Port of Hanko had high expectations for the future of this route. Nowadays it is managed by DFDS Company and operated by ferry Sailor with a regular timetable and 9 departures in a week. According to the General Operations Manager of DFDS in the last three years, the Hanko-Paldiski route has a 10-12% market share of the regular sea freight traffic between Finland and Estonia.

Based on my observations while working at the DFDS check-in, the capacity of the ferry is not always 100% used. It's connected with many factors such as the geographical location of ports, driveways, pricing, schedule, etc. These and other factors affect customer satisfaction and determine which ferry the customer chooses.

Customers of Hanko-Paldiski route are logistics companies that are planning the route and book tickets, and truck drivers who directly use the ferry, as well as passengers with the cars or motor homes.

Customer satisfaction surveys for logistics companies are made regularly by DFDS and they know the actual situation. A survey for drivers was conducted in 2017 in the port of Paldiski in the form of a questionnaire. But the results were uncertain due to drivers refused to take part in the survey. In the port of Hanko, customer satisfaction surveys were not conducted. Therefore DFDS don’t consider surveying for logistic companies within this thesis. For the route operations manager is interesting to know drivers' opinions about the service and to identify the existing problems.

The main goal of this thesis is to find opportunities for the development of regular liner sea traffic between The Western Port of Hanko and The Northern Port of Paldiski through the customer satisfaction survey of drivers.

The objects of the study are the users of the ferry Sailor, i.e. truck drivers. Passengers on the cars and motor homes use the ferry mainly in the summer holidays. They make

up a small part of all customers, so their opinion in this study is not explored. This means that a survey will be conducted for the truck drivers. Based on the answers will be identified existing problems that customers meet during using the Hanko-Paldiski route. If it will be possible, solutions for the problems will be offered also. Solving driver's problems will improve the satisfaction of the route and can increase the demand for the route.

The main problems of this study include next three questions:

1. Are drivers satisfied with the Hanko-Paldiski route and ferry Sailor?
2. What problems do they meet on this route?
3. How these problems can be solved?

This work consists of theoretical and research parts. In the theoretical part will be described the importance of sea transport for Finland, the situation in freight transportation by sea from/to Finland in recent years, general features of the liner traffic, as well as liner traffic between Finland and Estonia. The research part aims to solve thesis problems and consists of preparing for the survey, conducting the interview, results and their analysis.

2 RESEARCH METHODOLOGY

The research process can be divided into theoretical and empirical parts. Theoretical research includes the processing of ready information. Empirical research is theory-based research methods that are aimed at finding answers to a research problem. (Heikkilä 2014, 12.)

Empirical research by the approach method can be quantitative and qualitative. Both quantitative and qualitative methods can be used to fulfill each other in the same study. (Heikkilä 2014, 14-15.)

Quantitative research is also statistical research based on numbers and percentages. Data is collected by standardized forms with the completed alternatives and formed in graphs and tables. Conclusions are based on them. Quantitative research is usually used to describe an existing situation, but it is not enough to explain the reasons. Typical data collection methods are forms and internet surveys, structured interviews, systematic observation, experimental studies. (Heikkilä 2014, 15.)

Qualitative research is aimed to understand the object of research and the reasons for its behavior and decisions. It focuses on a small number of subjects, but they are examined accurately. Qualitative research is suitable for example for the development activity, search of alternatives and study of social problems. The collection of data can be unstructured and information is usually in text form. Typical data collection methods are personal interviews, group interviews, participant observation, role-playing methods, ready materials, and documents. (Heikkilä 2014, 15.)

Research types graphically displayed in Figure 1.

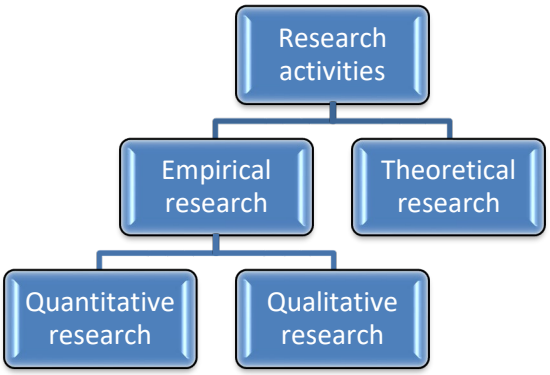


Figure 1. Research activities (Heikkila 2014, 13).

Data collected due to the research can be gotten from primary and secondary sources. Therefore information is accordingly called primary and secondary data.

Primary data are collected directly from sources by the researcher. The primary sources, for example, are surveys, interviews, observations, etc. (Krishnaswami, etc 2010, 86.)

Data in secondary sources were collected and compiled earlier for another purpose. It can be for example researches, reports, publications in newspapers and journals, etc. (Krishnaswami, etc 2010, 86.)

The nature of this research from the one side is the case-study of the development Hanko-Paldiski route by the understanding behavior and decision making of truck drivers who use this route. It will be made through the customer satisfaction survey. From the other side, research will be partly based on the analysis of numbers from databases to describe an existing situation in Finnish sea traffic and on the routes between Finland and Estonia. So in this research will be used both qualitative and quantitative approaches to complement each other.

3 FINNISH SEA TRANSPORT NOWADAYS

For many years the world economy based on the fact that the manufacture of certain goods is more profitable to have in the country where it is cheaper. So countries focus on the production of some goods and sell them to each other. The high level of international trades creates a greater need for transborder transport. (Tapaninen 2013, 12.)

Finland logistically is like an island since its sea border is one-third of the country's border. So due to Finland's geographical position towards other countries, import and export of the country depends on the sea and maritime transport. Since immemorial time Finland has been practicing shipping. And nowadays foreign trade for about 85 percent is transported through waterways. Finland carries both exports and imports by sea. (Meriliitto 2019.)

In year 2018, Finnish sea transport has occupied about 84% of all foreign trade. It is one percent more than in 2017. Sea freight tonnage increased by almost six percent from the previous year and was almost 91 million tons in 2018. Detaled information is shown in table 1. (Tulli 2019a.)

Table 1. Finland's foreign trade in the years 2017 and 2018.

Transport mode	2017		2018		Change, %
	1000 tons	Share, %	1000 tons	Share, %	
Sea transport	85 814	83,5	90 909	84	6
Inland water transport	487	0,5	533	0,5	9
Rail and road transport	14 546	14,1	14 523	13,4	0
Air transport	296	0,3	267	0,2	-10
Others	1 775	1,7	1 943	1,8	9
Total	102 918	100	108176	100	5

According to Finnish customs traffic statistics, the total number of import loaded trucks increased by 7 % to 654 000 units in 2018. 47 % of them arrived through the sea ports.

It is 308 000 units and 4 % more than in 2017. Other ways were 25 % Russian border, 20 % Swedish border and 7 % Norwegian border. (Tulli 2019b.)

The number of export loaded trucks continues growth in 2018 and increased by 3 % to 564000 units. 270 000 of them departed from ports and it is 48 %. Other parts of trucks crossed land borders, specifically 21% Russian border, 22% Swedish border and 9% Norwegian border. (Tulli 2019b.)

Although the total passenger foreign flow decreased slightly in 2018, the number of arrivals and departures through the ports has grown (Tulli 2019b).

Table 2 shows the numbers of International freight traffic through Finnish seaports in the years 2014–2018 in tons (Tilastokeskus 2019).

Table 2. International freight traffic through Finnish seaports in the years 2014–2018 (in tons).

Year	Import	Export	Total	Change
2014	48 031 339	48 192 022	96 223 361	
2015	44 492 479	44 676 348	89 168 827	-7,33%
2016	46 498 052	48 387 602	94 885 654	6,41%
2017	47 294 813	51 482 940	98 777 753	4,10%
2018	50 857 566	52 921 521	103 779 087	5,06%

For better clarity, we can represent the data from Table 2 on Figure 2. In this case, we will see an increase in both imports and export through Finnish seaports over the past three years.

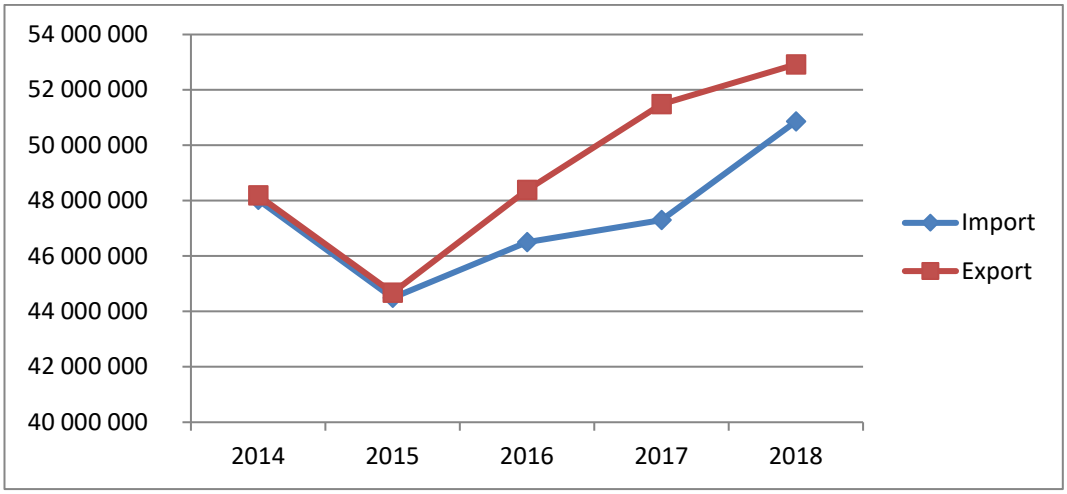


Figure 2. International freight traffic through Finnish seaports in the years 2014–2018 (in tons).

From the figures above it is obvious that sea traffic is very important for the Finnish economy and it was in the growth stage in recent years. Thus, regular sea traffic, as the main sea transport for general cargo, is also increasing.

4 LINER TRAFFIC

World maritime transport principles have changed in recent years. Nowadays ocean liner traffic is operated among major harbours by container ships. Finnish liner traffic has disappeared from outside Europe and both cargo and passenger ferries operate across the Baltic and North Seas. (Meriliitto 2019.)

Commercial shipping modes, in theory, are divided into two main groups: liner and tramp (Pöllänen, etc. 2003, 105).

The tramp is also called a general trader. Tramp vessel has no fixed schedule and published ports of call. It operates in any part of the world where it can have a contract. Tramp vessel sails according to the charter-party documents. It is a contract between a ship-owner and a charterer for the hire of a ship for the carriage of passengers or cargo. Generally tramp cargo is a bulk cargo such as coal, fertilizers, timber, grain, etc. (Branch 2007, 52, 56.)

Regular liner traffic is a type of maritime traffic when the ferry route connects two or a group of ports on a specific permanent schedule. Liner traffic vessel transports cargo from different customers. That is, the shipping space is offered and available for all shippers who require it. Shipping timetable on short routes is set up to a minute, and for long ones within a day. Timetable for liner traffic must be well calculated and thought out. The departure of the vessel does not depend on its fullness. It corresponds with the sailing schedule. (Tapaninen 2013, 81.)

Regular shipping between Finland and Sweden, Finland and Estonia is a liner. It is at most ro-ro freight traffic and ropax passenger traffic. Ro-ro vessels carry vehicles that are driven on and off the ship on their own wheels through the ramp. This loading method is called the roll on - roll off. Ropax is a ro-ro vessel built for freight vehicle transport with passenger accommodation. (Logistiikkamaailma 2019.)

Examples of liner traffic routes from Finland are Hanko-Paldiski, Helsinki-Tallinn, Turku-Stockholm, etc.

So we can summarize features of sea liner traffic:

- Regular schedule;
- Permanent predetermined route;

- Departure is not dependent on the fullness of the ship;
- Uniform tariffs;
- The possibility of concluding permanent contracts with transport companies;
- Oversea traffic is part of the well-calculated route, so customers expect punctuality in the departure and arrival;
- Fluctuations in demand, for example seasonal.

4.1 Liner traffic route and sailing schedule

According to the fact that regular liner traffic operates with a permanent schedule, it is important to have punctual sailing and arrival times. Otherwise, its trust and prestige will be decline. (Branch 2007, 51.)

Shipping companies invest large amounts in a ship. Therefor important that ship earns money all its lifetime. The sailing schedule should be planned so that the vessel is possibly fully loaded. The company gets a larger profit if it provides full employment for a ship all over the year and not only on peak seasons. (Branch 2007, 202.)

The sailing schedule depends on many factors, including the following:

- Availability of ships including crew, and their characteristics;
- Availability of ports facilities and services;
- Shipping demand fluctuations to ensure possibly fully loading;
- Route features such as loading and unloading time, voyage time, climatic conditions and political actions;
- Total voyage costs (Branch 2007, 204-205).

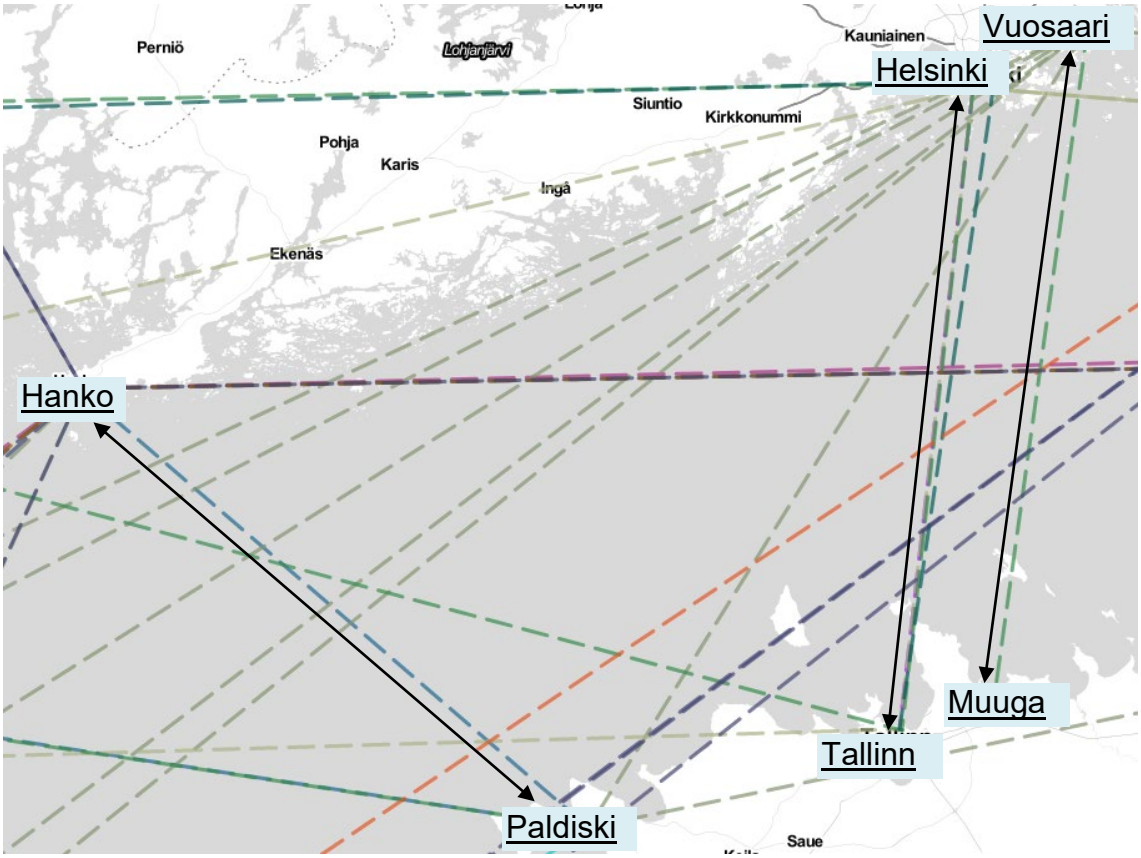
Route start and end ports are determined by different factors such as:

- Ship specification defines which port it can call.
- Ports location is the most important factor. It defines how high demand shipping will have. The well-located port has, for example, transshipment opportunities, good connections with railway or motorways.
- Operational costs in the port such as cargo dues, berth charges, pilotage, towage, etc.

- Port development level including efficiency of port operations, quality of port management, degree of technology, port infrastructure.
  (Branch 2007, 393-394.)

4.2 Liner traffic between Finland and Estonia

Liner traffic between Finland and Estonia goes nowadays through two routes. It is Hanko-Paldiski, and Helsinki–Tallinn (Picture 1). There is also Eastern route Loviisa - Kunda which is under development.



Picture 1. Liner traffic between Finland and Estonia (European transport maps 2019).

Freight traffic between Helsinki and Tallinn is operated by three shipping companies Tallink Silja Line, Viking Line, and Eckerö Line. Mainly trucks are transported on ropax ferries which have few departures every day. These are well-known passenger ferries, which also take on board cargo trucks.

Tallink Silja Line and Eckerö Line operate also cargo ferries which departures from Vuosaari harbour in Finland and arrives to Muuga harbour in Estonia. Both ports are located outside the cities. It contributes to reducing heavy traffic in Helsinki and Tallinn city centers and allows drivers to get highways quickly. Muuga Harbour is the biggest cargo port in Estonia. The position of Muuga is convenient for drivers who are traveling further along the European Route E67 Via Baltica, for example, to Latvia, Lithuania, Poland or even to Ukraine. Also, passenger cars and caravans can use this route.

Ferry Sea Wind is operated by Tallink Silja Line and has two departures in a day (Table 3).

Table 3. Ferry Sea Wind timetable for Vuosaari – Muuga route (TallinkSilja 2019).

M/s Sea Wind (6.1-21.12.2019)		
	Helsinki (Vuosaari)	Muuga
Monday-Friday	13.00 ->	17.00
Monday-Friday, Sunday	23.30 ->	03.30
	Muuga	Helsinki (Vuosaari)
Monday-Friday	07.00 ->	10.30
Monday-Friday, Sunday	18.30 ->	22.00

Ferry Finbo Cargo is operated by Eckerö Line. It is a new ferry that has begun to work on 25.6.2019 (Eckeroline 2019a). Ferry Finbo Cargo's schedule is shown in table 4.

Table 4. Ferry Finbo Cargo timetable for Vuosaari – Muuga route (Eckeroline 2019b).

M/s Finbo Cargo 2019					
	Vuosaari	Muuga		Muuga	Vuosaari
Monday-Friday	11.00 ->	13.45		15.15 ->	18.00
Monday-Thursday	19.15 ->	22.00		23.30 ->	07.00 next day
Friday	19.15 ->	22.00		-	-
Sunday	-	-		15.15 ->	18.00
Sunday	19.15 ->	22.00		23.30 ->	07.00 next day

The route between Hanko and Paldiski is operated by DFDS and Transfennica companies.

Ro-ro/storo ferry managed by Transfennica departures 2 times a week from Hanko and arrives to Paldiski South Port (Transfennica 2019).

DFDS operates the ropax ferry Sailor which sails from The Western Harbour of Hanko to The Paldiski Northern Port 9 times in a week (DFDS 2019).

In table 5 is shown how many passenger and freight ferries are owned by every shipping company, operating between Finland and Estonia.

Table 5. Shipping companies and the number of ferries, operating between Finland and Estonia.

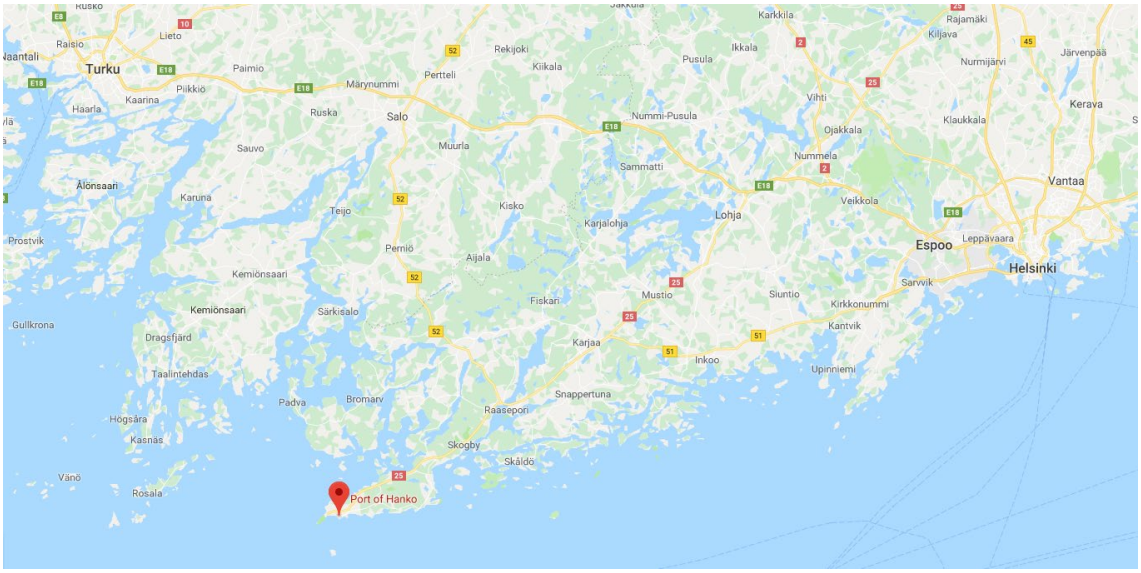
Shipping company	Passenger ferry	Freight ferry
DFDS	-	1
Tallink Group	3	1
Viking Line	1	-
Eckerö Line	1	1

According to E-mail inquiry with General Operations Manager of DFDS, company's share on liner traffic market between Finland and Estonia in the last 3 years was stable 10-12%. It is the smallest part comparing to others shipping companies operated with liner traffic between Finland and Estonia such as Tallink Group, Viking Line and Eckerö Line.

4.3 Hanko-Paldiski route

4.3.1 The Port of Hanko

Hanko is a small port town on the south coast of Finland (Picture 2).



Picture 2. The Port of Hanko on the map (Google maps 2019a).

The Port of Hanko is the southernmost port in Finland. It is ice-free over the year and operates efficiently and securely during the winter months. Due to its geographical location, The Port of Hanko offers fast connections to continental Europe. (The Port of Hanko 2019a.)

On the 1 st of January 2015, the Sulfur Directive came into force. It limits sulfur emissions from commercial shipping which increases shipping costs. It brings to Hanko good cost and environmental benefits due to the shorter sea voyage to other Europe Ports. (The Port of Hanko 2019b.)

The main market area for the Port of Hanko is Europe. It has an almost daily connection to Lübeck and Rostock in Germany, three times in a week to Gdynia in Poland and Antwerpen in Belgium. Hanko has departures to Paldiski North nine times in a week and to Paldiski South 2 times in a week. One time in a week ferries depart to Tilbury in England and St. Peterburg in Russia. (The Port of Hanko 2019c.)

Nowadays The Port of Hanko is the second largest liner shipping port in Finland for truck and trailer traffic after Helsinki, the largest for German ro-ro traffic and in 2018 the eighth largest commercial port in Finland. It has a healthy export and import balance witch in 2018 was 54,55% to 45,45%. The Port of Hanko mainly handles the export of Finnish paper and metal products and imports of new cars. Special transports and heavy loads also pass through the Port of Hanko. In table 6 are shown numbers of international cargo shipping through Hanko and Helsinki Ports. (Tilastokeskus 2019.)

Table 6. International cargo shipping through Port of Hanko and Port of Helsinki in the years 2017-2018 (in tons).

	2017				2018			
	Hanko		Helsinki		Hanko		Helsinki	
	Import	Export	Import	Export	Import	Export	Import	Export
Total	1982169	2517156	7066908	6918965	2160444	2592483	7193129	7377509
Timber	771	745	2965	38940	863	1060	244	93748
Sawn wood	10194	237984	2628	495893	4674	138381	607	391332
Wood pulp	1583	3585	4537	74400	1377	7398	5811	565029
Paper	25244	869707	88426	699983	18151	608081	101176	721306
Plywood and veneers	7429	27169	4160	6264	3186	28960	3611	5384
Ores and concentrates	860	29000	59499	39355	5560	2907	80860	67187
Metals and metal manufactures	319581	411320	236067	82004	268122	351902	231469	87296
Crude oil	199	.	.	.	8104	.	.	.
Oil products	668	2055	6913	565	7509	79	6614	24
Coal and coke	3028	3561	1254834	44159	2033	1880	1208007	35614
Fertilizers	490	113	730	.	98	96	497	.
Chemicals	80780	110633	69763	54000	74795	98000	66879	66589
Crude minerals and cement	12827	317	277611	8646	66762	336	365845	7246
Cereals	21	.	8822	83873	.	.	17771	96738
General cargo	1295069	756961	4330913	4675680	1481050	1328921	4263103	4594857
Other merchandise	223425	64006	719040	615203	218160	24482	840635	645159

The Port of Hanko has grown last years. Table 7 are shown the numbers of import and export through the Port of Hanko in the years 2014-2018. (Tilastokeskus 2019.)

Table 7. Import and export through the Port of Hanko in the years 2014-2018 (in tons).

Year	Import	Export	Total	Change of total
2014	1 760 226	1 924 841	3 685 067	
2015	1 848 519	2 285 995	4 134 514	12,20%
2016	2 058 661	2 734 332	4 792 993	15,93%
2017	1 982 169	2 517 156	4 499 325	-6,13%
2018	2 160 444	2 592 483	4 752 927	5,64%

In order to see clearly change dynamics of import and export through the Port of Hanko need to place numbers from Table 7 on Figure 3.

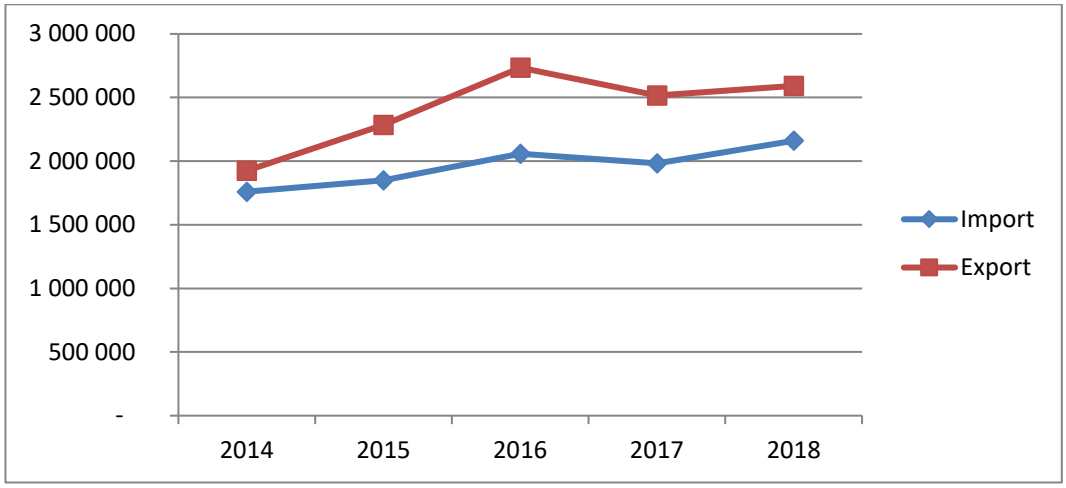


Figure 3. Import and export through the Port of Hanko in the years 2014-2018 (in tons).

The Port of Hanko combines fast liner traffic to Europe Ports with its good driveways, well-developed infrastructure, and quick services. It mainly consists of two parts.

- The Western Harbour handles liner traffic.
- The Outer harbour handles Pure Car Carriers.

The Port of Hanko positioning itself as a “fast and friendly port”.

4.3.2 The Port of Paldiski

Paldiski is a small town on the northwest of Estonia, 45 km west of the capital city Tallinn, and Baltic Sea Port. There are Paldiski North and South Ports.

Paldiski South Port is a Baltic Sea cargo harbour owned by Port of Tallinn.

The Northern Port of Paldiski is a 100% privately owned trading seaport on the Baltic Sea. It is the Estonian port closest to Europe (Picture 3).

Picture 3. The Port of Paldiski on the map (Google maps 2019b).

The Northern Port of Paldiski offers navigation year-round due to ice-free water in the natural bay. The Northern Port of Paldiski has a free economic zone status. So Port customers have the option of storing vehicles on the territory of the free economic zone without paying customs duties and with compensation of the input VAT. (The Port of Paldiski 2019.)

Due to the small size of Paldiski, it is easy to get out of the port to the highway. There is a straight road that connects Paldiski with road E67. European route E67 is a road connecting Helsinki in Finland with Prague in the Czech Republic via Tallinn in Estonia, Riga in Latvia, Kaunas in Lithuania, Warsaw and Wroclaw in Poland.

Due to the Estonian ports association, the Northern Port of Paldiski has grown last 5 years. At the same time, Estonian ports volume in common had declined as shown in table 8. (Estonian ports association 2019.)

Table 8. Estonian ports volume of goods in the years 2014-2018 (in 1000 tons).

	Year				
Ports	2014	2015	2016	2017	2018
Port of Tallinn	28 321	22 430	20 120	19 180	20 608
Paldiski North Port	1 875	2 300	2 500	2 550	2 840
All Estonian Ports	42 732	35 350	34 160	34 350	36 141

Data from Table 8 is graphically shown in Figure 4 and Figure 5.

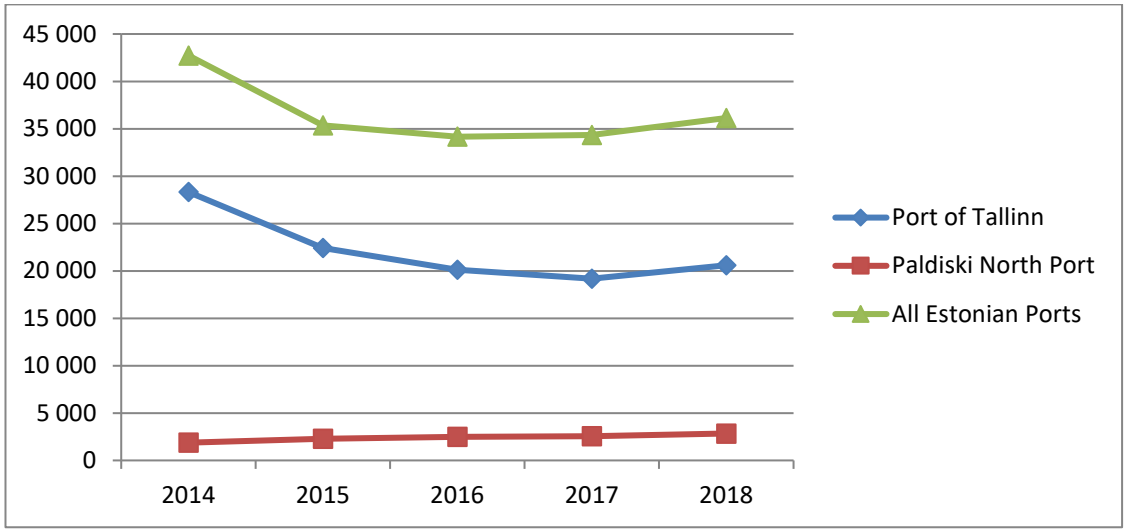


Figure 4. Estonian ports volume of goods in the years 2014-2018 (in 1000 tons).

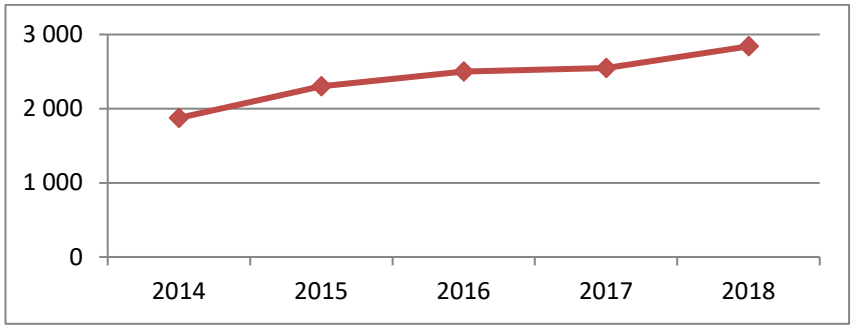


Figure 5. The Northern Port of Paldiski volumes of goods in the years 2014-2018 (in 1000 tons).

4.3.3 Hanko-Paldiski liner sea traffic

According to web-page sea-distances.org distance between Hanko and Paldiski is 46 nautical miles. It is about 85 km. For comparison, from Helsinki to Tallinn 48 nautical miles and it is about 89 km.

Hanko and Paldiski are situated on opposite coasts of the Baltic Sea which has the next features:

- The Baltic Sea is a small and shallow, almost enclosed sea area, but the world's second-largest brackish water reservoir.
- The Baltic Sea area is about 392 000 square kilometers. The average draft is 55 meters. For comparison, it is 1500 meters in the Mediterranean Sea.
- About 85 million people live in the Baltic Sea catchment area.
- The Baltic Sea is one of the busiest in the world, about 15% of the world's freight traffic.
- In winter ice covers about 218 000 square kilometers, but in some winters the Baltic Sea can freeze almost completely.
- Navigation in the Baltic Sea is challenging due to crossing routes, shallow waters, archipelagoes and winter conditions.
  (Stateofthebalticsea 2019.)

At the end of 2011 liner sea traffic between Hanko and Paldiski has begun. The Port of Hanko has expected good opportunities from the route. At the beginning between Hanko and Paldiski sailed m/s Via Mare. (Länsi-uusimaa 2011.)

Nowadays DFDS manages the Hanko-Paldiski route and m/s Sailor operates it with 9 departures in a week. Shipping time is 3-3,5 hours. In Table 9 there is a schedule for regular liner traffic between Hanko and Paldiski by m/s Sailor. (DFDS 2019.)

Table 9. Schedule for Hanko-Paldiski route by DFDS.

Departures from Hanko		Arrivals to Paldiski		Departures from Paldiski		Arrivals to Hanko	
Mondays	23:00	Tuesdays	02:30	Mondays	04:00	Mondays	07:30
Tuesdays	13:00	Tuesdays	16:00	Tuesdays	05:00	Tuesdays	08:30
Tuesdays	23:00	Wednesdays	02:30	Tuesdays	18:00	Tuesdays	21:00
Wednesdays	13:00	Wednesdays	16:00	Wednesdays	05:00	Wednesdays	08:30
Wednesdays	23:00	Thursdays	02:30	Wednesdays	18:00	Wednesdays	21:00
Thursdays	13:00	Thursdays	16:00	Thursdays	05:00	Thursdays	08:30
Thursdays	23:00	Fridays	02:30	Thursdays	18:00	Thursdays	21:00
Fridays	23:00	Saturdays	02:30	Fridays	05:00	Fridays	08:30
Sundays	22:00	Mondays	01:30	Sundays	17:30	Sundays	21:00

M/s Sailor is a ropax vessel shown on Picture 4. The ferry takes onboard 119 passengers and 1400 lane meters of vehicles. This route can only be traveled with the vehicle due to the infrastructure of the Port of Hanko. Ropax vessels can transport trucks and trailers, trailers, hazardous cargo, reefer trailers, ISO Containers, reefer containers, mobile machines, industrial cargo, automotives, passenger cars. (DFDS 2019.)

Picture 4. M/s Sailor on Hanko-Paldiski route (DFDS 2019).

M/S Sailor is a cargo vessel and has no shops and bars onboard. There is a buffet restaurant on board and meals are included in the ticket price. There is a sauna on the ferry, which is free for passengers. There are one, two and three-bed cabins on the ship. (DFDS 2019.)

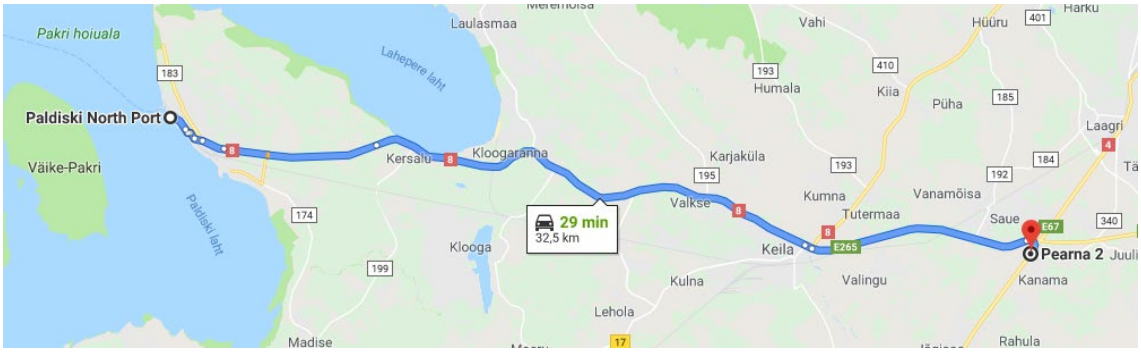
On the short routes like between Hanko and Paldiski, ro-ro vessels are highly competitive due to fast loading and unloading. If necessary, also ship harbour-time can be minimal. (Pöllänen etc. 2003, 96.)

4.4 Routes comparing: Hanko-Paldiski and Vuosaari-Muuga

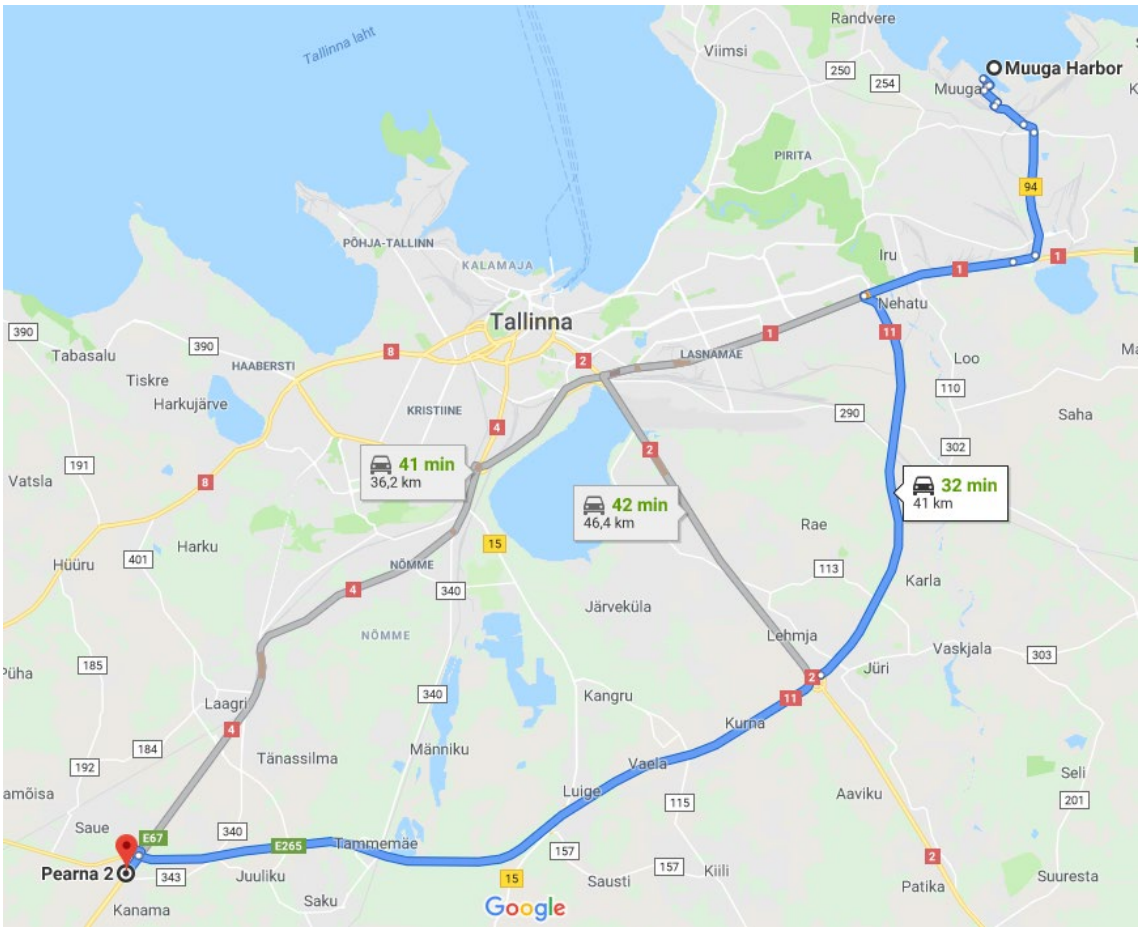
As already noted in paragraph 4.2 nowadays liner traffic between Finland and Estonia goes through two routes. It is Hanko-Paldiski and Helsinki-Tallinn (or cargo ferry route Vuosaari-Muuga). Consider briefly the routes of freight ferries below.

Ferry routes Hanko-Paldiski and Vuosaari-Muuga are similar in that all 4 ports are located outside the city centers. It is their big advantage. It is easy to get and leave the ports and to find parking places in case of needed rest time. These ports provide free truck parking spaces. From Paldiski and Muuga harbours there is an easy connection with European Route E67 Via Baltica.

For comparison, on the pictures 5 and 6 are marked paths from Paldiski North and Muuga ports to European Route E67, which is used by drivers traveling to Latvia, Poland, etc.



Picture 5. Distance from Northern Port of Paldiski to road E67 (Google maps 2019c).



Picture 6. Distance from Muuga harbour to road E67 (Google maps 2019d).

From Northern Port of Paldiski to Via Baltica is 32 km, and from Port of Muuga is 41 km. That is, the distance differs by 9 km.

From 1.1.2019 the congestion fee started to charge in the Helsinki Ports Lansisatama, Katajanokka and Eteläsatama. This fee is added to the ticket for bulk, partly and full-

loaded trucks in import and export between Finland and Baltic Countries. The reason for it is the fast grown road traffic on the streets neighboring to the ports. The congestion fee is included in the ticket price for trucks and increases it. This gives good advantage to ports located outside Helsinki. (DSV 2019.)

As noted in paragraph 4.2., the Vuosaari-Muuga route is operated by ferries Sea Wind and Finbo Cargo, and the Hanko-Paldiski route is operated by ferry Sailors. When comparing schedules of these ferries we can detect that Sea Wind and Sailor have closed departure and arrival times, except that morning departure from Estonia by ferry Sailor is 2 hours earlier. The schedule of the new Finbo Cargo ferry is different from Sailor and Sea Wind and it lets having ferry's own customers. It can be also convenient for some drivers that evening departure from Muuga at 23.30 arrives to Vuosaari at 07.00 in the morning. Thus, drivers do not have to leave the ferry in the middle of the night, and they can fully relax.

The ferry schedule is difficult to evaluate as convenient or not, as for different logistics companies is more suitable different departure and arrival times.

Both routes have their regular customers. At the same time, all 3 ferries are strong competitors to each other.

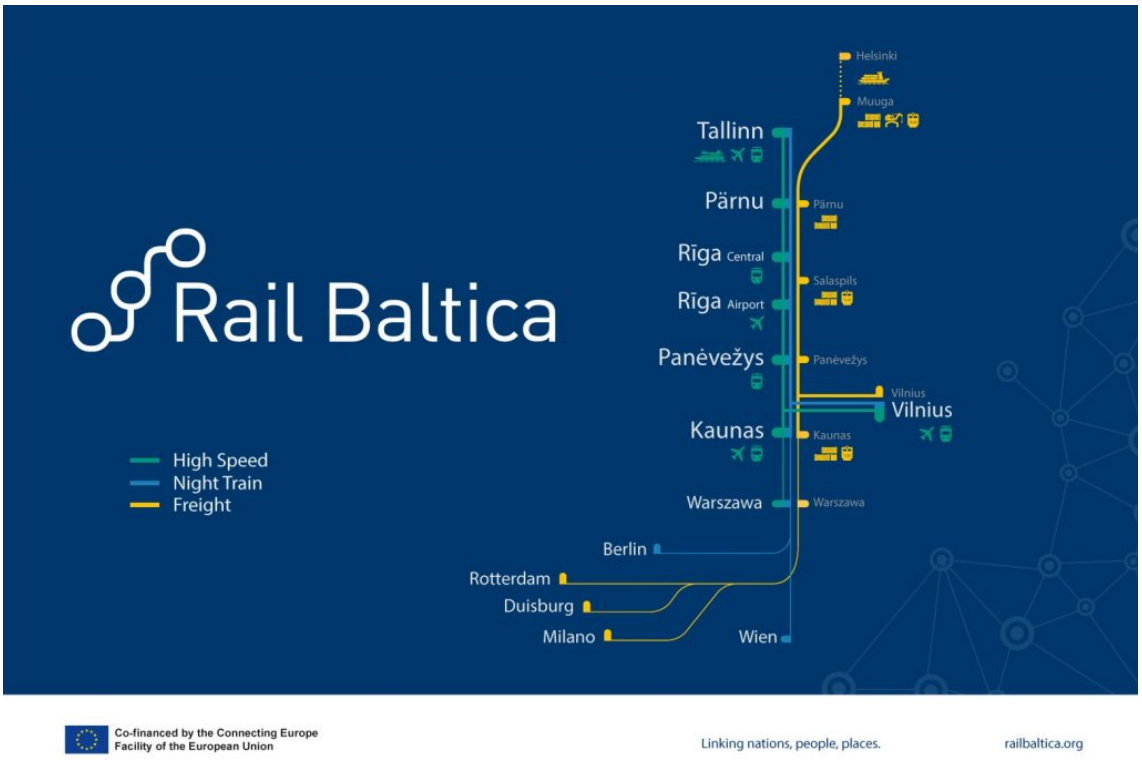
4.5 Helsinki-Tallinn railway tunnel

The idea to connect two coastal cities of the Finnish Gulf with fast transport appeared more than 100 years ago. But only in 1994, the construction of the railway tunnel between Helsinki and Tallinn was started to discuss seriously. At that time and 20 years more they were talking about the tunneling route, the necessary geological researches, the construction period of at least 10 years, as well as such advantages of the project as the closeness to Central Europe. (Helsingin Sanomat 2019.)

At the beginning of 2018 in Tallinn was held the FinEst Link seminar. There were presented technical projects for the construction of the Helsinki-Tallinn tunnel, including the tunnel routing and station locations, the operational solution based on the traffic flow estimation, the safety concept for the tunnel and the construction schedule and cost estimation based on these technical details. (Sweco 2019.)

Since 1993, there has been a constant increase in the number of passengers traveling between Helsinki and Tallinn. Also, the transportation of goods between countries is growing almost every year. The Helsinki-Tallinn railway tunnel construction would combine two cities into one economic zone. Travel time between cities will be reduced from today's 2,5-4 hours to 30 minutes. (Finestlink 2019.)

The construction of the Rail Baltica is due to be completed in 2026. A direct railway will connect Warsaw with Tallinn through Kaunas and Riga as shown in picture 7. (Railbaltica 2019.)



Picture 7. Train types and railway plans of Rail Baltica (Railbaltica 2019).

If the Helsinki-Tallinn tunnel will be built, it would become a part of the Rail Baltica. Rail Baltica and the tunnel together would make it possible to reduce significantly the travel time from Helsinki to Warsaw. At the same time, goods currently delivered by trucks would be delivered by trains.

Now is the year 2019 and the construction of the tunnel has not yet begun. The design of construction was supposed to begin at the end of 2018. And at the beginning of 2019, has appeared information about construction partial financing by China. This

would allow start realizing the idea of building a tunnel. On the other hand, an environmental assessment of the tunnel construction has not made yet and the same time tunnel route has not chosen yet. This is planned to be done this year. Despite all the problems, some project participants say that the tunnel will be built at the end of 2024. (Tekniikkatalous 2019; Ostologistiikka 2019.)

The construction of the Helsinki-Tallinn railway tunnel together with the completion of Rail Baltica will considerably reduce the need for transportation goods by trucks, and accordingly, it will reduce the need for liner ferry traffic between Finland and Estonia. This would be a threat to both passenger and cargo ferries. But while the tunnel construction has not begun and even there is no tunnel project yet, ferries are an integral part of the connection between Finland and Baltic countries, and Central Europe.

5 SURVEY (CONFIDENTIAL)

6 CONCLUSION (CONFIDENTIAL)

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