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Vertical Integration of Inland Port into Port Network: Case Study of Port Ust-Luga

by

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Acknowledgments

I dedicate this work to my mother.
Thank you for your faith in me.

Abstract

Vertical integration in the maritime industry is an actively developing trend nowadays. Besides integration within the industry and the rise of mega-carriers, we now face from an interindustry perspective that vertical integration with its 'visible hand of management' replaces 'invisible hand of the price mechanism' at the port sector as well. For a company in our global economy, integration of logistics processes became as important as the creation and development of competitive advantages. Regionalization of ports and privatization in the port sector, open new opportunities for all parties in their network. Yet, vertical integration of inland ports, for example specializing on dry bulk traffic, into a seaport network is a relatively unexplored field of port studies. Hence, it is important to realize why this trend is happening? What are the drivers of vertical integration into a seaport and what are the issues given the dry bulk focus? How does it influence competitiveness of the integrating parties? To answer these questions, port networks were analyzed from the stand point of bulk logistics, transaction costs analysis was applied to the port sector and a combination of strategic tools is applied to a particular port network. The analysis of this study was then applied on a particular case: a company exporting coal, vertically integrated into the Port of Ust-Luga (which is part of the North-Western Russian ports network). A survey was carried out with companies vertically integrated into the seaport. This empirical analysis allowed to explore 9 factors that had crucial influence on the decision to vertically integrate and 10 factors that were important for such decision. Based on Porter's 'extended diamond', the conceptual framework of a company's vertical integration into a seaport is proposed.

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List of Abbreviations

BCG	Boston Consulting Group
BP	British Petroleum
BSR	Baltic Sea Region
BTJ	Baltic Transport Journal
CA	Competitive Advantage
DWT	Deadweight Tons
EDI	Electronic Data Interchange
ICT	Information and Communication Technology
ITF	International Transport Workers' Federation
L/D	Loading and discharging of a vessel
OJSC	Open Joint-Stock Company
OPEX	Operating Expenses
PA	Port Authority
PPA	Port Portfolio Analysis
PPP	Public-Private Partnership
SWOT	Strength, Weaknesses, Opportunities and Threats
TC	Transaction Costs
TCE	Transaction Costs Economics
TCA	Transaction Costs Analysis
UNCTAD	United Nation Conference on Trade and Development
WTO	World Trade Organization

1. Introduction

Globalization of economics processes and intensification of trade increase pressure on international transportation system. Maritime freight transportation has crucial function in the world economy. Maritime transport enables trade of raw materials and goods, carrying more than 90% of the world total trade in terms of weight (Rodrigue, 2007). Consequently, in the global marketplace seaports appear as logistics centers of cargo flows and nexuses of different transport systems (Notteboom and Rodrigue, 2007).

Fragmentation of production and consumption around the world create complex logistics chains. In new highly competitive environment companies compete within their logistics chains rather than as individual firms (Robinson, 2002). Fierce competition requires incorporation of new logistics strategies and integration of logistics functions along a supply chain. Therefore seaports become integrated members of companies supply chains (Carbone and De Martino, 2003).

Present transactional environment bounds together many different market players which pursue different interests and as result it generates 'logistics friction' (Hesse and Rodrigue, 2004). To cope with this environment, in spatial perspective ports evolve to a network of terminals controlled by specific firms (Hall, 2004), (Pallis et al., 2011). Particularly, seaports increasingly develop networks with other seaports and inland nodes, through strategies of horizontal and vertical integration respectively (De Langen and Hazendonck, 2012).

Devolution of public responsibility and privatization in the port sector allow multinational enterprises to integrate into seaports. Accordingly, nowadays we can recognize that some companies specializing in bulk cargo traffic are vertically integrated into seaports and seaport terminals (e.g. Arcelor Mittal at Hamburg, LUKOIL at Vysotsk, Glencore at Taman, ENCI at Rotterdam etc.). Pallis et al. (2011) stress that presently most port studies are focused on container logistics and seaports as whole, hence future research efforts should be expanded toward dry bulk logistics, terminals and inland port systems.

Important to note that vertical integration in port sector is a widespread phenomenon in Russia nowadays. Most of seaports in the country are private entities with public port authorities, which keep functions of maritime safety and port regulation. Significant growth of foreign trade in the country (from 110 billion US Dollars in 2000 to 653 billion US Dollars in 2008) puts additional pressure on transport system, but mostly requires adequate infrastructure and transportation facilities at the seaports. However on practice domestic seaports do not have sufficient capacity to serve all export and import trade needs. Hence, there are numerous cargo flows dependent on seaports of neighboring countries, e.g. export of coal through Latvia, Estonia; export of grain through Ukraine; import of Ro-Ro and containers through Finland etc. Therefore Federal Government had initiated greenfield development of seaports and seaport terminals, created public-private partnerships (PPP) projects and now finance ports infrastructure and hinterland.

All these considerations bring us to the question of current research which is to determine role of vertical integration of inland ports into port networks with respect to bulk logistics. The analysis was applied to vertical integration of Russian second

largest coal mining company into the North-Western port network namely Big Port of Saint Petersburg which include Port of St. Petersburg, Port Vysotsk, Port Vyborg, Port Primorsk and Port of Ust-Luga, particularly to vertical integration of OJSC 'Kuzbassrazrezugol' into the Port of Ust-Luga.

Research questions are defined as follows:

1. Why inland ports specialized on bulk traffic integrate into port networks?
    a) What is the role of vertical integration in maritime industry?
    b) Which transaction costs in ports sector influence decision to vertically integrate into a seaport?
    c) What is the link between competitive advantages of a company and a seaport within the scope of vertical integration?
2. What is the strategic positioning of the Port of Ust-Luga within the port network?
    a) What are the features of dry bulk cargo traffic, particularly coal seaborne trade in Baltic Sea Region?
    b) Which factors predetermine vertical integration into seaport based on perceptions of port and logistics managers of integrated company?

Therefore, considering the specifics of dry bulk transportation we explore link between seaport networks and inland ports. Transaction costs analysis in the port sector allowed to explore sources of transaction costs and factors influencing company's decision to vertically integrate into a seaport. Basing on Porter's 'extended diamond' of competitive advantages we build conceptual framework of a company's vertical integration into a seaport. Strategic positioning tool Port Portfolio Analysis coupled with SWOT analysis of the Port of Ust-Luga allowed to investigate competitive standing of the seaport and underlying reasons of its position.

2. Global Economics

Nowadays, globalization is the most prominent trend of international economics. Three waves of globalization, facilitated by scientific-and-technological progress, as well as by political and social developments, have changed the world over the last 150 years (Steger, 2003), (Buckley and Ghauri, 2004), (Levy, 2007). Removals of formal borders, improved manufacturing, cheaper transportation and development of communication technologies enabled division of production across different countries. The world became a global marketplace. Involvement of firms in international business signalized emergence of multinational enterprises (MNEs) which perform business activities and hold facilities in more than one country. Recent studies show that MNEs account for about 70 per cent of world trade, whereas about 30 per cent flows within corporate structures of MNEs (Rodrigue, 2009), (Steger, 2003) etc.

Population growth, redistribution of markets and globalization of economy have boosted international trade. From 1953 to 2010, the world international trade grew 177 times by its value (WTO 2011). In turn these trends have increased need for international transportation (Rodrigue, 2009), whereby new sources of natural resources and intermediary goods have led to more complicated logistic systems (La Londe 1994). Author noted that along with new opportunities brought by globalization it also resulted in new levels of competition. Nowadays firms have to compete in the 'new modern international competition' (Porter, 1990), which in turn puts additional pressure on firm's logistics activities (La Londe, 1994).

2.1. Maritime logistics

Panayides (2006) explicitly explains the convergence of logistics and maritime transport. Author argues that logistics and maritime transport 'add value by making products available in right place and at right time' and have similar performance indicators in terms of demand/supply management, cost reduction and customer service (Panayides, 2006, p.6). Nowadays shippers have to compete in terms of transport cost minimization as well as reliability and flexibility of its logistics chain. Thus derived nature of demand for transport becomes an integrated demand (Panayides, 2006). Therefore realization of integrated demand for maritime transport can improve company's logistics chain and thus bring a competitive advantage to the company.

Rodrigue (2009) stressed that maritime and air transport are two modes of transport specifically concerned in the international trade. Emergence of air transport enabled fast way of transportation on long distances, however more expensive relatively to maritime transport, whereas maritime transport was moving freight for ages. The fact that the surface of the world for 71 per cent is covered by three oceans (i.e. Atlantic, Pacific and Indian) predetermines essential significance of shipping (Stopford, 2009). Ships move large volumes of different cargoes offering rates lower than other modes of transport (Rodrigue, 2009). Moreover, technological advance and growth of trade volumes enable economies of scale, which in turn can keep maritime transport cost low (Stopford, 2009).

'Developments in the world economy and merchandise trade are also driving developments in seaborne trade' (UNCTAD, 2011, p.7). As such maritime transport carries approximately 80 per cent of world trade by volume, which is 8.4 billion tons

in 2010 (UNCTAD 2011). Important to note that shipping predominantly serves trade of raw materials. For 40 years tankers were representing the biggest share in the total world tonnage reflecting the extent of demand for oil. The most significant trend in maritime transport was brought by development of a container box. Standardized box made revolution in freight transport: simplifying shipment of general cargo, increasing safety of cargo, reducing transport cost per unit of cargo and enhancing intermodal transportation. Containerization induced development of special containerships and container terminals as well as introduced new logistics concepts.

Globalization processes, growing economic activity, restructuring of logistics and development of integrated demand for maritime transport, focus much attention on seaports nowadays. Notteboom and Rodrigue (2007) inferred that improvements of maritime shipping efficiency is now dependent on improvements of inland transport with a 'seaport as a nexus of inland and maritime transport systems'. Seaports evolved to a logistics centers for cargo flows, affecting all parties in a logistics chain and efficiency of the chain as whole (Panayides, 2006), (Robinson, 2002), (Haezendonck, 2001). Therefore a seaport appears as the 'key element' in global marketplace.

2.2. The role of ports in global marketplace.

'Port is a place where the ocean ferry and the rails
continue inland the trade routes from land to land' (Owen 1914).

To determine role of port in global marketplace study of main stages of port evolution and associated with it transformation of seaport's functions is requires. Initial preoccupation of seaport was related to provision of sheltered harbor, which was a necessary condition to perform naval and commercial shipping activities (Morgan and Bird, 1958). Location of harbors was predetermined by natural physical characteristics as well as by strategic location against trade routes. Growth of trade, influenced development of harbors functions. In 19th century some harbors evolved to a collection of specialized private docks and wharfs. More frequently harbors were mixing with municipal interest and ownership. Growing scale of activities in harbors was putting limits on overall efficiency, due to lack of coordination within the harbor and in hinterland (Morgan and Bird, 1958).

This trend progressed toward involvement of 'public trust' that eventually led to the creation of port authorities. After the Second World War the main role of ports was considered 'to serve the shipping industry' in order to generate more trade and to accommodate growing in size vessels (Heaver, 2006). Since then, seaports were viewed from the standpoint of public investments contributing to general public benefit. To cope with new environment characterized by globalization of economy, increasing competition and integration of business process, seaports have changed functions and role in the marketplace.

2.2.1. Specialization in port sector

Containerization brought significant changes to maritime shipping and ports sector. Rodrigue and Notteboom (2009) noted that 'introduction of container vessels meant larger cargo volumes per port call'. In turn increasing volumes of seaborne trade were putting higher pressure on cargo handling operations at seaports, resulting in development of container terminals specializing only on container handling. Since

then, new technological advance at seaports started influencing trends in the world trade.

Among numerous advantages of containerization, Fremont (2009) emphasized new opportunities brought by horizontal and vertical integration in liner shipping industry. Particularly author stress the development of hub-and-spoke networks and new logistics services. First of all development of 'container networks' and emergence of liner alliances have allowed to connect poles of global economy: Europe, North America and Eastern Asia (Fremont, 2007), (Rimmer, 2004). Transshipment strategy introduced by Maersk in 1980s and development of transshipment hubs have enabled the hub-and-spoke system. On the one hand this system contributed to greater flexibility of shipping companies. On the other hand it benefited shippers by increased connectivity and higher frequency of liner services (Fremont, 2007).

Secondly, standardized nature of container implies standardized cargo operations, also when different modes of transport are involved. For a shipper, besides actual movement of goods, information about the goods in transit represents crucial role for efficient logistics chain management. Vertical integration of liner companies to container terminals and inland logistics, increased coordination and allowed provision of new services (e.g. just-in-time, door-to-door, value added logistics etc.) (Notteboom, 2007), (Fremont, 2007), (Slack and Freemont,2005) (Franc and Van der Horst, 2010). Scholars acknowledged that development of container traffic resulted in a 'new geography of terminals' in which competitive strategy is focused on terminals and not only on seaports (Slack and Wang, 2003), (Heaver, 1995). Overall containerization contributed to improved productivity of cargo handling at ports and introduced new levels of competition.

Growth of international trade and focus on specialization has implications in terminalization of bulk cargo traffic as well. Development of specialized terminals is a necessary condition in order to accommodate large volumes of commodities and to ensure continuity of cargo flow, i.e. crude oil, coal and timber terminals. Jansson and Shneerson (1982) recognized 'an increase in specialization of berths in ports' which were appropriated for handling of bulk commodities or some types of general cargoes by 'individual users'. Increasing international competition requires parties involved in trade of bulk commodities to pursue new logistics principles as well.

In this respect Hall (2004, p.143) points out on 'convergence between specific ports and specific firms', which author defined as 'mutual specialization'. Olivier and Slack (2006) point out on Japanese groups which developed their global logistics strategies through the vertical and horizontal integration in shipping and port sector. These strategies allowed them to create group synergies. Carbone and De Martino (2003) in the study of Renualt's supply chain at the Port Le Havre defined transportation as an integral part of the company's supply chain, whereas the seaport appears as part of the chain. The seaport fulfills the company's logistics needs in transportation, storage, and distribution. Thus seaports gain the crucial role in the process of information and cargo flow management (Carbone and De Martino, 2003).

Development of seaports or seaport terminals requires capital investments in superstructure and infrastructure. Bird (1971) and Heaver (2006) stressed that due to lack of public investments, seaports became a bottleneck in whole logistics chain. In the meantime, mutual specialization between a seaport and a company is possible only in case of secured relationships with port authority (Hall, 2004). Port

reform pursued by World Bank (2007) with the definitions of new seaport's administration models became an opportune solution for the port sector and facilitated shift toward a private ownership.

Present devolution of public responsibility at seaports, defined by Baird (2000), Baltazar and Brooks (2001), Brooks and Cullinane (2007) etc., imply full involvement of private sector in port governance. All over the world there is a variety of port governance models which reflect different level of responsibilities and port functions (Brooks, 2004). Based on study of container terminals around the world, Tongzon and Heng (2005) concluded that privatization in the port sector allows improving a seaport's operational efficiency and its competitiveness. Thus new opportunities brought by port reform and involvement of seaports to capital markets, imply the new important role of seaports as objects for private investments.

Global marketplace is a highly developed international system, with maritime transport as the key element which enhances international trade, strengthens division of production and intensifies trade. Robinson (2002) argued that nowadays in highly competitive and globalized economy firms compete within their supply chains. Author noted that in new logistics environment, more logistic chains become focused on seaports. Shippers seek not only for safe and efficient operations but for a greater value offered by a seaport. Notteboom and Winkelmans (2002) stress that seaport is now a 'node for contacts and contracts', with a multitude of individuals collaborating on the value creation process. Thus integration of a logistics chain into a seaport can be considered as unification of 'contacts and contracts' under a corporate umbrella.

2.3. Port networks

Van Klink (1997) suggested that new port function is a result of complex logistics operations, which require greater control and coordination between production, marketing and logistics. There are different standpoints on how to classify all individuals at seaport and their links: by form of interaction, stakeholder approach, etc. For the purpose of discussion in this section, all links at a seaport are generalized as internal and outer.

In past decades scholars defined certain patterns and models of a seaport development. Bird (1963) defined Anyport model to explain how seaports evolve in time and space, focusing on a seaport's infrastructure and providing a base for comparison of actual seaports (Bird, 1971). Later, Hoyle (1989) elaborated Anyport model to explain evolution of interrelation between a seaport and a city and how ports were shifting outside of old port cities. These models were aimed to explain certain functional changes at seaports and how its links with surrounding environment were changing as well. Notteboom and Rodrigue (2005) noted that seeking to accommodate more traffic, seaports have been improving cargo handling and maritime technologies, increasing specialization and physically expanding. Overall, these models showed that while seaports were developing internal and outer links, more of these links were becoming internal for seaports overtime.

Along with developments in society, technology and economy, we were facing changes in geopolitics and transformation of spatial systems. In a globalized world, Van Klink (1998) considers port network as a new spatial model. Van Klink (1995) identifies four stages in functional and spatial port development: (i) the port city, (ii) the port area, (iii) the port region and (iv) the port network. It is a sequential

perspective of port development, from late medieval port cities to port logistic networks of XXI century (Rodrigue, 2009). First three stages can be considered under Anyport model. Whereas transition to the fourth stage is a consequence of fundamental changes in economy, trade and logistic strategies.

Diseconomies of scale within a seaport limit further growth, hence decreasing attractiveness to locate port-related activities at the seaport and hence leading to de-concentration (Van Klink, 1998). Thus port development, integration of logistics processes and de-concentration of port-related activities led to the rise of port networks. According to typology of port networks three types of networks are distinguished by types of interdependence, namely: sequential, reciprocal and pooled networks (Van Klink 1995). Seaports can engage in all types of networks at one time (including different modes of transport and traffic categories).

Port network concept was further developed to a new sequential phase of the past models, namely port regionalization (Notteboom and Rodrigue, 2005). Authors stress the importance of developing links with hinterland (i.e. inland ports and terminals) in order to strengthen and improve competitive standing of a seaport, because it will bring a prospective for future growth and development of a seaport. Notteboom and Winkelmans (2004) point out that 'internal capabilities of a seaport are no more exclusively sufficient for success of a seaport', therefore it is important to develop networks with logistic chains and create 'synergies with other transport nodes'. Consequently, since more outer links became internal, limits and boundaries of seaports became flawed. Seaports are no longer perceived as separate economic units, but as major logistic nodes in spatial logistics chains (Van Klink, 1998).

Finally, Notteboom and Rodrigue (2005) concluded that in the port regionalization phase the crucial objective of seaports is to engage in 'direct and indirect forms of networks with transport nodes and other market players'. In most recent publication, De Langen and Haezendonck (2012) argue that nowadays ports develop into port networks, while regionalization of ports expand their hinterland to create closer links with other seaports as well as inland ports. Authors infer that such port networks can be both results of horizontal integration into other ports or vertical integration into inland ports.

Port regionalization phase is closely related with specialization in freight transportation. Notteboom and Rodrigue (2005) discussed port regionalization mostly in terms of containerized commodity, whereby container logistics perfectly suits the concept of networking with inland ports due to its multimodal nature. However one should not underestimate the role of bulk cargoes as well, thus for dry bulk logistics this concept requires further clarification.

2.3.1. Inland ports.

There is no single consensus on terminology of inland node (Notteboom and Rodrigue, 2009). With respect of containerized traffic inland node can appear as dry port, inland port or inland terminal, hub, container depot or logistics center etc.

Leitner and Harrison (2001) consider inland port as a site with 'transportation facilities which process international trade' in location 'away from congested seaports'. Inferring that not all inland ports follow the same development model, authors classify them according to the availability of certain modes of transport, e.g. multimodal trade center, air traffic, inland water way ports or feeder inland ports.

Notteboom and Rodrigue (2009) elaborated definition of inland ports in seven dimensions. Authors noted that inland nodes can be related to a wide range of traffic categories, can differ in its primary functional characteristics, availability of transport modes and nature of ownership. Within the hierarchy of inland terminals, authors defined 4 levels: gateways, freight distribution cluster, inland port and satellite terminals. In spatial perspective, gateways mainly serve inland transport corridors and generate high value added, whereas inland ports appear as 'load centers for commodity chains' with lower value added (Notteboom and Rodrigue, 2009).

Given that port networks facilitate de-concentration of containerized traffic away from seaports, Notteboom and Rodrigue (2005) define port-related activities which are still suitable to locate within seaport. These activities concerned on transshipment of bulk commodities in large volumes also requiring storage at seaport. Important to consider principles of bulk transportation which imply that loaded cargo is transported as close as possible to a place of final destination avoiding transshipments underway. Therefore a seaport gets role of cargo buffer for specific traffic categories.

Based on above discussion, the extended view on port networks is proposed. We consider integration processes at port sector as argued by De Langen and Haezendonck (2012) in corresponding perspective, where inland nodes vertically integrate into port networks. With respect to dry bulk logistics, facilities possessed by private company and located in hinterland (e.g. plants, mines), vertically integrate into a seaport. In such case integration of a company into a seaport appears as the direct form of networking between the seaport and market players. Also proposed network can be classified according to the van Klink's (1998) typology.

Such form of networking can become beneficial for both a seaport and a company. For a seaport it is an opportunity to ensure valued utilization of facilities, land and infrastructure, to secure certain cargo flows through the seaport, to attract investments. 'Integration of a seaport into networks of business relations that shape supply chains can bring success to the seaport' (Notteboom, 2007). For the company it is an opportunity to acquire the key element of the logistics chain, to ensure continuity of cargo flow through the seaport and to fulfill the need for certainty. Integrating company can improve its competitiveness and gain benefits of networking.

3. Vertical integration into a seaport

Vertical integration as phenomena firstly described by Coase (1937) was defined as coordination of factors of production without interference of price mechanism. It is when entrepreneur decides to organize the transactions himself which were previously bought from the market. Later on Chandler (1977) defined vertical integration as a business strategy when 'the visible hand of management' replaces 'the invisible hand of market mechanism'. Over the last century much effort was put in explanation of underlying reasons for vertical integration. The most acknowledged explanation is from the standpoint of organizational economics (Joskow 2006), particularly Transaction Costs Economics developed by Williamson (1979, 1983, 1985, 2000) and property rights theory elaborated by Hart (1986, 1990, 1995). Within the scope of current research we focus on TCE, discussed in sections 3.3 and 3.4. Transaction costs in the port sector are defined, with pros and cons of vertical integration into a seaport. Application of transaction cost to port networks is discussed in section 3.5. 'Extended diamond' of competitive advantages with respect to vertical integration into a seaport is explored in section 3.6.

3.1. Vertical integration strategy

Chandler's (1977) in-depth analysis of vertical integration strategy showed that evolution of enterprise and vertical integration were interdependent processes. In middle XIX century, vertical integration in crops trading (i.e. farmers, consolidators, forwarders, railway and traders) allowed to reduce costs of transactions and improve efficiency of their business. Greater scheduling and coordination allowed increasing utilization of resources with higher productivity and reduced costs even more. In this process, administrative coordination took role of price mechanism. Chandler (1977) noted that technological advance which led to considerable growth of production volumes, in turn resulted also in economies of scale in administrative coordination. These processes were also accompanied with shift from 'horizontal combination' to vertical integration strategy. Finally, separation of management from ownership, improved qualification of managers and rise of administrative hierarchies indicated transition toward managerial capitalism, characterized with vertical integration of business (Chandler, 1977).

Integration is the twofold strategy. Firstly, horizontal integration implies merger of companies within the same industry or on the same stage of production, which results in economies of scale (Besanko, 2010). However Chandler (1977) argues that future success of horizontal integration is predetermined by possibility to further integrate mass production into mass distribution. Secondly, vertical integration implies a merger of companies from different industries or subsequent stages of production, which will result in economies of scope and will allow greater coordination of a company's business processes (Besanko, 2010).

Overall, strategy of vertical integration is focused on the make-or-buy decision (Joskow 1988). Therefore, the main question is which activities along a vertical chain to arrange within the company's boundaries and which to buy from the marketplace. Beasanko (2010) defines the vertical chain as business processes beginning from extraction of raw materials, including all intermediary stages of production and transportation and ending at distribution of finished goods to final consumers. The make-or-buy decision depends on costs of transactions and

required degree of control over the vertical chain. Vertical integration is evident in many different industries including manufacturing, transport, marketing and finance.

Transportation is a crucial activity for every company which uses tangible resource or supplies tangible products. Transportation activity gains considerable importance for companies which are already integrated upstream and downstream. Casson (1986) argued that integration into transportation activities 'fills the transport gap' between subsequent stages of production. Also author noted that vertical integration into maritime shipping mostly concerns companies involved in commodity trades (oil, coal, agri-bulks) or in continuous production (aluminum). Maltz (1993) argued that large companies use private truck fleet because they want to reduce risks related with logistics activities. Alternatively Casson (1986) showed that vertical integration in transport industry can go other way round, when transport companies integrate with freight generating activities.

Nowadays we face significant trends associated with horizontal and vertical integration strategies in maritime shipping industry. Seaport (terminal) operating companies and shipping lines are both making maritime transport chain an integrated system (Franc and Van der Horst 2010). The former are horizontally integrating into other seaports on international scale, increasing their presence on major trade routes. The latter are integrating vertically, expanding their business toward seaports and inland logistics. Freemont (2009) argued that the main aim pursued by shipping lines is to strengthen their core businesses. In last decade these trends received much attention from the side of scholars (Rodrigue and Notteboom, 2009), (Slack and Freemont, 2005), (Freemont, 2009), (Franc and Van der Horst, 2010) etc.

Most of the business activity is oriented to the international markets which signifies role of logistics as the major link of business processes. Quality and price of products have to be in a strategic fit with reliability and responsiveness of a companies' logistics chain. Logistics integration came to the central stage of business processes, with a seaport as a crucial element in integration strategies.

3.2. Logistics integration.

Logistics is a relatively new force in business which became generally acknowledged in 1970s, with its main objective to efficiently manage flow of resources and products. Slats et al. (1995) noted that company's logistic activities included: (i) flow of goods, transportation and handling; (ii) flow of information regarding orders, deliveries, transport; (iii) management and control. Hence, main logistics functions were focused on prompt transportation, safe storage and product availability.

However globalization of economy, outsourcing and fragmentation of production raised new requirements for logistics. Meantime technological advance and development of ICT supplied new tools for efficient management. Moreover Cooper (1993) points out that, although trade became larger, it also had changed qualitatively – trade of intermediary goods increased significantly. Therefore, logistics as a force was further evolving to company's logistics strategies and integrated logistics approaches allowing better customer service and reducing total logistic costs (La Londe, 1994).

New business environment extended scope of logistics functions and induced new logistic strategies. New global economy can be characterized as highly competitive.

It requires producers to compete in terms of cost, quality, speed, flexibility and reliability (Stock, 1999). In addition, Christopher (2005) stressed some logistics functions which now became crucial for business: responsiveness, aimed to cope with market volatility and uncertainty; 'Kanban philosophy', aimed to achieve balance with minimum inventory; shift from 'push producing' to 'demand pull'.

Such complex approach to logistics functions was defined as integrated logistics, which incorporates 'logistics activities both within a firm and across firm's boundaries' (Stock, 1999). Integrated logistics concept, which goes beyond corporate boundaries, became a new logistics strategy, namely supply chain management (La Londe, 1994). There might be some confusion in terminology as no single consensus exists, however this discussion is outside of current research.

Complexity of logistics chains and changing logistics models, force market players to rethink their roles in processes of transportation (Notteboom and Rodrigue, 2005). Until recently, logistics and maritime transport were not closely related, but booming containerization and changing shipper's requirements contribute to convergence of both (Panayides, 2006). New production and trading patterns require more than just shipping and forwarding because supply of transport service is no longer segmented (Freemont, 2009). Nowadays shippers require 'global logistics packages' (Notteboom, 2007).

Vertical and horizontal integration within transport industry allows single company to control few segments of the logistics chain (Panayides, 2006), (Notteboom, 2007). In that way shipping lines engage in alliances and integrate in inland transportation, forwarding and seaport terminals operations. Such high level of functional integration led to emergence of full logistic service providers and megacarriers (Notteboom and Winkelmans, 2004). This in turn enables provision of 'one-stop shop' logistics services (Panayides, 2006).

Notteboom and Rodrigue (2005) emphasized that seaports reflect market driven processes, hence more often they become a subject of logistics integration as well. Seaports became a 'crossroad between production and distribution' (Carbone and De Martino, 2003), thus integration of seaport with its major customers becomes a requirement. In the meantime internalization of segments of logistics chain makes the chain more transparent and allows to reduce transaction costs between the segments (Fremont, 2009).

3.3. Transaction Costs Economics.

In the last century transaction costs came to the central stage of economics (Williamson, 1975). Ronald Coase has put the beginning of transaction cost considerations in his book "The Nature of The Firm". In the beginning of XX century economists considered that economic system is able to work by itself. Particularly the price mechanism, explained by Adam Smith, can itself coordinate production of goods, operating decisions and allocating resources. Meantime in U.S.A. there was a considerable attention to coordination and planning of industrial production, evident with vertically integrated business structures in different industries (Coase, 1991). So the question rose, why coordination, management and planning were needed for companies, if the price mechanism was in place and coordinated the market. Coase (1937) explained it as 'costs of using the price mechanism'. There are exchange transactions which direct production and they have certain cost, but if these transactions are internalized within firm boundaries, than costs of transacting

can be eliminated (Coase, 1937). These transaction costs can be viewed as 'costs of running the system' (Coase, 1991), i.e. negotiating contracts and controlling agreements.

3.3.1. Transaction costs theory

Implications of transaction costs were explored by Oliver E. Williamson (Williamson 1979, 1985, 2000). Author argued that any contracting problem can be investigated in terms of transaction costs (Williamson, 1985). Contracts by nature are aimed to facilitate exchange of market transactions, while complete contracting could make transaction costs negligible. However executing complete contracts is prohibitively costly or even impossible (Williamson, 1975). Considering that transactions can occur on every stage of company's activities, there can be a great incentive to economize on transaction costs (Williamson, 1985, 2000).

Transaction Cost Economics (TCE) is focused on analysis of ex ante transaction costs of investment decisions and ex post transaction costs of contract performance efficiency (Joskow, 2006). Making decision regarding vertical integration, decision-makers compare production and transaction costs related to internal organization, with costs related to market transactions (Franc and Van Der Horst, 2010). The choice of the governance structure should be toward the one that minimize transaction costs.

Rindfleisch and Heide (1997) synthesized academic and empirical knowledge about Transaction Costs Analysis (TCA), based on researches conducted in different industries, i.e. manufacturing, marketing, finance, transport etc. Authors argued that TCA belongs to New Institutional Economics, whereas firms and markets appear as alternative governance structures, which differ in transaction costs. Overall, their integrative review showed that TCA rests on the framework developed by Williamson.

In TCE there are three essential behavioral assumptions: (i) Bounded rationality, (ii) Opportunism and (iii) Risk neutrality.

(i) Bounded rationality creates problem in uncertain environment. Williamson argued that bounded rationality is a notion of limited ability to process information, communicate and make rational decisions. Meantime Rindfleisch and Heide (1997) elaborate this assumption as overconfidence and improper valuation of gains and losses. Overall, authors stress natural inability to anticipate future exchange conditions and thus to write comprehensive contracts. Hence, all negotiated contracts are considered as incomplete (Williamson, 2000). Therefore, transaction costs appear as ex ante and ex post reasons of contracting (Franc and Van Der Horst, 2010).

(ii) Opportunism is a natural feature of all people, expressed as 'self-interest seeking with guile' (Williamson, 1979). Although people differ in their degree of opportunism, every human has own price. Thus opportunism 'is a central concept of transaction costs' (Williamson, 1979). It becomes a problem when relationship between transacting parties includes any specific asset, as covenant of transaction. Therefore transaction costs arise from opportunistic behavior between transacting parties.

(iii) Risk neutrality received less attention in studies of TCE. However, Chines and McMackin (1996) argued that application of this assumption

was underestimated in previous works. Authors suggested to incorporate risk assumption to the framework, arguing that risk neutrality is a basic determinant of human behavior (Chines and McMackin, 1996). Thus, various risks associated with business activity, predetermine existence of transaction costs.

Also, in TCE there are three critical dimensions which characterize transactions: (i) Asset specificity, (ii) Uncertainty and (iii) Frequency.

(i) Asset specificity is acknowledged as most important characteristics of TCE. Asset specificity leads to the 'locked-in' problem arising from incomplete contracts and certain attributes of transaction (Joskow, 2006). Transacting parties may need using relationship specific asset, to execute a transaction. The value of such asset is higher within this transaction, but less in its alternative use. Therefore, the 'hold-up' problem arise if parties will be bargaining for quasi rents (Williamson 1985). There are four generally accepted forms of asset specificity (Williamson, 1979), (Joskow, 2006), (Besanko, 2010):
- site specificity appears when assets are located side-by-side. Once sited, asset becomes immobile, i.e. plant located near mine.
- physical asset specificity appears when parties use an asset designed for particular transaction, therefore its value in alternative use will be lower, than in its original use.
- human asset specificity refers to situation when people have to acquire and use skills, which are specific for particular transaction. It appears when worker becomes highly effective in a particular firm's routine process, and thus generates higher value for this firm. The value will not be the same for another firm.
- dedicated assets appears as result of general investment in facilities dedicated to particular buyer. Again such facility loses its value if used beyond the initial relations.

(ii) Uncertainty represents the problem of foreseeing contingencies and expressing them in contracts. Rindfleisch and Heide (1997) define uncertainty in twofold perspective: environmental and behavioral. Authors associate environmental uncertainty with ability to adapt to changing circumstances, i.e. renegotiate agreements. Behavioral uncertainty is associated as ability to control compliance of agreements, as well as ability to determine relevant information and to measure it. For example, when one agent of a certain transaction has information regarding this particular transaction, information asymmetry may arise as the cost of acquiring this information by another agent. Also Klein (1989) identifies information asymmetry as a potential for opportunistic behavior.

(iii) Transaction frequency identifies the pattern of activity. Williamson (1979) distinguished two frequency categories: occasional and recurrent. Frequency of transactions is a strong incentive for hierarchical governance, because frequent transactions result in economies of scale.

These theoretical concepts help explaining the nature of transaction costs. In terms of the framework discussed above, the extent of transaction costs is conditional to level of asset specificity, frequency of interaction and degree of uncertainty. It brings us back to the basic problem of transaction cost economics, which is to decide either to contract transactions through the market or to internalize transactions

within the firm boundaries through the strategy of vertical integration. Analysis of transaction costs allows explaining why transacting parties make decisions in favor of particular organizational structure.

3.3.2. 'Logistics Friction'

Within the scope of current study, transaction costs analysis is focused on transport industry, with particular emphasis on maritime economics and seaports. In order to relate theoretical framework of TCE to the specifics of freight transportation, we first describe export logistics chain which includes a seaport.

Panayides (2002) defined logistic chain consisting of two successive stages of freight transportation: sea and inland legs. In such logistics chain we distinguish seaport as a focal stage between sea and inland legs. On each stage there is number of activities necessary for completion of whole transportation process.

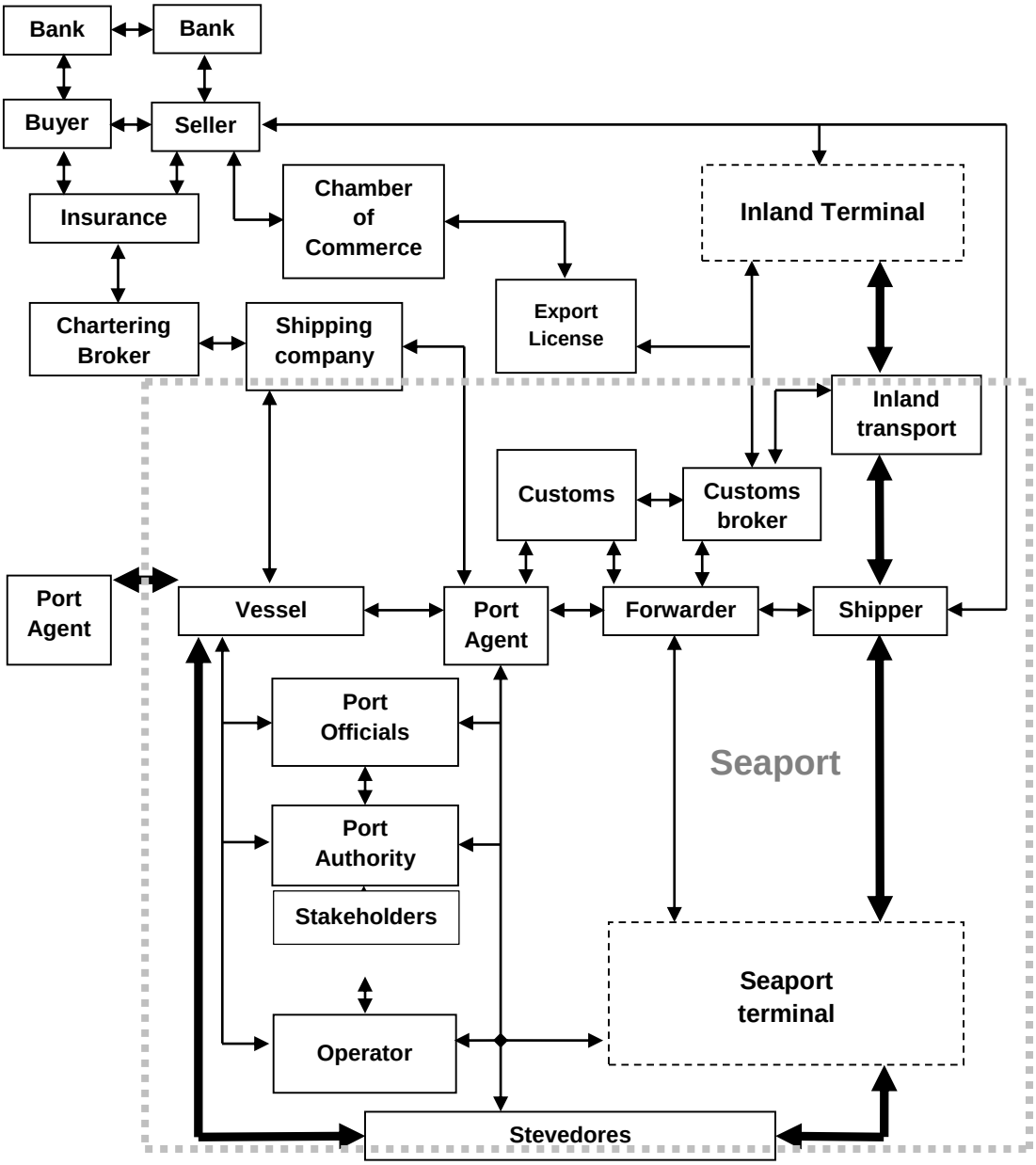
There are two forms of interaction between key members of a seaport community: physical and incorporeal (Martin and Thomas, 2001). Physical interaction requires movement of goods between different parties involved, i.e. inland transport, stevedores, on site movements. Incorporeal interactions exist between agents and their principles as well as between service providers and its users. This form of interaction implies activities related with contracting, supervision and exchange of information, whereby realization of these activities generate considerable transaction costs.

Kylaheiko et al. (2000) consider transport corridor which include a seaport, as temporary organizational structure with large number of parties involved. Authors defined 24 parties in the chain linked through documentation flow, whereas only 7 parties have physical interaction with cargo. All parties exchange 76 different documents and therefore such massive flow of documents causes considerable transaction expressed as costs of communication.

Schary (1994) argues that transaction costs in logistics chain occur as cost of coordination with external partners. Management of physical cargo flow is important as much as efficient management of information, data and documention flows. EDI can decrease cost of transacting and simplify coordination processes. Also Notteboom and Winkelmans (2001) argued that developed information systems and EDI among parties in a logistics chain can lower bounded rationality of actors at seaport. However, implementation of uniform data standards and EDI in logistics flow requires common initiatives between parties to comply with it.

Taking into account logistics chain of Cooper (1994), export logistics chain specialized on dry bulk commodities is visualized at Figure 1. It includes the inland port as 'load center of commodity chain' and the seaport as the key element in the seller's logistics chain. To perform export activities the seller needs to establish efficient communication and coordination between shipper, customs broker, forwarder and port agent. Continuous cargo flow through the seaport requires efficient coordination between the inland port, the seaport and actual shipments. In turn efficient operations at seaport require active cooperation between its operator, port authority, port officials (e.g. border inspections, sanitary control, customs, PSC etc.) and other external stakeholders.

Figure 1. Export logistics chain at seaport.



Source: elaboration of author, based on Cooper (1994) and Kylaheiko et al. (2000).

These four parties in the logistics chain bind together seller/buyer business transaction with actual transfer of goods through the seaport. Along with logistics relations management, the seller also has to establish coordination with external parties, e.g. Chamber of Commerce, Banks, Insurance companies etc. The seller has to keep contracting relationships in due course and manage documentation flow in timely manner. In the same time certain documents enabling foreign economic activity can be limited by due dates of validity, which creates additional constraint for the seller.

In the transactional environment large number of players pursue different interest basing on contractual relations. According to previous discussion of TCE,

contractual relations are the main source of transaction costs. Parties in the logistics chain experience transaction costs when searching and collecting information, negotiating and contracting with counteragents, controlling compliance of contracts, adjusting and renegotiating agreements if counterparty violates contract.

Completion of transportation process depends on positive outcome of all subsequent activities. Important to note that time spent on the process represents actual costs as well. Thus total cost of transportation is a compound of: costs for actual movement of goods, cost of time spent and the transaction costs occurred between parties of logistic chain. As result of such 'logistics friction' (Hesse and Rodrigue, 2004), firms develop different logistics strategies, from outsourcing to vertical integration.

3.3.3. Transaction costs in port sector.

Further, transaction costs which occur at seaport between parties in logistics chain are determined:

i. Specific assets are crucial determinants of logistic chain. Efficient performance of logistics operations related to physical movement of goods at seaport requires irrecoverable investments in equipment, storage facilities etc., therefore it can cause opportunistic behavior (Ivanaj and Franzil, 2006). Such situation can be explained in terms of relationship-specific investment, which is the most common source of transaction cost. The extent of relationship-specific investments can strongly affect structure of vertical relations in company (Joskow, 1987).
ii. Company specific technology – introduction of new technology into one stage of production or shipping process, may call for expenditure on subsequent stages (Casson, 1986), (Panayides, 2002). New technology in production may put additional specific requirements on cargo handling and storage in seaport. On the one hand it will cause a problem in terms of relationship-specific investment, resulting in transaction costs. On the other hand a new technology can be a know-how which shipper would like to keep in secret. In the latter case it will represent a problem of opportunistic behavior which in turn causes transaction costs.
iii. Frequency of shipments, cargo volume – as already mentioned every shipment at seaport is accompanied with a set of contracts and documents. Bounded rationality causes transaction costs related to incomplete contracts. Moreover, frequent transactions entail greater costs in the administration and monitoring of transaction (Klein, 1989). Also author argues that high cargo volume brings very high potential for internalizing transport activities within company boundaries. Frequent transactions and large volumes can result in certain economies of scale for vertically integrating company.
iv. Continuity of cargo flow – is very important positive incentive for vertical integration (Casson, 1986). Author argues that it is hard to ensure continuity through the sequence of short-term contracts, whereas long-term contracts are hard to implement because there is always a risk that one of the parties will break a contract. In terms of bounded rationality, contracting represent transaction costs by definition. Considering, that for producer it is of a strategic importance to ensure continuity of cargo flow through a seaport, thus it can cause opportunism from the seaport side and as result transaction costs for shipper.

v. "Small numbers" bargaining – is a problem of limited number of alternatives to substitute a counterparty in a transaction. It is a problem to switch between highly specific productions facilities at short notice (Casson, 1986). If a seaport is unable to meet changing demand of a shipper, than such situation will require redirection of cargo volume through other seaports. Such uncertainty in actions of a seaport can cause transaction costs.

vi. Pricing and total cost – certain sale contracts usually specify price range for goods traded. Consequently seller has to foresee in price the logistics costs including: transportation, storage and cargo handling at seaport, as well as additional costs (force major). However precise estimation of total logistic costs is associated with bounded rationality of parties and uncertainty of environment, and thus causing transaction costs.

vii. Coordination – Van der Horst and De Langen (2008) argued that to ensure efficiency of a logistics chain, coordination beyond price is required. At the same time it is hard to achieve required level of coordination through the market transactions due to bounded rationality and opportunistic behavior of parties involved, i.e. insufficient planning, corruption. Authors conclude that one of devices to achieve desired coordination is a strategy of vertical integration.

viii. Control – another important incentive for vertical integration with transport (Casson, 1986). Author argues that to ensure high quality of transportation/handling services, shipper shall control and monitor the process himself. Alternatively, high quality level of transportation service can be achieved if agent is 'carrying goods on his own account' (Casson 1986). Such relationship will have high importance for goods prone to damage, for perishable goods and high value goods. In any case poor quality of transportation services may result in additional costs for shipper. According to TCE, control and monitoring is associated with additional transaction costs. Seaport is a place where cargo is accumulated and various cargo handling procedures are performed, hence vertical integration of production into seaport can allow higher degree of control.

ix. Responsiveness - is one of the key characteristics of a logistics chain. For a logistics chain including the sea leg is important to take into account complexity and the changing nature of shipping. Vessel calling a seaport poses a risk of uncertainty for a shipper, i.e. vessel can be detained by seaport officials. In situation when cargo remains at seaport for extra storage time and while certain cargo documentation can expire, hence shipper can bear considerable transaction costs.

x. Reliability and reputation – reputation is an ability to perform action repeatedly in the same manner (Herbig and Milewicz, 1995). It also implies expectations about future behavior of the company (Saxton 1998) and is an indicator of reliability (Bennett and Gabriel, 2001). In turn, reliability is a crucial characteristic of a logistic chain now. Thus poor reliability and bad reputation of particular seaport will create uncertainty, which can indirectly cause additional transaction cost for a shipper (i.e. higher freight rates).

xi. Paperwork – foreign economic activity is associated with execution of large sets of documents including licenses, legalization, custom clearance, letters of credit etc. Thus it is very important to manage whole paperwork in timely manner and in due course. Company making shipments of cargo on continuous basis may experience opportunism and uncertainty issues from parties processing the paperwork, including parties at seaport. Such situation

inevitably causing transaction costs. Therefore integration with a seaport can allow reducing these transaction costs.

xii. Stakeholder management and relations with official authorities – seaport is a complex environment driven by social and political developments, as well external stakeholders, each pursuing specific strategic objectives (Dooms et al. 2004). Objectives of external stakeholders have to be taken into account and proactively managed by port authorities and terminal operators. Failure to manage relations with external stakeholders may influence transaction costs incurred by a shipper.

xiii. Environment – shipper of particular cargoes has to comply with certain environmental requirements. For some types of cargo it is required to use measures directed to minimization of environmental risks. At seaport such measures are predominantly related with additional investments in equipment, facilities and infrastructure. In turn this cause transaction costs associated with relationship-specific investments. Transaction costs will also arise if pollution will happen by fault of stevedores, whereas shipper can become liable to pay penalty for the cargo.

xiv. Human resource – efficient operations at seaport are dependent on human resources. Managers, stevedores, dock labor are required to have specific skills, knowledge and expertise to work with particular types of cargoes. Meantime seller or buyer of the cargo has to control and monitor activities performed by its agents at seaport stage. This creates a problem, defined as 'human resource specificity' (Williamson, 1991). Meantime transaction costs associated with opportunism, uncertainty and bounded rationality will occur due to presence of human factor on every stage of logistic chain. Maltz (1993) and Rindfleisch and Heide (1997) concluded that human-specific assets are positively related with vertical integration decision.

xv. Shipper's business transactions – important to note that for a integrating company, seaport plays complementary role to the core business. In turn a seaport is the key element in the logistics chain which facilitates commercial activity of a producer. Thus, on the one hand seaport is a source of uncertainty and high transaction costs. On the other hand, integration of a company into a seaport can improve its logistics chain, overcome some risks and simplify core business transactions.

Martin and Thomass (2001) argue that efficient work of a seaport terminal has to be fully integrated and coordinated, stressing that 'unity of command' is the key to effective management. For a seaport terminal is crucial to be controlled by a single entity, whether public or private (Martin and Thomass, 2001). Although not all parties will act opportunistically, nevertheless risks of opportunism and uncertainty create need for formalized governance structures. Hence a company may have incentives to economize on transaction costs which occur along different stages of a logistics chain. Taking into account role of seaport as the key element in company's logistics chain, existence of high transaction costs at seaport stage can become an incentive to economize on these costs, particularly through vertical integration into a seaport.

3.4. Factors influencing decision of vertical integration into a seaport.

If company decides to vertically integrate into seaport, it implies that overall economic profit outweighs associated costs. So we begin to envelop 'Pros' from costs standpoint of view.

3.4.1. Pros: Costs and profits

First of all vertical integration into a seaport allows to economize on transaction costs associated with contracting. However within vertical chain, contracts will not be completely eliminated. Goods have value and they are moved in space, therefore contracts represent the fact of transferring responsibility over these goods. Although both companies are parts of single corporate structure, such contracting will have more formal character and associated costs will be significantly lower comparing to contracts supporting market transactions.

Vertical integration into a seaport allows reducing costs associated with bad performance of a common use seaport. Implementation of company's working standards at seaport allows to reduce losses related to cargo damage during cargo handling operations. In similar way own standards and formalized procedures can allow reducing losses associated with inefficiencies of seaport personal including managers and dock labor.

A seaport integrated within boundaries of a single company, gives ability to improve accuracy of logistics costs estimations. This in turn allows foreseeing logistics costs in long term contracts between parent company and its partners/clients. The company can avoid losses related to contracting with its partners/clients. Also accuracy in costs estimation can result in higher profits of core business.

Overspending and losses may arise due to poor coordination between parties of logistics chain including seaport. Vertical integration into seaport allows achieving high level of coordination (Franc and Van Der Horst 2010) and thus avoiding above mentioned costs.

Over certain volume or frequency of shipments (Rindfleisch and Heide, 1997), vertical integration into seaport will result in economies of scale. Thus logistics costs on seaport stage will be reduced even more and company can maximize benefits.

3.4.2. Pros: Reliability of logistics chain

Vertical integration into a seaport is a strategy aimed to improve core business of integrating company (Fremont, 2009). Logistics is a crucial force of any business, with reliability as one of its main characteristics. Thus vertical integration into seaport can improve reliability of company's logistics chain.

Vertical integration into a seaport allows reducing dependence on external logistics service providers. This in turn allows to reduce port-related risks and thus improve reliability of the company's logistics chain.

As result of vertical integration into a seaport, precise information about current situation at the seaport becomes available, thus coordination and control of logistics processes will improve (Franc and Van Der Horst, 2010).

Improved reliability of vertically integrated seaport will allow parent company to execute long term planning.

For a company involved in export or import of large volume of cargoes (i.e. bulk cargoes) requiring accumulation of cargo at seaport, vertical integration into seaport increases company's flexibility. First of all company gains simplified financial relations with seaport (i.e. extension of payments, avoidance of extra charges).

Secondly, company gains freedom in terms of storage space and volume, thus having a certain cargo buffer at seaport.

3.4.3. Pros: Port development

Long term and high capital investments in modernization of equipment and development of infrastructure are required in order to improve efficiency and performance of operations at seaport. At the same time vertical integration assumes a certain form of ownership over a seaport. Thus vertically integrated company has incentive to make secure investments in development of a seaport.

Company vertically integrated into seaport can implement innovative and company specific technologies on site. In such case a company will have less risk of information disclosure. Also in such way company can gain inimitable competitive advantage at seaport.

3.4.4. Pros: Own rules

Vertically integrated seaport becomes a platform for implementation of company specific standards and formalization of procedures (Van Der Horst and De Langen, 2010). This in turn can allow achieving higher productivity levels, simplify documentation flow, set specific objectives for its employees and ensure overall strategic fit between seaport and parent company.

Company integrated into seaport will be able to set own policy for human resources. Administrative structure can be optimized in accordance with particular requirements as well. Dock labor can be trained and specialized for particular cargo operations, which will eventually result in higher efficiency. Although human factor always represents certain risks, company will have possibility to reduce this risks, if it has human resource at seaport under own control.

Through own managers permanently located at seaport, vertically integrated company is able to establish and maintain good relations with Port Authority, port officials and customs. These in turn will allow ensuring smooth and swift cargo operations.

Vertically integrated company into a seaport becomes an operator; therefore it will be inevitably involved in stakeholder management. It is generally acknowledged that proactive stakeholder management will help to avoid potential external threats (Dooms et al. 2004). Moreover proactive stakeholder management can improve overall image of the parent company.

Important to note that company vertically integrated into seaport can improve its reputation. This may have implications for the party which charter vessels for loading/discharging at the terminal, as well as for shipping company and its vessel calling the terminal. Good reputation of particular seaport (seaport terminal) can be defined in terms of stability of labor, guaranteed loading/discharging rates and severity of local authorities. These factors have direct impact on freight rate for call to particular seaport and also on possibility to attract suitable tonnage.

3.4.5. Pros: Market

Vertical integration into seaport allows expanding company's spheres of influence. It also allows becoming closer to markets. Being flexible in terms of cargo buffer located at seaport, company can become more flexible in terms of market volatility. If demand, supply or prices for goods are changing, company will have robustness

to overcome the volatility. Moreover company can even introduce price discrimination strategy. Having cargo buffer available at seaport, company can easily switch between holding on low market and trading on high market.

3.4.6. Pros: Core business of a company

As already noted, vertical integration into a seaport will result in efficiency and reliability of company's logistics chain. Such result can be identified as stability of the key element of a logistics chain. This stability has positive effect on the company's core business: ability to forecast cash flow more precisely, ability to gain positive image on capital markets and thus attract external investments more easily (Van De Voorde, 2009).

Company vertically integrated into a seaport can improve own green image through the implementation of green logistics strategies on site. Nowadays, green logistics gained high importance for large corporations. On the one hand it is a certain benchmark of company's activities which affects its image. On the other hand it is a mean of achieving cost reduction through efficient use of resources.

3.4.7. Cons: Integration

Vertical integration into a seaport implies complex legal arrangements which involve contracting (particular arrangements are subject to the local laws and legitimate governance structures). Very high strategic value of a seaport or a seaport terminal implies that the scale of such arrangements is very high as well. Contracts have to foresee future relations between integrating company, port authority, local and national authorities and other stakeholders involved. Whereas flaws on the stage of initial arrangements and contracting can have costly results in the future. Thus referring to the TCE, overall initial stage implies very high transaction costs.

Company integrating into a seaport will have to optimize its organizational structure. In turn this will result in more complex corporate hierarchy, which can increase agency problem. To insure efficient performance of integrated seaport and its strategic fit with core business, company will need highly professional managers. Overall organizational structure will become less flexible, because seaport is a heavy asset.

3.4.8. Cons: Within a seaport

Company integrated into a seaport will make investments in superstructure and infrastructure. Although investments are expected to pay off over certain life cycle, the risk exists that company will have to cease some business activities and leave the seaport. Most investments made by vertically integrated company are considered as sunk cost, which represent financial risk (Haralambidies et al. 2002).

As already noted, market conditions and business environment can change. Hence company vertically integrated into seaport has a risk that facilities remain unutilized. Due to high barriers of exit, low utilization of integrated seaport may result in high losses for core business.

If vertically integrated seaport doesn't perform well, than parent company has no one to blame for inefficiencies. Moreover if seaport fails to comply with certain requirements and generates loss, there is no possibility to take legal actions against the operator, because seaport is a part of a single organizational structure. Hence parent company has to find solution for all inefficiencies itself.

3.4.9. Cons: Seaport environment

Vertical integration into a seaport can generate negative externalities (Haralambidies et al. 2002). Dedication of seaport terminal to a single user will result in declining competition at seaport.

As mentioned above, company integrated into a seaport becomes an operator, hence, it will be inevitably involved in external stakeholder management. This in turn represents very important issue for integrating company. Proactive stakeholder management requires special knowledge, skills and competences. Failing to overcome this issue may threaten operations at seaport.

3.5. Transaction costs and Networks

Transaction costs approach received criticism for limiting choice of organizing transactions only to two forms, through the market or through the internal organisation. Other critic of transaction costs approach is related to the fact that transaction costs caused by bounded rationality, opportunism and uncertainty also exist within organizations.

Considering existence of other hybrid forms of organizing relationships between firms, transaction costs approach is rather extreme. One of such hybrid forms is a network. Networking is based on trust, hence transaction costs are considered to be very low in networks (Lambooy et al., 2001). However uncertainty, opportunistic behavior and dynamics of economic processes do not allow overcoming all risks. Thus networks are not the solution for transaction costs issues.

3.5.1. Network theory

Basic assumption of network is that one firm depends on the resources possessed by other firm. Development of relationships is affected through technical, logistical and economical systems, and also include important social element (Johanson and Mattsson, 1987). Scholars argued that features of relationships between parties in networks considerably reduce transaction costs.

These can be explained with the fact that parties in networks develop relationships through interaction, which imply mutual orientation towards each other. Meantime mutual orientation occurs though exchange and adaption. First, while exchanging minor or major transactions, parties go through the learning process. Secondly, through adaption process parties increase dependence on each other, which is usually asymmetric; parties have to solve conflicts avoiding exit from relations and from network; adapting parties are required to invest in adaption process, which in turn limits their freedom (Johanson and Mattsson, 1987). As result of mutual orientation process parties gain mutual knowledge about each other.

In transaction costs theory, asset specificity considered as exception of internal activities, whereas within networks it is a result of inter-organizational investments (Johanson and Mattsson, 1987). Authors argue that in network, asset specificity is not sufficient premise for vertical integration, on contrary it is a possibility for parties to grow within network. Also authors suggest that it is possible to overcome uncertainty through adaption process in network, rather than through internalization of transactions under corporate umbrella.

These considerations go along with other scholars. According to Lambooy et al. (2001) in network relations, communication and mutual learning can overbalance opportunistic behavior and mitigate bounded rationality. Moreover authors argue

that networking partners may have incentive to invest in network relations and good reputation, i.e. by making special effort, showing stronger commitment, performing more and better beyond contracting obligations. All together will result in low transaction costs.

Firms in network are interdependent, ‘use of assets in one firm is dependent on the use of other firm’s assets’ (Johanson and Mattsson, 1987). Thus, investments and its consequences are also interdependent. Firms in network have objectives regarding future positions within networks which are related to their strategies. Meantime firms tend to secure important resources and their trading areas. Thus firms use competitive and complementary strategies, or combination of both.

The ‘nature of relationships’ (Johanson and Mattsson, 1987) is the crucial difference between TC approach and network approach. Bilateral opportunistic relations from TC point of view are opposed to trustworthy and long lasting relations from network point of view. Thus networks can coordinate relations in the same manner as vertically integrated structures.

3.5.2. Transaction costs in port networks

Port networks strengthen functioning through partnerships with other logistics nodes (Van Klink, 1997). Referring to Haezendonck (2011) we distinguish between three types of port networks by the premise of their occurrence: shipping strategy, inland logistics and political will.

Port networks on sea leg emerge in response to shipping strategy of transshipment. The main driver for such networking is economies of scale predetermined by size and intake capacity of vessels, as well as by nautical accessibility of ports and regions. This type of port networks applies to both containerized and bulk commodities. For example Rotterdam is a hub port which has established network with other ports in Europe (transshipment of containers, accumulation of crude oil, distribution of oil products etc.).

Port networks on inland leg emerge in response to scarcity of land at seaport and growing congestion around the seaport. Inland networks for containerized traffic gain much attention in this field. Multimodality of containers enables realization of contemporary logistics strategies and thus allows to meet growing demand. Important to note that inland container ports is now a new market of logistics services. Given strong focus on containers, Pallis et al. (2011) note that studies of spatial port systems and seaport terminals concerned on bulk traffic requires more research efforts. Hence in section 2.3.1, with respect to dry bulk traffic we define a form of port network where inland ports integrate into seaport. For a certain company it can be easier to own terminal at seaport rather than continuously negotiate contracts for it (Gomez-Ibanez, 2003).

Both types of networks explained above realize commercial interest of parties involved in freight transportation process. Objectives pursued in these types of port networks imply reduction of transaction costs, increase of coordination, decrease of cycle time, sharing of resources and improvement of logistics services (i.e. JIT, door-to-door). Efficient work in network implies mutually oriented, trustworthy relations between parties, which buy more transactions from market. However on practice we recognize that both types of port networks are partially realized through horizontal and vertical integration strategies. Shipping lines vertically integrate into

inland logistics, whereas terminal operating companies horizontally integrate into other terminals.

The third type of networking distinguished as realization of political will. It is when Governmental policy initiates networking. Examples of such network can be Flanders ports network and Russian Baltic ports network. The former was initiated by Flemish Government, whereby ports Antwerp, Zeebruge and Ghent were expected to collaborate (in containerized traffic) combining their advantages, sharing infrastructure and inland terminals. However it seems that network fails to achieve desired outcome, as large players are reluctant to cooperate, due to lack of benefits for them, e.g. port Antwerp. Such behavior of powerful players can be characterized as opportunism which generates certain transaction costs in network. The second example, concerns the situation where Russian Federal Government initiated greenfield development of seaports and terminals (Primorsk, Ust-Luga, Vysotsk*) in the range of the existing seaports (St. Petersburg, Vyborg, Vysotsk*). All five ports in the range were expected to engage in port network for redistribution of cargo flows and strengthening port's competitiveness. As result of Government initiatives, fierce competition between ports in network and lack of trust induce considerable transaction costs, which diminish positive effects of networking.

Increase or decrease of transaction costs in networks is predetermined by the level of trust between networking parties. Although parties operate in port networks, subsequent stages of transportation are usually internalized under corporate umbrella.

3.6. Port Competitive advantages and vertical integration

Theory of competitive advantages was explored by Porter (1990), Campbel et al. (1991), Ricardo (2010), Adams (1994) in terms of formation of competiveness. Authors defined competitive advantages as compound of product characteristics, specific conditions of production and sale, additional services which make distinction of a company and create superiority over its competitors.

According to Porter (1980, 1990) innovation, new technologies, new market segments, anticipation of changing demand, changing means of production, as well as changing government regulations create incentives for competitive advantages. Porter's ideas of competition theory was elaborated in Boston Consulting Group and implemented to Competitive Advantage Matrix, where the parameters are scale effect and product differentiation (Morrison and Wensley, 1991).

Campbell et al. (1999) consider company's competitive advantages in terms of possible increase of profits compared to its rivals. Authors argue that high profits allow company to invest in prospective projects and thus to gain leadership on the market, which in turn imply competitive advantage of a company (Campbell et al 1999).

In terms of competitive advantages, Porter proved that close link between industries or enterprises contribute to formation of a 'diamond of competitive advantage'. This diamond consists of four determinants which in turn contribute to the formation of industrial clusters (Porter, 1990):

I. Factor conditions are tangible and intangible resources necessary for creation of competitive advantage.

II. Demand conditions are characteristics of price elasticity's of demand, life cycle of demand and other characteristics of demand, as well as population and its particular traditions.
III. Related and supporting industries imply presence of related industries in the economy, intermediate goods and certain information.
IV. Strategy of company, structure and rivalry imply that company has its own strategy aimed to gain better position on the market.

Also determinants of competitive advantages include efficiency of economic ties, because competitive position doesn't always provide the most favorable conditions for realization of competitive advantages and its economic and social interest. Hence there is a need to make partnership with neighboring systems.

To determine competitive advantages of a seaport it is necessary to consider its functional characteristics and its role in certain economic relations.

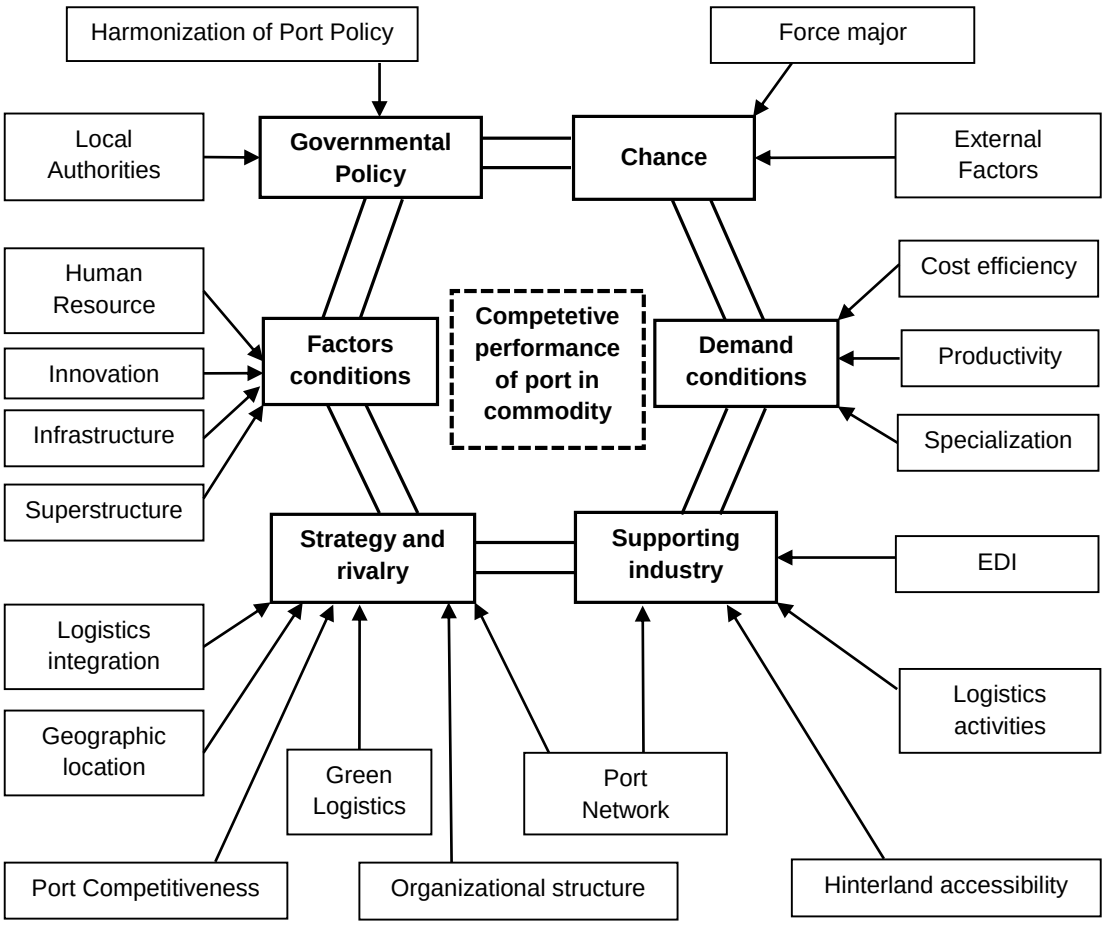
Creation and development of competitive advantages of a seaport (terminal) may be associated with the development of corporate strategy of vertically integrated company, aimed to improve its logistics chain. As element of logistics chain, seaport links shipper and shipping company and generates added value for both parties. As element of corporate structure, vertically integrated seaport supports core business of integrating company by reducing transaction costs and transportation costs (Fremont, 2009). Haezendonck (2001) notes about logistics chain that strength of certain link or transfer point is very much dependent on strength of all other links and transfer points. In turn this can be defined as synergy effect. Thus we suggest to consider competitive advantages of a seaport in twofold perspective, as part of logistics chain and as partner of vertically integrated structure. In any case seaport is expected to be cost efficient and provide high service quality.

Scaramelli (2010) has identified essential determinants of seaport competitiveness, which she grouped as follows: superstructure and infrastructure, quality of port services, hinterland, port costs, labor, ICT, environmental concerns, authorities and others. Although hardware components (superstructure and infrastructure) are important for efficient operations, software elements (service quality, reliability) gain more priority from seaport users (Haezendonck, 2001). However the determinants can be not applicable to all ports and competitive position of seaport has to be determined in individual traffic categories Coeck's et al. (1997).

Also authors elaborated Porter's 'diamond' of competitive advantages with respect to the seaport sector. The 'extended diamond' includes six determinants of competitive advantages: factor conditions, strategy and rivalry, demand conditions, supporting industry, government policy and chance. Governmental policy is inevitably involved in ports development process, chance represents port's liability to external environment. Therefore based on 'extended diamond' frameworks, competitive advantages of a seaport are grouped as follows:

I. Innovations, human resource, superstructure, infrastructure.
II. Productivity, cost efficiency, focus on particular traffic categories.
III. Port networks, logistics activities.
IV. Corporate strategies, logistics strategies.
V. Governmental policy, local authorities.
VI. Chance, force major, external factors.

Figure 2: 'Extended diamond' of a seaport's competitive advantages.



Source: elaboration of author, based on Coeck et al. (1997) and Haezendonck (2001).

Efficient development of competitive advantages predetermines level of seaport competitiveness. Meantime choice of a particular seaport for vertical integration requires company:

- to assess competitive advantages of a particular seaport (seaport terminal) as compared to competitive advantages of other seaports (seaport terminals).
- To assess competitive advantages of particular seaport with respect to the interests of integrating company.

Therefore, seaport competitiveness has to be assessed, considering its functions in logistics chain. Whereby, competitive advantages of a seaport have to satisfy strategic objectives of a company, including: reduction of total logistics costs (i.e. transport costs, time costs and transaction costs), improve reliability of a logistics chain, and maximize benefits for a core business.

4. We load in bulk.

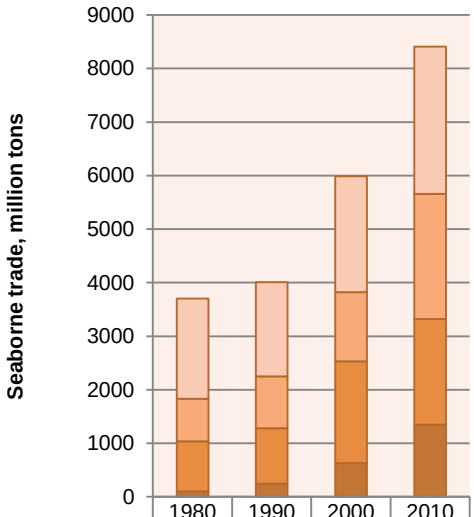
Production chain initially begins from extraction of raw materials. However resources are not equally spread around the globe. Thus trade flow occurs as result of moving raw materials from the place of extraction to the place of consumption. Raw materials are predominantly shipped in bulk and they constitute large share of seaborne trade.

Bulk trade can be classified in two categories: liquid bulk and dry bulk. In turn within liquid bulk one can distinguish: crude oil and oil products trades. Within dry bulk, there are two sub-categories: major bulk and minor bulk trades. Major bulk trade includes: coal, iron ore, grain, bauxite and alumina, and phosphate. Minor bulks include following but not limited to: coke, potash, scrap, fertilizers etc.

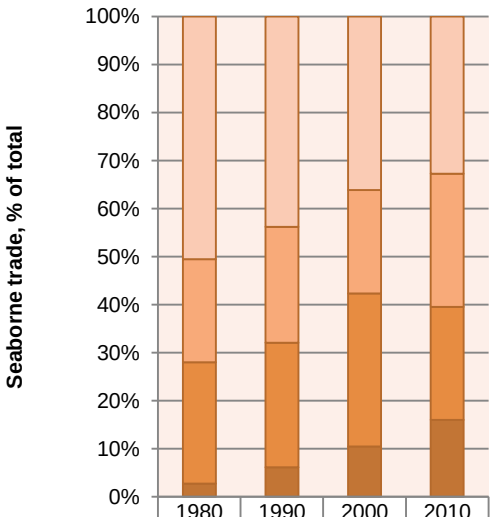
In general trade of bulk commodities is predetermined with: economic growth, political factors, international trade barriers and energy demand (Frankel et al. 1985). Globalization of economy and developed ICT provide importers a certain degree of freedom when choosing their suppliers. Hence, in general, bulk trade can be characterized as volatile.

In 2010 world seaborne trade amounted nearly 8.88 billion tons, 74% of this volume constitute bulk trade, including liquid and dry bulks (UNCTAD, 2011). The structure of world seaborne trade is represented at figure 3.

Figure 3: International seaborne trade, selected years, in millions of tons loaded (left); International seaborne trade, selected years, in % of total (right).



	1980	1990	2000	2010
Liquid bulk	1871	1755	2163	2752
Major bulks	796	968	1288	2333
Other Dry*	935	1039	1905	1976
Containers	102	246	628	1347



	1980	1990	2000	2010
Liquid Bulks	51%	44%	36%	33%
Major Bulks	21%	24%	22%	28%
Other Dry*	25%	26%	32%	24%
Containers	3%	6%	10%	16%

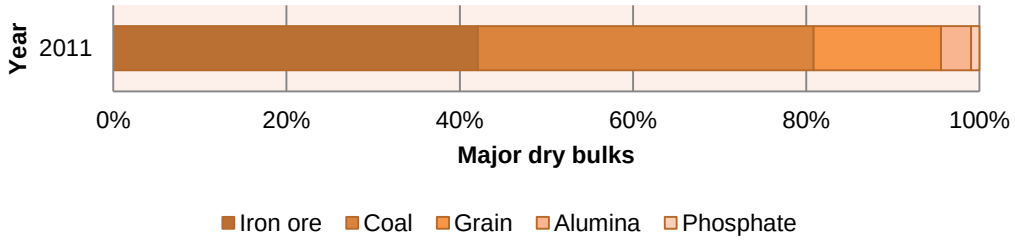
*Other dry include minor bulk and general cargoes.
Source: elaboration of author based on UNCTAD Review of Maritime Transport 2011.

Stopford (2009) and Bird (1971) noted some basic principles of bulk transport: to gain economies of scale using bigger ships; to minimize number of transshipments; to improve cargo handling operations.

I. First principle is well acknowledged, transport cost per unit drops as the size of a vessel grows. However, important to note that saving effect will be diminishing and also there are some limits for big ships to access seaports and straits (draught, beam and heights).
II. Second principle imply that source of saving shifts from vessel to efficient cargo handling operations at seaport. Large scale of cargo operations at seaport makes it reasonable to use sophisticated equipment dedicated to particular cargo. High productivity at seaport contributes to overall cost efficiency of transportation (Stopford, 2009).
III. Third principle defines that for bulk cargoes it is crucially important to reduce number of transshipments, especially for inexpensive cargoes. It allows avoiding additional expenses on actual cargo handling as well it allows avoiding natural loss during transshipment. Therefore bulk commodities has to be transported from place of extraction directly to seaport.

Cost efficient transportation is crucial for industries involved in trade of bulk commodities in high volume (Stopford, 2009). Author notes that for such industries, generally accepted solution is complete logistics chain designed and controlled by single company. The chain is fully integrated and can include inland facility, inland transport, dedicated seaport terminal and shipping. Examples of integration in logistics chains can be found in following industries: aluminum, oil, grain, coal etc. Frankel et al. (1985) notes that if trade is uncertain than integration is less favorable because of the risk of low utilization. On contrary, rather stable trade patterns give incentive for integration of industry into shipping.

Figure 4: Structure of major bulk's worldwide seaborne trade.



Source: elaboration of author based on
UNCTAD Review of Maritime Transport 2011

Bulk trade is very diverse and includes many different types of commodities. Each commodity has its own specifics in terms of transportation, storage and handling requirements, as well as there are certain geographical features (Bird, 1971). Hence it is hardly possible to generalize about bulk transportation system (Stopford, 2009). Within the scope of current research we focus on coal trade in Baltic Sea Region.

Coal is the second largest dry bulk commodity in seaborne trade. In 2010 coal trade amounted 904 million tons (UNCTAD, 2011), which is slightly less than 39% of all major bulks shipped this year. Today, coal is the most fast growing source of energy besides renewables. In 2011 coal constitutes 30% of global energy consumption, which is the highest level for the last 40 years (BP, 2012).

Initially coal trade had led to dedication of seaports and shipping, because coal is the type of commodity that cannot be mixed with any other commodity. Vessels carrying coal was dedicated to this type of cargo and had to sail one way in ballast. In harbors coal was stored and loaded/discharged in specialized berth as well. Bird (1971) uses definition 'terminal' with respect to such specialized berth to which dedicated ships sails for loading. In earlier work Morgan and Bird (1958) define such 'special port installation' as 'industrial port' serving only activity for which it was built.

4.1. Bulk terminal

Bulk terminal is a crucial element in bulk logistics chain. Bulk terminal has two equally important functions: cargo handling and storage. Cargo handling is directly dependent on type and performance of the equipment implemented at bulk terminal. Whereas storage appears as the crucial function, because terminal is a buffer in bulk logistics chain. Economies of scale enjoyed in shipping predetermine availability of large cargo consignments at terminal. Thus efficient operations at terminal depends on: productivity of cargo handling equipment; sufficient scale of storage facilities and its suitability for particular cargo; favorable location of terminal in terms of foreland and hinterland; availability of hinterland connections; sufficient planning and coordination with other elements of logistics chain (Frankel et al. 1985).

Availability of railway and inland waterway at bulk terminal is necessary condition for cost efficiency of bulk logistics chain. Inland waterways allow gaining economies of scale even in relatively small shipments, on barges of up to 3000 tons. However this mode is predetermined by availability of navigable river which is not always the case. Therefore availability of railway connection at terminal is crucial. Railway is the cheapest inland mode of transport, when it is used to move large volume of commodities. Moreover terminal needs to have well developed railway system on site. It provides certain level of flexibly in operations, allows redeploying wagons within the terminal and ensuring continuity of cargo operations. Depending on scale of the facilities, terminal can also operate own locomotives and other complementary equipment. Cargo operations can be arranged directly from/to wagons which can result in even higher productivity. However latter option is a subject to particular type of equipment used for cargo handling.

4.1.1. Storage

Adequate type of storage for bulk commodities is required in order to ensure protection, blending, grading, as well as to allow performance of necessary cargo operations at terminal (Frankel et al. 1985). Some commodities can be stored in the open air, namely pilling storage. For other types of bulk cargo covered storage is required, silos for grain, warehouse for fertilizers. It is important to ensure that no pollution will occur under the impact of wind, rain etc. Efficient storage of bulk cargoes requires dock labor to have specific proficiencies and skills use of special technics.

4.1.2. Equipment

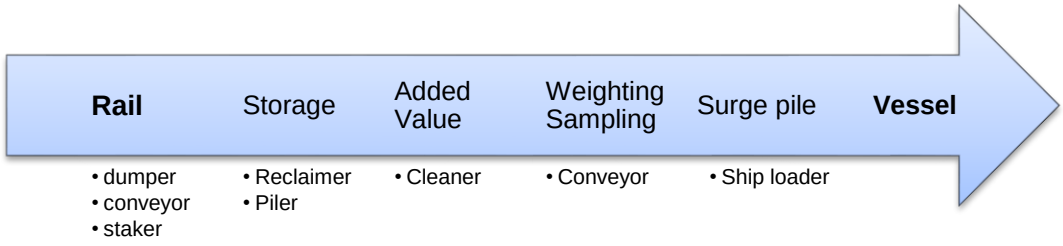
Type of equipment at bulk terminal varies from basic to state of the art. Choice of certain type is predetermined by scale of a terminal and expected throughput, as well as financial condition. All equipment for bulk cargo handling can be categorized as follows: loading, discharging, storing/reclaiming, transferring, cleaning, weighting and sampling (Frankel et al. 1985).

In basic case, common portal cranes equipped with grabbers perform loading and discharging of vessel; derrick cranes perform loading and discharging of rail wagons; ordinary machinery such as excavators and trucks perform piling, reclaiming and transport of cargo within the terminal. This type of equipment allows achieving handling rates of maximum 2500 tons per day.

In the state of the art case, combination of conveyors and radial ship loaders perform loading; ship unloaders perform discharging; sophisticated system of conveyors, pilers, reclaimers and machinery perform movement within the terminal. This type of equipment allows achieving significant loading rates of about 15000 tons per hour and discharging rates of about 4000 tons per hour.

It is worth noting that these are two extreme cases, whereas intermediary cases are possible when combination of different types of equipment is used. Figure 5 represents flow of cargo at state of the art bulk terminal.

Figure 5: Flow diagram for state of the art coal export terminal.



Source: elaboration of author based on Frankel et al. (1985).

Besides actual handling of cargo, there are two more important functions that has to be performed at bulk terminal: sampling and weighting. Sampling is needed in some cases to ensure quality of cargo, thus it requires special facility on site. Weighting of cargo is important due to fact that cargo is sold on weight. This procedure can be performed automatically while using conveyors. However it can represent bigger problem for basic case terminals, as additional intermediary stage in cargo handling operations has to be implemented, which results in costs.

Summarizing, we list factors that affect choice of certain equipment at bulk terminal: physical constraints on site (dimensions, weight); suitability to specific vessels (dimensions, possible damage of hold); OPEX; required skills for construction; operations and maintenance; environmental footprint; infrastructure requirements; permissible natural loss of cargo; possibility to reverse operations (Frankel et al. 1985).

5. Methodology

As discussed in previous sections, vertical integration is a strategic decision, hence we base our methodology on combination of frameworks for seaport strategic planning. We use framework of in-depth analysis of seaport strategies developed by Haezendonck (2001). We also use insights from framework for sustainable port planning elaborated by Dooms and Macharis (2003). Descriptive tool for strategic port planning, Port Portfolio Analysis, is discussed in section 5.1. Then we develop conceptual framework for SWOT analysis, described in section 5.2. Based on the conceptual framework we develop a questionnaire for survey, described in section 5.3.

5.1. Port Portfolio Analysis

Port Portfolio Analysis (PPA) is a technic based on "growth-share matrix" originally developed by Boston Consulting Group (BCG). BCG The matrix was intended for large corporations to analyze their business units. It is a two dimensional visualization representing relation between three variables. Circles plotted in terms of X and Y axis represent market share relatively to its rivals and growth rate respectively. The size of circles represents total sales of the units. Within the BCG-matrix, portfolio of business units is placed between four quadrants, namely: "dog", "question mark", "cash cow" and "star". Each quadrant represents different qualities of each business unit (Hax and Majluf, 1983)

Basic principles of BCG-matrix translated to PPA, to incorporate the matrix within the port sector (Haezendonck, 2001), however it requires adaption of terminology to seaport sector and implementation of four complementary 'levels' of analysis. The improvements suggested by Haezendonck (2001) are explained below.

First of all, original business units are identified as seaports. On the new complementary levels of analysis, business units will be identified as different traffic categories: dry bulk, liquid bulk, conventional cargo, containers and Ro-Ro (roll on – roll off).

I. First level is a comparison of overall market shares and growth rates of seaport in the range, whereas the range is considered as "portfolio of ports". Hence ports are positioned in terms of total traffic evolution. Data plotted in terms of X and Y axis according to original BCG-matrix.
II. At second level, traffic structure is enveloped for each seaport, whereas each seaport is considered as a 'portfolio of traffic categories'. Hence for every seaport, each traffic category is positioned in terms of its share in total traffic of a particular port and its average growth rate.
III. At third level, certain traffic category is analyzed between the ports in the range, whereas we consider the range as portfolio of traffic categories. Hence ports are positioned according to growth rate in particular traffic category and its market share in range.
IV. At fourth level, portfolio analysis is similar to the third level, however with two exceptions. Firstly, market share of particular traffic category is taken within the seaport rather than within the range. Secondly, this level introduces third variable which is the size of the total traffic as compared to the other ports in the range.

Second improvement is related to terminology. Original definitions of quadrants don't clearly reflect the context of port sector. Therefore Haezendonck (2001) suggests new, more suitable definitions (Figure 6):

- "Dog" becomes "Minor performer" – identification of seaport that has low market share with low growth rate.
- "Question mark" becomes "High potential" – identification of seaport with low market share and with high growth, but which can be further moved to another quadrant representing higher than average market share.
- "Star" becomes "Star performer" – suggesting that current positioning in the matrix can change, because of the changing nature of long-term sustainability.
- "Cash cow" becomes "Mature leader" – suggesting that entity has a strong standing in terms of market share which is not owed to a high growth.

Figure 6. BCG-matrix adapted for strategic port planning

Growth Rate	High	**High Potential**	**Star Performer**
	Low	**Minor Performer**	**Mature Leader**
		Low	High
		Relative Market Share	

Source: elaboration of author based on Haezenbonck (2001).

PPA is a practical tool which gives insight on current position of ports as compared to its rivals. It gives an indication of the competition among ports in a range. PPA may have significant value for both port authorities and port operators and can be seen as a basis for the strategic planning and future resource allocation. Meantime PPA itself doesn't have implications to the causality of port position in the portfolio, however it is still can bring great strategic value (Haezendonck, 2011). Author suggests that prescriptive value of the analysis can be increased if PPA is linked with SWOT analysis. Also author notes that when interpreting PPA it is important to pay attention to 'inherited factor conditions'.

5.1.1. Data for PPA

In current research we analyze ports in Baltic Sea Region, with focus on bulk traffic, particularly coal trade. In order to conduct PPA we have to identify range of seaports which fit our criteria. Seaports have to be in competition for traffic category, meaning either sharing same hinterland or serving potentially same clients.

First of all we choose Port Ust-Luga, within focus on analysis of Coal Terminal located at this port. For the second we choose four more ports, namely: Port Saint-Petersburg, Port Ust-Luga, Port Vyborg, Port Vysotsk, Port Primorsk. All five ports are located in the eastern part of Gulf of Finland and within 300 km of driving distance between the most distant ones. Hence they all share same hinterland. All

ports have bulk traffic in their portfolios. Also except Port Primorsk, other four ports ports serve coal trade. PPA for selected ports is conducted on four levels.

The throughput data for PPA was acquired from online open sources: Big Port of St. Petersburg (BPSP), Internet portal of the Federal Agency for Sea and River Transport, Unified State Information System on the situation in the world's oceans (ESIMO) and official web sites of the seaports.

5.2. SWOT analysis

SWOT analysis is a strategic planning procedure aimed to appraisal of internal and external environment of any organization (Dyson 1990). This technic allows determination of factors of interest, important to achieve objectives. Analysis of internal environment allows identification of Weaknesses that need to be eliminated and Strength on which to build. Analysis of external environment allows identifying which Threats to counter and Opportunities to take advantage of.

As we noted in Chapter 3, vertical integration of a company into a seaport is aimed to reduce transaction costs, to improve logistics chain and thus to support core business by making it more competitive. In terms of TCE, company's logistics chain can be improved through vertical integration into seaport, whereby transaction costs occurring at seaport will be reduced. Taking into account Porter's 'diamond' of competitive advantages, creation of partnership between company and seaport can strengthen competitive advantages of both.

Having defined factors determining company's vertical integration into a seaport (Section 3.4), as well as having mentioned competitive advantages of a seaport based on Porter's 'extended diamond framework' (Section 3.6), the aim is to identify the link between these factors and the competitive advantages. In order to explore rational of a company's vertical integration into a seaport we will need to conduct SWOT analysis which will allow determination of strengths, weaknesses, opportunities and threats of the particular seaport, taking into account competitive advantages of the seaport and factors predetermining vertical integration.

Current approach is based on the assumption that realization of competitive advantages involves implementation of certain actions in which arise transaction costs. We argue that if to reduce transaction costs related to particular actions, it will allow strengthening corresponding competitive advantages.

As result we get a conceptual framework (Figure 7) for analysis of seaport's competitive advantages considering company's strategic objectives directed to reduction of transaction costs.

5.2.1. Conceptual framework of vertical integration into a seaport.

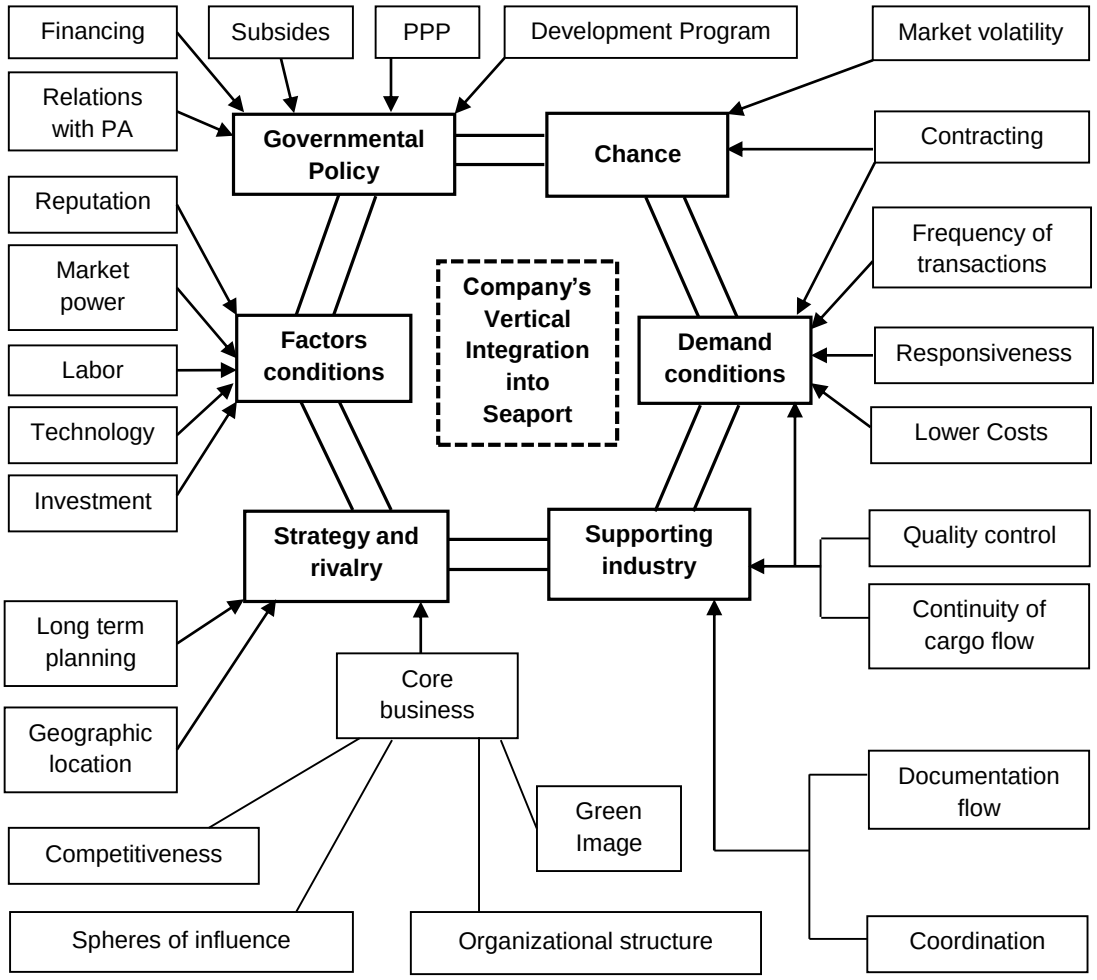
As can be seen from visualization of the framework:

- Based on Porter's 'extended diamond', conceptual framework represents interconnection of factors predetermining company's vertical integration into seaport, with competitive advantages of seaport.
- The 'extended diamond' of competitive advantages is influenced by factors determining company's vertical integration into seaport. Some of the factors are assigned to more than one determinant of competitive advantages. Contracting factor influences determinants of competitive advantages associated with chance and demand conditions. It can be explained that

contracts accompany provision of services at seaport. In the meantime contracts are associated with bounded rationality and limited ability to anticipate all possible contingencies.

- Double lines show that competitive advantages of seaport strengthen competitive advantages of the integrating company, and vice versa.
- Company's vertical integration into seaport implies the process of integration and matching determinants of competitive advantages of the company with determinants of competitive advantages of the seaport. Hence double lines between determinants of competitive advantages represent twofold perspective of this matching process.

Figure 7: Conceptual framework of a company's vertical integration into a seaport.



Source: elaboration of author.

Based on this conceptual framework we construct questionnaire for survey.

5.3. Survey

Survey was developed for executives and managers of OJSC "Kuzbassrazrezugol" which were involved in decision making of vertical integration into seaport. Survey was built upon three inputs: sources of transaction costs in port sector, factors influencing company to vertically integrate into seaport and conceptual framework of vertical integration into seaport, defined in sections 3.3, 3.4 and 5.2 respectively.

Survey consists of 26 questions (table 1), respondents were asked to rate on the Likkert scale, from 1 to 7 (from potentially negative to positive), the effect of the factors on the company's decision to vertically integrate into coal terminal at Port Ust-Luga.

Table 1: Questionnaire.

I	The need for long-term capital intensive investments in infrastructure and equipment of the terminal (high asset specificity)
II	The need to implement company specific technologies in the seaport terminal and the ability to protect know-how
III	Ability to attract highly qualified personnel in the seaport terminal, meeting requirements of the company
IV	Ability of a long term planning of company's activities at seaport (overcoming uncertainty)
V	The complexity of long term contracting (i.e. with seaport, operator of seaport terminal or other parties of logistics chain linked with seaport operations)
VI	The need to overcome risks associated with the violation of contracts (by seaport itself or other parties of logistics chain related to seaport activities)
VII	High frequency of transactions (shipments) and related frequency of contracting
VIII	The need to ensure continuity of cargo flow to seaport (from seaport)
IX	The need for the seaport to respond quickly to changing requirements of shipper (e.g. change in volume of the consignment)
X	The need to overcome risk of seaport's sudden refusal to accept cargo (i.e. due to insufficient capacity of the seaport)
XI	Ability to reduce transportation costs, and accordingly, the reduction of products costs
XII	Ability to gain market power, due to price discrimination
XIII	Uncertainty of the market (volatility)
XIV	Geographic location of company's trading area
XV	The company's ability to influence the reputation and reliability of the seaport terminal (implications for shipping companies, freight rates level)
XVI	Ability to ensure close and loyal cooperation between the company and port authorities
XVII	The possibility of improving the coordination of company's logistics processes
XVIII	The possibility of increasing the accuracy of planning logistics costs
XIX	The possibility of improving the quality control of cargo operations in port
XX	Ability to improve documentation flow associated with the company's activities in the port
XXI	Ability to optimize the management of company's core business (cash flow forecasting)
XXII	Ability to attract external investments
XXIII	Changing the company's organizational structure
XXIV	The possibility of expanding spheres of influence of the company
XXV	The possibility of improving the competitiveness of the company
XXVI	Ability to reduce environmental footprint and improve the "green image" of the company

Source: elaboration of author

In order to benchmark responds, survey was also distributed to European seaports: Port of Rotterdam, Port of Amsterdam and Port of Hamburg. Port and logistics managers as well as executives at vertically integrated companies specializing on bulk traffic, were asked to rate the same factors. The questionnaire was built in excel file and emailed to respondents. They were asked to fill in the excel file and send it back. All individual respondents were treated as confidential.

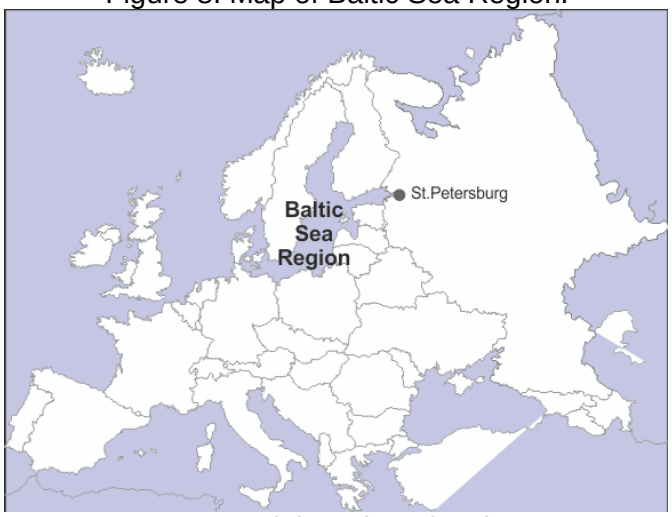
6. Analysis of Results.

In this chapter we present results of quantitative and qualitative models. Descriptive analysis of Baltic Sea Region and of seaports in the range is conducted in section 6.1 and 6.2. In Section 6.3, Port Portfolio Analysis allows to analyze competitive positions of seaports in the range and to analyze structure of cargo traffic at seaports as compared to rivals. Results of the survey are presented and analyzed in section 6.4. SWOT analysis of the Port of Ust-Luga is conducted, in section 6.5. Combination of strength and opportunities allows to identify sources of competitive advantages, while 'extended diamond' based analysis shows why these strength and opportunities, and thus competitive advantages occur.

6.1. Baltic Sea Region

Baltic Sea Region is a busy shipping area, characterized by special distinctions affecting the structure of seaborne trade in the region.

Figure 8. Map of Baltic Sea Region.



Source: elaboration of author

First of all, Baltic Sea is an isolated basin accessible only through Danish strait and Kiel Canal. Therefore size of vessel entering the region has draught restricted to about 15 m, which is about 150.000 dead weight tons vessel.

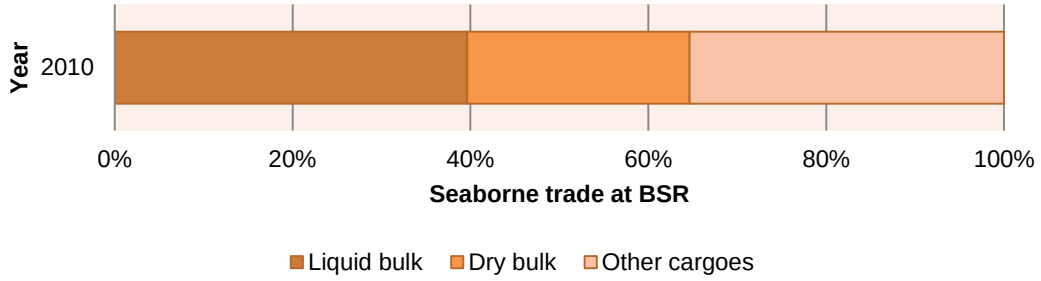
Second limitation is predetermined by ice conditions in eastern and northern part of Baltic Sea. Thus to access some areas, vessel need to have ice class, whereas some areas remain not accessible for few month in winter.

Third limitation occurs due to growing environmental concerns in the region, which resulted in requirements of bunker quality. Vessels operation in BSR has to use low sulfur bunker (MGO) which is more expensive than regular (IFO).

Finally, forth limitation occurs due to fact that in BSR there are mostly European countries which have high standards of sailor wages, monitored by ITF, and which shipping companies have to comply with. Overall BSR can be characterized as one of the strictest and demanding shipping markets in the world.

In 2010 total throughput of Baltic ports reached 828.4 million tones, which constitute around 9% of world seaborne trade. Share of bulk cargoes account for about 65%, of which 40% is liquid bulk and 25% is dry bulk (Rozmarynowska, 2011). More than half of bulk trade in BSR is export cargo.

Figure 9: Structure of seaborne trade at BSR, major bulk's



Source: elaboration of author based on BTJ (2011)

In 2010 dry bulk cargoes at BSR amount 207 million tones. Coal is the largest dry bulk commodity of seaborne trade in BSR, which accounts about 63 million tones, as compared to 22 million tons of iron ore (BTJ, 2011). Largest coal exporting ports are listed below in Table 2.

Table 2: List of largest coal exporting and importing ports in BSR

	Export			Import		
			volume			volume
1	LV	Riga	11,6	PL	Szczecin-Sw.	3,7
2	RU	Ust-Luga	8,9	SE	Oxelosund	1,8
3	LV	Ventspils	3,7	FL	Pori	1,7
4	PL	Szczecin-Sw.	3,3	SE	Lulea	1,6
5	PL	Gdansk	2,8	DK	Enstedvaerkets Havn	1,4
6	RU	Vysotsk	2,3	DE	Rostok	1,2
7	RU	St.Petersburg	2,2	DK	Nordjyllandsvaerket	1,0
8	DK	Enstedvaerkets Havn	1,7	FL	Raahe	1,0
9	EE	Tallin	1,5	DK	Studstrupvaerkets	0,7
10	PL	Gdynia	0,8	FL	Naantali	0,7

Source: elaboration of author based on Błuś (2012)

Largest share of coal seaborne exports is served by Russian, Latvian and Polish ports. It is worth to note that Latvian ports mostly serve Russian export, due to insufficient capacity of Russian Baltic ports. However this situation is changing now, because Russia is actively involved in development on new ports in BSR. For example Ust-Luga commenced its operations in 2008 and in 2010 it became second largest coal exporting port BSR.

6.2. The Ports

Current research is focused on the range of five ports: Ust-Luga, St.Petersburg, Vyborg, Vysotsk, Primorsk. These ports are located within the distance of 300 km (by land) around the Gulf of Finland.

All ports in the range constitute North-Western gateway of Russian foreign trade. Two ports in the range, namely Port Primorsk and Port Ust-Luga are newcomers in the range. Both ports were built as the result of Federal Program aimed to the development of Russian merchant shipping.

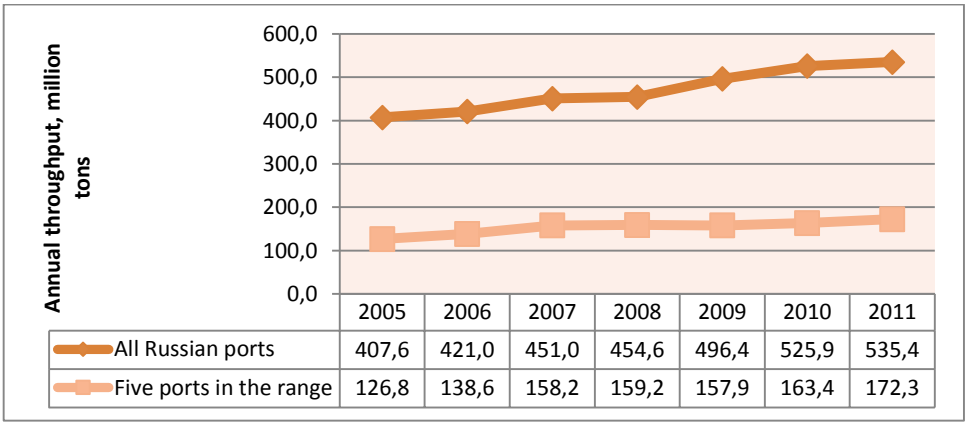
Figure 10 : Map of Russian ports in Gulf of Finland

Source: elaboration of author

Throughout the time, Soviet Union export was very dependent on seaports of Latvia, Lithuania and Estonia. After the independence, Russian Federation was left with only 4 ports in Baltic Sea Region: St.Petersburg, Vyborg, Vysotsk and Kaliningrad. At that time these ports were able to satisfy only quarter of trade volume. Thus in 1991 the main target was set to modernization and improvement of existing facilities as well as development of additional capacity. In 1993, Federal Government has approved program of construction of new specialized seaports in the range of Port of St. Petersburg. According to the program, Port Primorsk was purely dedicated for crude oil trade, while Port Ust-Luga was planned as the new state of the art port, a collection of specialized terminals for a variety of traffic categories.

In 2011 the five ports under consideration amounted for 32% of total throughput of all Russian ports. Dynamics of cargo throughput of Russian port is represented in figure 11.

Figure 11. Throughput of seaports in Russia 2005-2011.



	2005	2006	2007	2008	2009	2010	2011
All Russian ports	407,6	421,0	451,0	454,6	496,4	525,9	535,4
Five ports in the range	126,8	138,6	158,2	159,2	157,9	163,4	172,3

Source: elaboration of author based on Federal Statistics.

All five ports are privatized, but have single public Port Authority, Big Port of Saint Petersburg, with representatives also situated at each seaport. The Port Authority holds functions of regulator and is responsible for maritime safety issues in the region. Also “Rosmorport”, from the side of the Federal Government is responsible for development of port infrastructure in the range.

6.2.1. Port St.Petersburg

Port of Saint Petersburg was the biggest Russian port in Baltic Sea. The port is located in the bottom of Gulf of Finland, on Neva River delta islands. The port was built in 1703, together with construction of the city. All over the history, the seaport have been a key transport node facilitating trade, growth and prosperity in the region and whole country.

Territory of the port is 528,468 ha. There are 145 berths, with total length of 31 km. Depth at port is up to 11,9 m. Maritime channel links seaport with Finland Gulf, is 80-150 m wide, hence seaport is able to accommodate vessels up to 320 m long and 42 m wide.

Cargo traffic at port is very diverse. It includes all cargo types: dry bulk, liquid bulk, general cargo, containerized and Ro-Ro. Port has few separate container terminals. There are also passenger and cruise terminal, but they are part of separate port authority namely “Passenger Port Saint Petersburg”, which is out of scope of current research.

In 1992, former Leningrad Port Authority was privatized. It became open joint stock Company, whereas main shareholders were port workers. Later on most of port workers sold their shares to private companies. BPSP experienced several reorganizations in last 20 years, which finally resulted in the port being split between few big companies. In 2011, UCL Port B.V. became major shareholder as well the biggest operator (by number and area of terminals in operation).

Nowadays Port of St. Petersburg experiencing the common problem of old port cities. Close location to the city, limits further growth of the port and generates traffic congestion. Thus Federal Government decided to develop new ports in the range.

6.2.2. Port Vyborg

History of this port begins in XIV century. Vyborg is a city port which is located at the bottom of Gulf of Vyborg. Although it is a relatively small port it has very diverse cargo traffic, including dry bulk, liquid bulk and general cargoes. Also recently port handled Ro-Ro cargo, however its share in total traffic of the port remained negligent.

Territory of the port is 16,66 ha. Maximum depth is 6,5 m. Total length of quay wall is 1480 m. With two berths dedicated for passenger ferries, there is 1000 m of quay for cargo operations. The railway road goes directly to the port area, which enables the port to handle moderately large volume of bulk cargo. Therefore there are three berths specializing on bulk cargoes. Additionally there is special complex for loading fertilizers in bulk, which has capacity of about 600 000 tons per year. Other three berth are used for general cargoes. There are 3 warehouses located on the port area, with total area of 1737 m2 and open storage of 34440 m2.

Also there is a Vyborg Shipyard located near the port area. The shipyard is specializing in building and repair of special purpose vessels, icebreakers, offshore

gas rigs, containerships, tankers and heavy lift floating cranes. The shipyard has extensive network of clients and suppliers in Baltic Region. It employs 1500 workers.

Port of Vyborg is a privately owned company, privatized in 1991. In 2007 ownership was transferred to Oslo Marine Group. Port is a subject for investments from the Federal budget. Companies involved in export trade through this port invest in new equipment and warehouses.

6.2.3. Port Vysotsk

Another port with long history which begins in XVI century. Port Vysotsk is also located in Gulf of Vyborg, however at the external side. Territory of the port is 143,6 ha. Port consists of old port city part and two greenfield terminals which have distant locations from each other: dry bulk and liquid bulk terminals. Railroad connection, available on both terminals, is the main mode of transport for both cargo categories.

Dry bulk is specializing on coal shipments, it has territory of 33.6 ha. Length of quay wall is 674 m, with maximum depth of 9 m. Considerable developments have been taking place at terminal. Dredging activities have increased permissible depth from 9 m to 11.9 m and the quay wall is currently being prolonged to 780 m. Besides accessibility and infrastructure, terminal increases its efficiency due to improvements of cargo handling equipment, i.e. new cranes, conveyors. Overall, annual capacity have reached 5 million tons and is expected to grow up to 7.5 million tons. Meantime terminal has suffered some loss of traffic due to construction activities on site. Because of land availability, operator intends to expand territory of the port, increase handling capacity and attract new cargo categories, i.e. general cargo traffic.

Liquid bulk terminal is operated by “Distribution and Transshipment Complex Vysotsk “Lukoil –II”. Terminal became operational in June 16, 2004, with annual capacity of 2.5 million tons. In the beginning it was specializing only on export of crude oil, nowadays it is exporting oil products. Terminal has been continually improved. Current territory of the terminal is 110 ha and it has 3 berths with maximum depth of 13 m. There are 18 tanks, each has capacity of 50000 tons. There are few railway lines within the terminal, which enable to accommodate trains of 72 wagons long and process 180 wagons at one time. Important to note that current terminal has a very high level of environmental safety.

Besides extensive growth of both terminals, port has another green field project under development, which is a new cellulose terminal on one of neighborhood islands. Terminal is dedicated to private company “Vyborg Cellulose”, the project is in process now. On completion, terminal will be included in the frontier of Port Vysotsk.

6.2.4. Port Primorsk

Port Primorsk is one of the newcomers in the range. Within the Federal Program of port development this port was considered as a hub for crude oil export. The development of the port was held by “Transneft”.

The port was essentially planned to be dedicated for oil shipments and be directly connected with mainstream crude oil pipeline. Private company “Commercial Sea Port Primorsk” became responsible for the development of port area, as well as superstructure, infrastructure, hinterland and also for stakeholder management. Another private company “Specialized Oil Seaport Primorsk” became an operator of

the oil terminal. By December 27, 2001, terminal became operational with capacity of 20 million tons per year.

The territory of the terminal covers all port land, which is 246.85 ha. Modernization and improvement of the terminal have been done continually. In 2008, terminal started shipments of oil products, particularly of diesel fuel. In 2009, annual throughput of the terminal reached nearly 80 million tons thus it became the biggest liquid bulk port in Baltic Sea Region.

6.2.5. Port of Ust-Luga

Port of Ust-Luga is a second newcomer in the range. It is a green field project initiated by Federal Government in 1992. Construction and development of the seaport is managed by public-private partnership, namely OJSC “Company Ust-Luga”.

The seaport was intended to be a state of the art multifunctional logistics node consisting of various dedicated terminals serving all types of cargoes. Federal Government and private companies developed the port including its infrastructure and hinterland connections. In the meantime from the beginning of construction works private investors were entering the project. Hence most of the terminals have been developed for particular cargo traffic and for use of particular private companies.

Overall the project was aimed to decrease dependence of Russian trade from foreign ports (i.e. Latvia, Estonia, Lithuania, Kotka), decrease pressure on Port St. Petersburg and overall to increase its seaborne trade potential in BSR.

The territory of the port is 1045 ha. Total length of the quay walls more than 5 km, with maximum draught of 17 m. It allows the seaport to accommodate the largest vessels entering Baltic Sea. Seaport has relatively short approaching channel of 3.7 km long (opening of second channel will allow arranging circulation of vessels in the harbor). As opposed to other four ports in the range, Port Ust-Luga has very short ice condition period in the harbor. Seaport has railway and road connections.

Figure: 12. Port of Ust-luga, layout

Source: Ust-Luga Company.

There are 19 terminals at port Ust-Luga: 1) Coal terminal, 2) Universal terminal, 3) Sulphur Terminal, 4) Oil Cargo Complex, 5) Crude Oil Terminal (main stream oil

pipeline), 6) Logistic Center, 7) Multipurpose Terminal Yug-2, 8) Auto-Rail Ferry Complex, 9) Container Terminal, 10) LPG complex, 11) LGC Complex, 12, 13, 14) General Cargo Districts, 15) Bulk Cargo Complex, 16) Harbour Fleet Base (three more terminals have distant location thus not included on the figure: timber terminal, fishing terminal, Ro-Ro terminal).

There are few vertically integrated companies investing in development of terminals at the seaport: Kuzbasrazrezugol, RTL Group, UCL Holding B.V., Gunvor B.V. etc. In the first half of 2012, there were 9 operational terminals at seaport: coal terminal, multipurpose and general cargo terminals, timber terminal, sulfur terminal, crude oil terminals, three Ro-Ro terminals, container terminal, refer terminal and fleet base.

In 2002, coal terminal was the first one to commence operations at the seaport. Since then, throughput capacity of terminal had increased from 4 to 12.4 million tons per year. Important to note that cargo handling equipment on the terminal is able to clean the coal and thus increase its quality and value.

Ro-Ro terminal provides service for auto transport as well as for railway wagons. Container terminal has area of 140 ha, with planned capacity of 3 million TEU per year. In 2012, the mainstream crude oil pipeline was connected with crude oil terminal at the seaport. Planned capacity of the crude oil terminal is about 38 million tons per year.

Important to note that nowadays Federal Government pays much attention to the development of seaport's hinterland. This includes development of nearby located cities, modernization of infrastructure and development of new transport connections around the seaport.

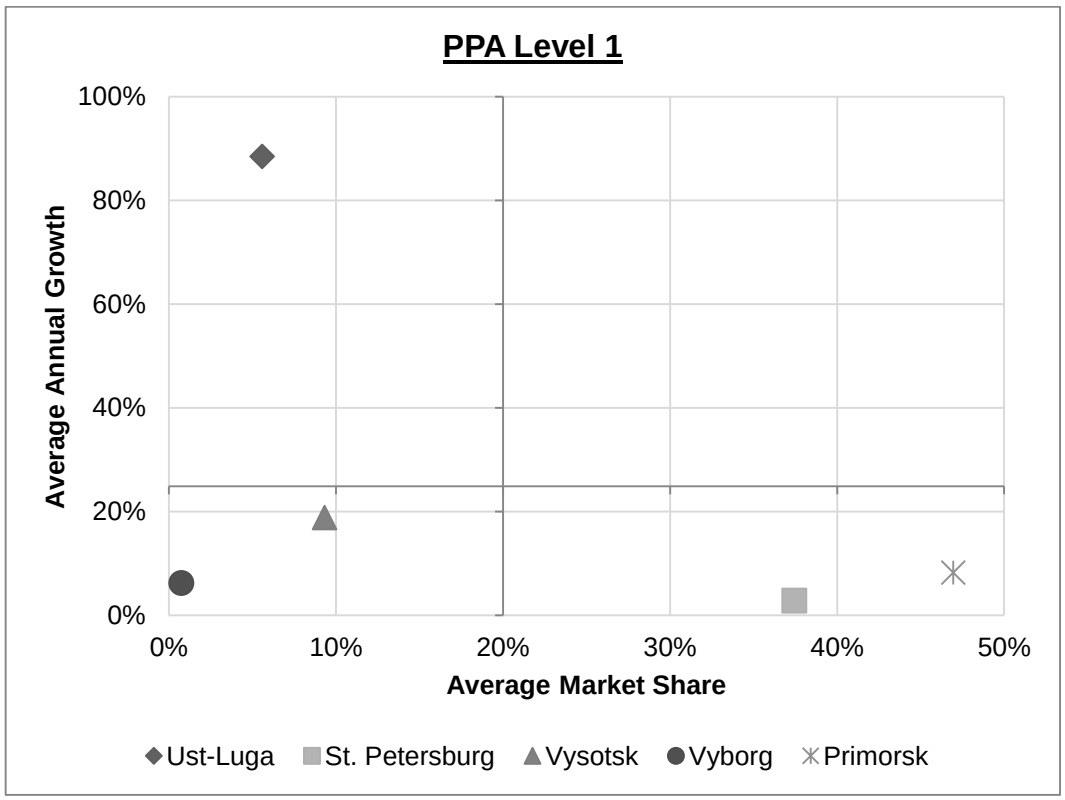
6.3. Port Portfolio Analysis

Port Portfolio Analysis was conducted on four levels for five ports in the range: Port of St. Petersburg, Port of Ust-Luga, Port Promorsk, Port Vysotsk and Port Vyborg. PPA is based on observation of 2005-2011 for 'unweighted' traffic data. Origin of coordinates divides graph to four quadrants allowing determining competitive position of the seaports and will be explained on each particular level.

6.3.1. PPA Level 1

Figure 13 represents visualization of PPA Level 1. On this level of analysis we consider port range as portfolio of seaports. The X-axis shows average market share in the range, the Y-axis shows average annual growth in the range. Origin of coordinate represents the average market share of the seaports (20%) and the average annual growth of the seaports (24.90%).

Figure 13. Port Portfolio Analysis, total traffic



Source: elaboration of the author based on port statistics.

According to the visualization of PPA Level 1:

- Port of Ust-Luga is positioned as "High Potential", with average market share of 5.5% and highest average annual growth rate of 88%. Such positioning of the seaport is appropriate, considering fact that seaport is a newcomer in the range and only 9 out of 19 terminals commenced operations. So we can expect that with continuation of high growth rates in near future the seaport could be positioned in higher market share position.
- Port of St. Petersburg and Port Primorsk are both positioned as "Mature Leader", with average market share and average annual growth of (37%, 2.8%) and (47%, 8.2%) respectively. Port of St. Petersburg has well

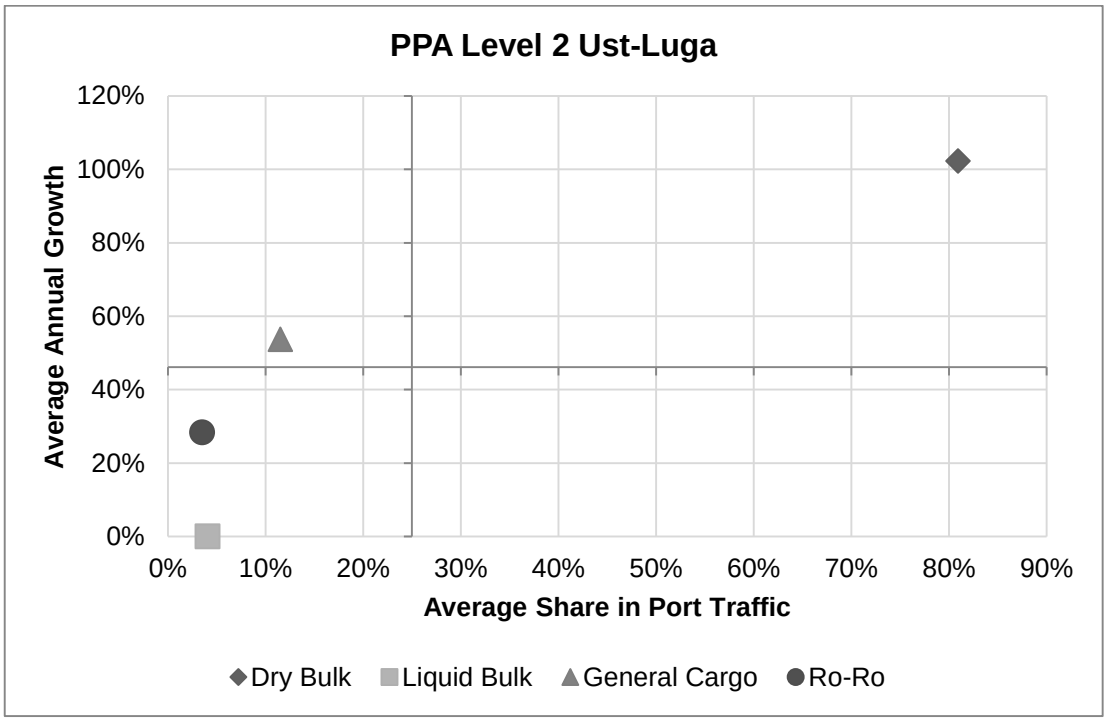
established position as a main seaport in the range. Although Port Primorsk is a new comer in the range, in less than 10 years it became the biggest liquid bulk seaport in BSR.

- Port Vyborg and Port Vysotsk are both positioned as “Minor Performer” with average market share and average annual growth of (0.74%, 6.17%) and (9.3%, 18.8%) respectively. Port Vyborg is a relatively small seaport thus it has a small market share. Port Vysotsk is a new comer in the range, and in less than 10 years it became the ninth largest liquid bulk seaport in BSR. However its throughput considerably decreased in recent years, therefore it could probably explain its close position to High Potential”

6.3.2. PPA Level 2

Figures 14-17 represents visualizations of PPA Level 2. On this level we will analyze traffic structure of each seaport. Our analysis distinguish between five traffic categories: Dry Bulk, Liquid Bulk, General Cargo, Containers and Ro-Ro. Visualization for Port Primorsk is not included because only one traffic category (Liquid Bulk) in port’s portfolio. The X-axis shows average share of traffic category at seaport, the Y-axis shows average annual growth of traffic category. Origin of coordinates represents the average traffic share at seaport and the average annual growth of traffic category at seaport.

Figure 14. Port Portfolio Analysis, Port of Ust-Luga, traffic structure.



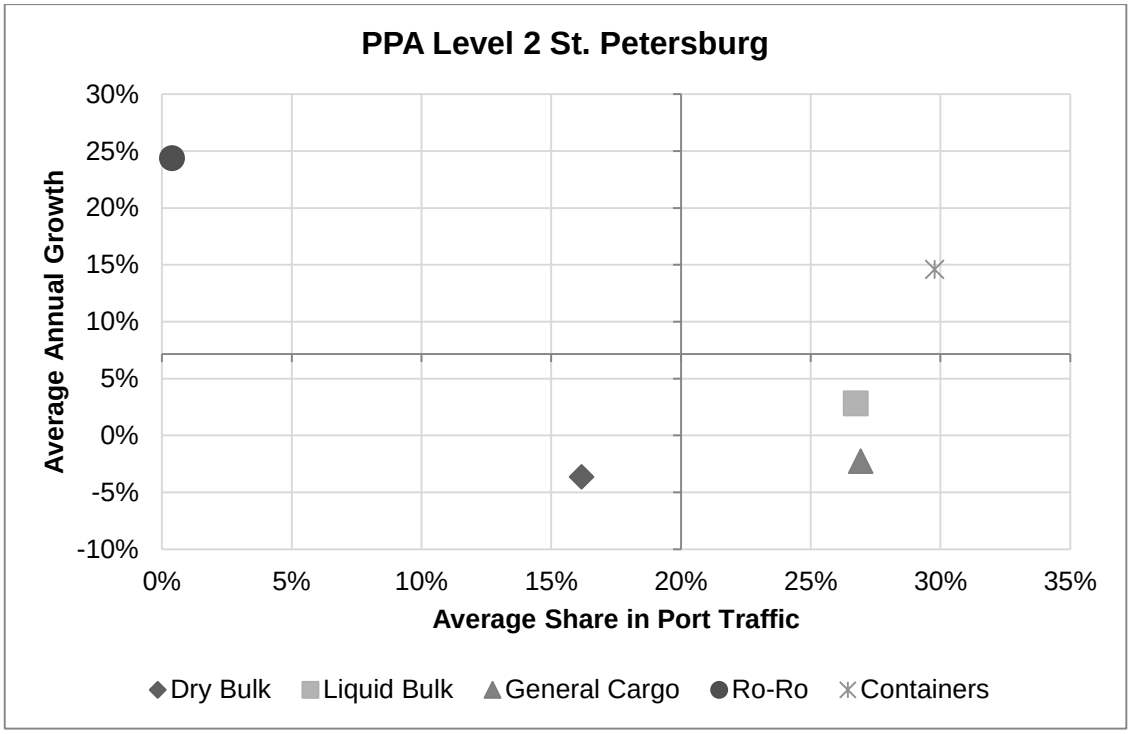
Source: elaboration of the author based on port statistics.

According to the visualization of PPA 2 Level 2 for Port of Ust-Luga:

- Overall seaport has relatively high average growth rate of (46%). Container traffic is not included because container terminal commenced operations a year ago and its share in total traffic is negligible.

- Dry Bulk traffic category is positioned as “Star Performer” with average growth rate of (102%) and average share of (81%).
- General Cargo traffic is positioned as “High Potential” with high average growth of (54%) and average share in port’s traffic of (11.5%).
- Liquid bulk and Ro-Ro categories are positioned as “Minor Performers”. Worth mentioning Ro-Ro category, due to its high average growth rate of (28%).

Figure 15. Port Portfolio Analysis, Port of St. Petersburg, traffic structure.

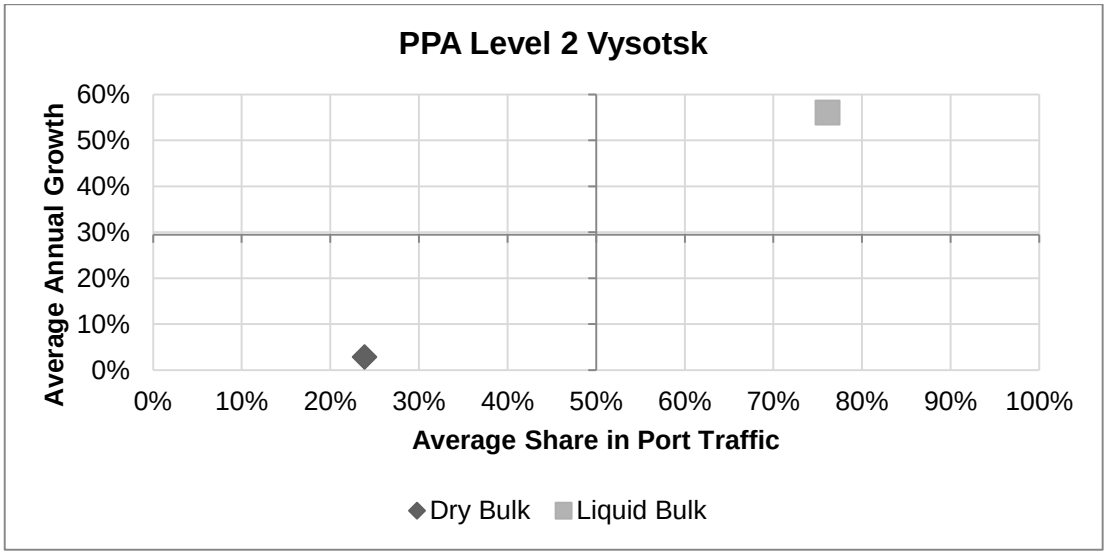


Source: elaboration of the author based on port statistics.

According to the visualization of PPA 2 Level 2 for Port of St. Petersburg:

- Overall port has average growth rate of (7%). All traffic categories are included.
- Ro-Ro category is positioned as “High Potential” with high average growth rate of (24%).
- Container traffic appears as “Star Performer” with average growth rate of (14.5%) and average share in port traffic of (30%).
- General Cargo and Liquid Bulk traffic categories are positioned as “Mature Leaders” with high average growth rate and average share in port’s traffic of (26.9%, -2.3%) and of (26.7%, 2.8%) respectively.
- Finally Dry bulk category appears as “Minor Performer” It still has relatively high average share of (16%), however negative average growth rate of (-3.65%).

Figure 16. Port Portfolio Analysis, Port Vysotsk, traffic structure.

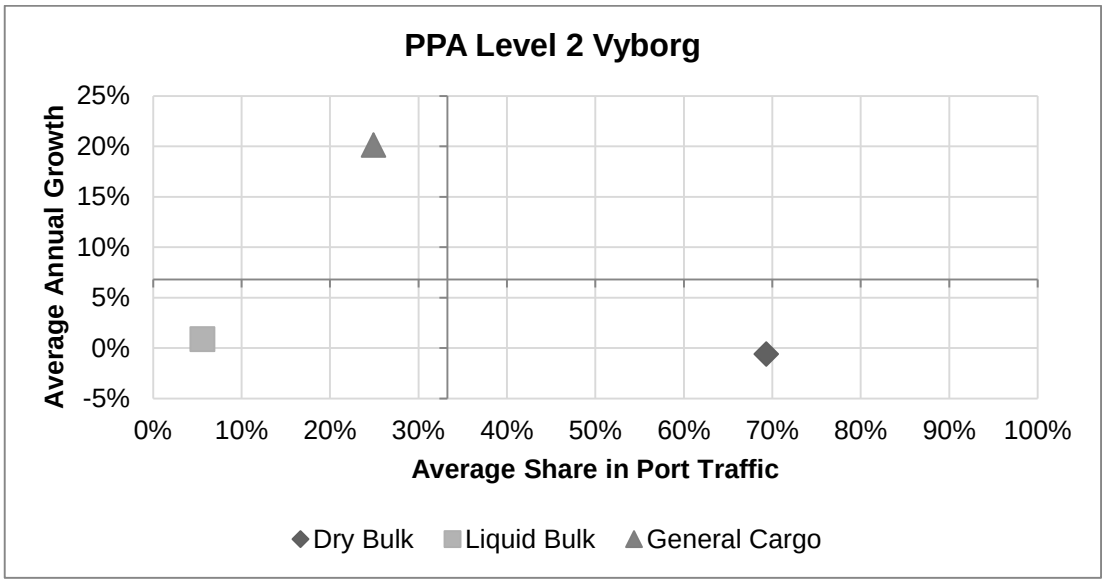


Source: elaboration of the author based on port statistics.

According to the visualization of PPA 2 Level 2 for Port Vysotsk:

- Overall seaport has average growth rate of (29%) and there are only two traffic categories.
- Liquid Bulk traffic appears as “Star Performer” with high average growth rate of (56%) and high average share in port traffic of (76%).
- Dry bulk category is positioned as “Minor Performer”. It has average share of (24%), with low average growth rate of (-3.65%).

Figure 17. Port Portfolio Analysis, port Vyborg, traffic structure.



Source: elaboration of the author based on port statistics.

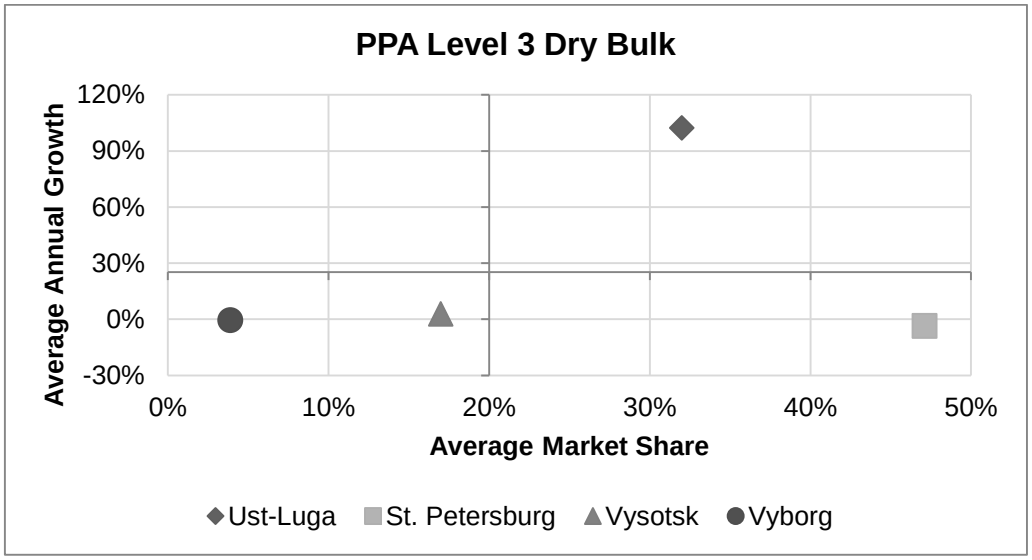
According to the visualization of PPA 2 Level 2 for Port Vyborg:

- Overall port has average growth rate of (6.8%) and there are three traffic categories. The seaport can service container and Ro-Ro traffic, however on non-regular basis and their share in total traffic is negligible. Also there is no “Star Performer” traffic at this seaport.
- General Cargo traffic is positioned as “High Potential” with high average growth rate of (20%) and average share in port traffic of (25%).
- Dry bulk category is positioned as “Mature Leader”. It has predominant average share of (70%), but negative average growth rate of (-0.6%).
- Liquid Bulk traffic appears as “Minor Performer” with average share of (5.6%).

6.3.3. PPA Level 3

Figure 18 represents visualization of PPA Level 3. On this level of analysis we consider seaports in the range as portfolio of specific traffic category. Port Primorsk is not included in the analysis because of its pure specialization on liquid bulk cargoes. The X-axis shows average market share in the range, the Y-axis shows average annual growth for a specific traffic category. In our case we will analyze Dry Bulk traffic category. Origin of coordinates represents: vertically the average market share of seaports in the range (20%) and horizontally the average annual growth of dry bulk traffic of the seaports (25.22%).

Figure 18. Port Portfolio Analysis, dry bulk traffic



Source: elaboration of the author based on port statistics.

According to the visualization of PPA Level 3:

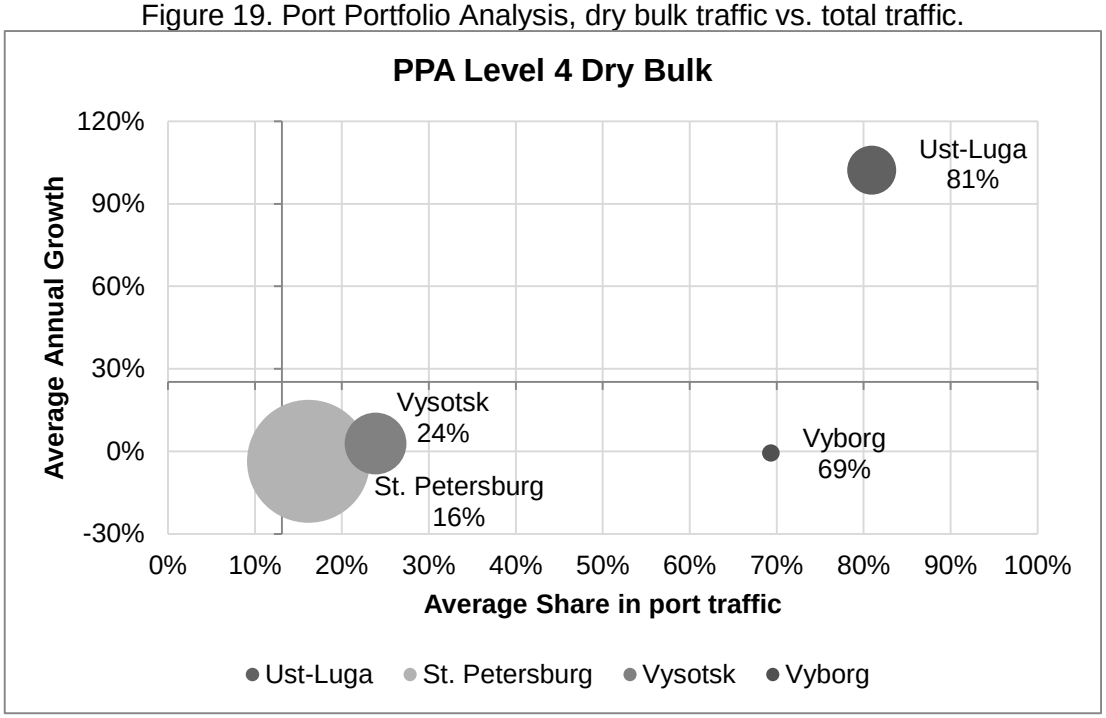
- Port of Ust-Luga is positioned as “Star Performer” with average market share of 32% and highest average annual growth rate of 102%. This positioning clearly proves specialization of the seaport on bulk commodities.
- Port St. Petersburg is positioned as “Mature Leader” with average market share of 47.12% however with negative average annual growth rate of -3.6%. Such a big market share means that in past decade, before new seaports commenced operations, St. Petersburg transshipped the most of dry bulk cargoes. While negative growth shows the trend of transition of dry bulk commodities towards new seaports in the range.

- Port Vyborg and Port Vysotsk are positioned as “Minor Performers” with average market share and average annual growth of (3.9%, 0.6%) and (17%, 2.8%) respectively. Again position of Port Vyborg in dry bulk category corresponds with its overall poor positioning in the range. Whereas Port Vysotsk gains higher market share of dry bulk traffic in the range, but steep decline in three consecutive years overall results in low growth rates.

6.3.4. PPA Level 4

Figure 19 represents visualization of PPA Level 4. On this level of analysis we examine bulk traffic of seaports within total traffic of each seaport. Also on this level of analysis we use additional dimension: each port visualized as a circle, which surface is proportional to the total traffic of seaport. The X-axis shows average market share of bulk traffic category within the port, the Y-axis shows average annual growth of bulk traffic category at each seaport. Origin of coordinates represents: vertically the average share of bulk traffic in all seaports (13.1%) and horizontally the average annual growth of dry bulk traffic of the seaports (25.22%).

Figure 19. Port Portfolio Analysis, dry bulk traffic vs. total traffic.



Source: elaboration of the author based on port statistics.

According to the visualization of PPA Level 4:

- Dry bulk traffic at Port of Ust-Luga is positioned as confident “Star Performer” in the port range; however the seaport’s its total traffic is smaller than of Port of St. Petersburg and Port Vysotsk.
- Other three ports are positioned as “Mature Leaders”. As already described on Level 2, Dry Bulk traffic at all of three ports have either low or negative average growth rates, still the average shares in seaports traffic is higher than the average in the port range.
  Port Vyborg is very much dependent on dry bulk traffic, but scale of this seaport remains low compared to all other seaports in the range.

Dry bulk traffic at Port Vysotsk was negatively affected in recent years; nevertheless it shows positive growth trend.
Dry Bulk traffic at Port of St. Petersburg declines, but due to its overall large scale of traffic it is still has the big share of dry bulk traffic in the range.

6.4. Survey results

The company, vertically integrated into Port Ust-Luga provided 20 responds. Survey results were accompanied with short phone conversation with representative of the company who commented on some of the answers. Also experts from EU ports provided 2 responds (Port Amsterdam and Port Hamburg).

Due to limited number of responds, there was no possibility to perform advanced statistics. This obstacle appeared as one of limitations of the research. Thus descriptive analysis of the survey results was conducted based on the responds and verbal communication. Responds from Ust-Luga are visualization in Appendix 1.

Table 3: Survey results.

Question No.	Likert Scale								Likert Scale						
	1	2	3	4	5	6	7		1	2	3	4	5	6	7
I			5	7	5	3				1					1
II			7	7	5		1				1				1
III	1	3	2	5	2	4	3				1			1	
IV					4	6	10						2		
V				1	5	5	9			1		1			
VI				1	4	6	9				1		1		
VII				1	5	6	8				1		1		
VIII				1	1	5	13				1	1			
IX			1	2	1	6	10					2			
X					6	7	7					2			
XI						1	19							1	1
XII					1	5	14						1	1	
XIII					1	7	12		1				1		
XIV		1	3	7	3	5	1					1			1
XV			2	4	5	5	4					1	1		
XVI						5	15					1		1	
XVII				2	4	6	8							1	1
XVIII					5	6	9							1	1
XIX				3	4	5	8							1	1
XX		1	4	6	5	2	2						1	1	
XXI						3	17		1		1				
XXII	1	7	6	3	1	2				1				1	
XXIII		2	6	7	5				1				1		
XXIV				4	5	8	3							2	
XXV						4	16							1	1
XXVI				2	4	5	9						2		

Source: elaboration of author based on responds from Coal Terminal, Port Ust-Luga (left); from EU port experts (right)

For the purpose of analysis of the survey results from Port Ust-Luga, we set following rules:

- If 10 and more respondents have rated certain factor from 1 to 4, than this factor has less significant influence on decision of vertical integration.

- If 10 and more respondents have rated certain factor from 5 to 7, than this factor has important influence on decision of vertical integration.
- If 10 and more respondents have rated certain factor as 7, than this factor has crucial influence on decision of vertical integration.

Factors associated with necessity of investments in specific assets and implementation of company specific technologies were rated by respondents (12 and 14 respectively) as less significant for vertical integration into seaport. According to verbal communication for the company integrating into a seaport, competitive advantages of the port has the most importance rather than necessity to invest in specific assets.

Ability to attract qualified personal was rated quite differentially. Whereby 9 respondents rated this factor as positive effect on decision of vertical integration, 5 respondents rated as neutral and 6 as potentially negative. It can be explained that human capital has not gained status of strategic asset in Russian economy.

Long term planning, including risks related with it, were rated by respondents (10 out of 20) as crucial factor influencing decision of vertical integration. Factors associated with contracting issues were rated by respondents (19 out of 20) as important factors influencing decision of vertical integration into seaport. Such results confirm theoretical concepts of TCE, that vertical integration aims reduction of transaction costs related to contracting issues.

The need to ensure continuity of cargo flow into seaport as well the need for responsiveness of the seaport to changing requirements of shipper were rated by respondents (13 and 10 respectively) as crucial factors influencing decision of vertical integration into seaport. This can be explained that seaport is a key element of company's logistics chain.

Ability to reduce transportation costs was rated by respondents (19 out of 20) as crucial factor influencing company's decision to vertically integrate into seaport. Referring to comments provided for survey results, reduction of transportation costs is a crucial aspect for decision of vertical integration into seaport. Other crucial aspects are ability to cope with market volatility and possibility for price discrimination (12 and 14 respectively) which company gains through vertical integration into seaport. This becomes possible because company has own facility at seaport and thus can make shipments in accordance with market trends.

Geographic location of markets was rated by respondents (11 out of 20) as factor which have less significant influence on company's decision to vertically integrate into seaport.

Ability to influence reputation of seaport terminal was rated by respondents (14 out of 20) as important factor for vertical integration into seaport.

Ability to establish loyal relations with Port Authority and local port officials was rated by respondents (15 out of 20) as another crucial aspect influencing company's decision to vertically integrate into seaport. It can be explained due to the specifics of business environment in Russia, based on importance of close relations between business partners.

Factors related to ability to improve company's logistics processes were rated by respondents (17 and above) as important factors influencing decision of vertical integration into seaport. Such tendency can be explained that efficient logistics, coordination and quality control can result in reduction of transport costs.

Possibility to simplify paperwork and documentation flow was rated by respondents (11 out of 20) as less significant factor for decision of vertical integration into seaport. It can be explained that due to bureaucracy issues in Russia, simplification of documentation flow through vertical integration is not expected.

Ability to improve company's core business and to increase competitiveness of the company were rated by respondents (16 and above) as crucial factors for decision of vertical integration into seaport. It can be explained that nowadays overall success of the company is dependent on high level of competitiveness. Moreover, for the company with highly complex logistics chain, vertical integration into seaport allows to increase certainty of its business.

Ability to attract external investments was rated by respondents (17 out of 20) as less significant factor for decision of vertical integration. Referring to comments, in this particular case vertically integrating company did not seek for external investments.

Changing the company's organization structure was rated by respondents (15 out of 20) as less significant factor for decision of vertical integration into seaport. Referring to comments, it is not relevant factor for company deciding to vertically integrate.

Ability to expand company's spheres of influence was rated by respondents (16 out of 20) as important factor for decision of vertical integration into seaport.

Ability to improve green image of the company was rated by respondents (18) as important factor for decision of vertical integration, considering worldwide trend for sustainable development and environment protection.

Based on results of the survey, important to note that most of respondents have rated 9 factors out of 26 (IV, VIII, IX, XI, XII, XIII, XVI, XXI, XXV) as having crucial influence on company's decision to vertically integrate into seaport. Other 10 factors (V, VI, VII, XV, XVII, XVIII, XIX, XXIV, XXVI) were rated as important factors for decision of vertical integration into seaport. Only 7 factors out of 26 (I, II, III, XIV, XX, XXII, XXIII) were rated as having less significant influence on company's decision to vertically integrate into seaport.

Due to low response rate from EU ports experts, their responds could hardly be generalized, nevertheless some points can be inferred.

First of all important to note that some of the factors were rated by experts quite differentially. These are related to specific assets, market volatility, investments, organizational structure (I, II, III, XIII, XXII, XXIII). Such result signifies that these factors are highly variable and dependent on particular case.

Secondly, EU ports experts rated factors (IV, XI, XII, XVII, XVIII, XIX, XX, XXIV, XXV, XXVI), related to logistics processes (planning, control, coordination), transportation costs, documentation flow, competitiveness and green image as having crucial and important influence on a company's decision of vertical

integration into a seaport. In this respect responds from Port Ust-Luga and from other EU ports experts are quite similar, which signifies role of a seaport as key element in a company's logistics chain.

6.5. SWOT analysis

SWOT analysis is based on information acquired from following sources: Baltic Port Organization, Baltic Transport Journal, official web sites of seaports in the range, sources used for collection of data for PPA. Personal communication with managers involved in port development in Russia. Summarized results of SWOT analysis presented in Figure 20.

Figure 20. Summary of SWOT analysis.

Strength	**Weakness**
Geographical location Accessibility (draught 17 m, low ice) PPP (government support, privatization) Available space for expansion	Hinterland connections Socio-economic environment (labor) Big Port Authority (5 ports) Bureaucracy and paperwork
Opportunities	**Threats**
Growing trade = Growing demand Redistribution of trade flows in Gulf of Finland Large scale public investments in port infrastructure and hinterland connections Development of EDI	Labor market Fierce port competition in the port range Stakeholder management Environmental standards High level of dedication to specific port users

Source: elaboration of author.

Internal environment at Port Ust-Luga.

Strength:

- Favorable geographical location:
  - North-Western part of Russian federation, crossroads of transport corridors: Northern and Southern transport corridors and Central Russia (cargo generating area).
  - Access to BSR countries, which import large volumes of raw materials (oil, coal, timber) and export industrial (intermediary and finished) goods.
  - The seaport appears as the extension of seaports network Big Port St. Petersburg.
- Good nautical accessibility: present draught of 17 m allows the seaport to accommodate largest vessels entering BSR. It is important factor for bulk seaborne trade.
- Very short ice condition period (sometimes ice free), which is a unique characteristic of seaport in this area.
- Availability of land, seaport is not constrained from hinterland and thus it has possibility to expand the territory.
- PA is actively involved in development of port infrastructure.
- Strong support of Federal Government, public finance, strong political will.
- Development of the seaport under PPP.
- Possibility to privatize terminals.
- Ability to implement investor's requirements on initial stage of construction of terminal, due to combination of greenfield development and PPP.

- Specialization on dry bulk commodities, proved by PPA.
- Highest average growth rate in terms of throughput, showed by PPA.
- Connection with mainstream oil pipeline.

Weaknesses:

- Underdeveloped hinterland transport connections, capacity of railway and road connections is not sufficient to accommodate planned throughput of the seaport.
- Absence of IWW connection.
- Underdeveloped logistics services at the seaport. There is a lack of supporting logistics industries due to seaport is a greenfield project and also not all terminals commenced operations yet.
- Low level of development of socio-economic environment in the port region, which negatively influence entrepreneurship activity around the seaport.
- Problem related with labor market due to distant location from big cities (150 km from City of St. Peteresburg, 30 km from Kingisepp town).
- Port dues and tariffs for cargo handling are set by Federal Government.
- The problem of high bureaucracy due to large scale of PA (single PA for 5 ports).
- Underdeveloped EDI, particularly in public structures.
- Dependence on support of Federal Government.
- Considerably low throughput of the seaport as compared to other seaports in the range, although the seaport became operational together with other greenfield projects (Vysotsk and Primorsk). PPA also showed this trend.
- Negative environmental footprint related with port development and construction activities (dredging, construction of quay walls, new transport connections)

External environment at Port Ust-Luga.

Opportunities:

- Growth of world trade and hence growing demand for raw materials.
- Russia's entering to WTO is expected to bring new trade opportunities for the country.
- Redistribution of trade flows and new logistics patterns in Gulf of Finland, generating more throughput at Port Ust-Luga:
    - Development of Ro-Ro, container and general cargo terminals in the seaport attracts more traffic due to relatively high draught at the seaport. Large vessels carrying cargo destined to Russia, will be more inclined to call Port of Ust-Luga rather than Latvian, Estonian or Finish seaport for transshipment of cargo.
    - The seaport is perceived as a strong partner of the port network in the range. Port of Ust-Luga is expected to redirect trade flows from Port of St. Petersburg in order to decrease concentration of seaborne trade and decrease traffic congestion at main port. PPA also showed this trend.
- Development of transport infrastructure:
    - Reconstruction of roads in the port region, including roads to St. Petersburg and Novgorod (A-120, M-10, M-11, P-35).

    - Construction of additional branch lines connected with the seaport. By 2015 planed throughput capacity of railway connections in the port region is expected to reach 92 million tons per year.
    - Development of extensive railway network within the seaport (depots, railway parks, branch lines). All terminals will have rail connection on site.
    - Development of feeder transportation. Large MNE's which own terminals in more than one seaport in the range plan to establish feeder services between the terminals.
- Adjustment tariffs for cargo handling operations to a particular port users.
- Federal Government is developing sustainable working environment in the port region. Complex development programs are aimed to develop socio-economic situation, including construction of households, development of transport infrastructure etc.
- Opportunity to develop industrial cluster in the port region. There are moderate number manufacturing plants and mines in the port region. Development of the port is expected to induce even higher business activity around the seaport.
- Ability to improve misbalance of tonnage supply in the region. Although bulk and general cargo terminals at the seaport are predominantly export oriented, some of the terminals are expected to be import oriented.
- Higher utilization of land, port facilities and capital is expected due to involvement of private companies.
- Development of unified EDI, which will include all set of procedures related to import and export activities.
- Development of North-Western Russian Port Network (5 seaports in the range, sharing same hinterland) initiated by Federal Government.

Threats:

- Losing support of Federal Government, to which the seaport owes its significant growth in recent years.
- Growth prospects for other seaports in the port range (Port Vysotsk, Port Primorsk). Both seaports are also part of Federal Program aimed to port development. Particularly Port Vysotsk has great prospects for growth, due to its favorable location, availability of free territory and developed transport infrastructure, however with lower draught.
- Underdeveloped labor market in the region. Failure of local and Federal government to develop socio-economic climate in the port region can negatively influence labor market of the seaport.
- Noncompliance of Russian environmental standards to high European standards. Nowadays some neighboring European countries are paying much attention to the development of the seaport and cargo operations there. They are threating to impose sanctions to Russia if certain environmental standards are not meet.
- PA is too big and it has to switch its investment policy between five seaports in the range. In such situation there is a threat of being neglected by PA.
- Dedication of terminals to particular companies (through vertical integration to the seaport), puts additional pressure on stakeholder management activities, coordination and further development of the seaport.

Findings of the SWOT analysis suggest that combination of strengthы with opportunities lead to the development of certain competitive advantage of the seaport. Overall, four sources of CAs of the Port of Ust-Luga can be distinguished.

First of all, geographical location and nautical accessibility are the core CAs of the Port of Ust-Luga. Important to note that Port of Ust-Luga is the greenfield project, hence initial decision to locate the seaport in this particular area have resulted in the principle competence, which strengthens determinants of CAs related to 'strategy and rivalry'. These competences also strengthen respective CAs of a company performing activities at the seaport.

Secondly, active involvement of Federal Government in development of the port sector appears as another source of CA. It includes such elements as feasibility of privatization, PPP project and public investments in development of the seaport's hinterland. Overall these elements allow strengthening determinants of competitive advantages related to 'factor condition' and 'governmental policy'. For a company deciding to vertically integrate into a seaport, these are crucial competences, because they allow establish secured relations with port authorities and pursue mutual specialization with the seaport. Also through vertically integration into the seaport, the company economizes on transaction costs associated with development of its own determinants of CAs.

Thirdly, competences of the Port of Ust-Luga are also related to the high level of specialization in particular traffic categories and integration of different logistics chains into the seaport. This competences occur as result of harmonization of port policy, described above. For the seaport it is a possibility to secure throughput of certain cargo flows, ensure high utilization of transport facilities and attract investments from integrating parties. For integrating company it is a possibility to support its core business, through implementation of corporate and logistics strategies at the seaport and improved productivity. These competences allow strengthening determinants of CAs related to 'demand condition' and 'strategy and rivalry'.

For the fourth, engagement of the Port of Ust-Luga in North-Western Russian port network results in another important CA of the seaport. Older seaports in the network have developed transport infrastructure in the hinterland, which new seaport can take use of. Also at older seaports, there is an established industry of logistics services provided for seaports users. Taking into account proximity of seaports at the network (150 km from the main seaport), provision of logistics services is expanding toward all ports in the network including Port Ust-Luga. This competence strengthens determinants of CAs related to 'strategy and rivalry' and 'supporting industry'.

Main weaknesses of the seaport occur due to underdeveloped hinterland and high level of bureaucracy. However to mitigate these disadvantages, Federal Government improves social climate around the seaport and develops transport infrastructure. Also bureaucracy issues are expected to decline, due to development and implementation of EDI, directed to simplification of import and export trade activities.

7. Conclusions

A multidisciplinary approach for port studies is applied in current research. First of all, the port sector is discussed from the spatial perspective, whereby inland nodes specializing in dry bulk cargo traffic integrate into port networks. Secondly, assuming that a seaport is a highly transactional environment, the framework of Transaction Costs Economics was applied to the port sector, in order to explore transaction costs influencing a company specializing on dry bulk traffic to vertically integrate into a seaport. Particularly this field of port studies appeared relatively unexplored. Perhaps because 'devolution of public responsibility' and privatization in the port sector are relatively recent trends, thus vertical integration of a company into a seaport became feasible only recently. Analysis of this trend and exploration of factors influencing the vertical integration into seaports requires more attention in port studies. A survey administered to Port of Ust-Luga and some EU ports, allowed identifying actual factors influencing vertical integration into a seaport. Thirdly, vertical integration of a company into a seaport is researched from the stand point of 'extended diamond' of determinants of CAs in the port sector. A twofold perspective of the vertical integration into seaports is proposed. On the one hand, CAs of a seaport can strengthen determinants of CAs of an integrating company. On the other hand development of CAs requires realization of certain actions, which imply existence of transaction costs. Thus vertical integration into a seaport allows lowering transaction costs related with these actions and strengthening corresponding determinants of CAs. Finally, a combination of strategic tools for port planning allowed to identify strategic positioning of the analyzed seaport as compared to its rivals as well as to explore actual reasons determining such position. Then based on the 'extended diamond' framework we explore strengths and opportunities of the seaport which lead to certain competences. Also current research proves that a combination of PPA and SWOT analysis has high strategic value for analysis of individual seaports as well as of port networks.

1. Why inland ports specialized on bulk traffic integrate into port networks?

To answer this question we first investigated development of a port's functions and determine role of port in the global market place. It was found that main functions of seaports developed through specialization in particular traffic categories and standardization of cargo handling operations. Also seaport gained new functions such as an element in logistics strategies or an object for private investments. Nowadays seaport evolved to a logistics node in spatial system and further develops into networks with other logistics nodes. Inland port, as defined in sections 2.3, can be a private company specializing on dry bulk cargo traffic. Transshipment at seaport is the focal stage in dry bulk logistics chain. On the one hand it requires storage and handling of cargo at seaport and on the other hand it allows shipper to avoid additional transshipments on inland leg. Thus for inland port vertical integration into seaport imply acquisition of a flexible cargo buffer, improved coordination of inland transportation and lower transaction costs at seaport. Given a cargo buffer at seaport, integrated company becomes flexible in terms of market volatility. Important to note that port network initiated by government is a subject for public investments in port infrastructure and hinterland, also network becomes a platform for implementation of different programs aimed to support and develop it (section 3.5). Hence integration of an inland port into a port network allows to obtain preferences provided by governmental policy and take advantage of developing

hinterland. Integration into a port network implies access to information about the network and parties engaged in it. However, lack of trust in a port network is an obstacle, considering that networking parties realize own commercial interests. Thus parties engage in networks not as single entities but as integrated corporate structures.

a. What is the role of vertical integration in maritime industry?

In globalized economy, logistics chains and logistics strategies become so complex that require integrated approach for control and coordination. Hence derived demand for transport becomes also integrated demand. As discussed in sections 3.1 and 3.2, strategy of vertical integration appears in different sectors of maritime industry, which allows to strengthen economic ties between subsequent stages of transportation or production. For certain traffic categories, vertical integration in maritime industry links together maritime shipping, port sector and inland logistics. Vertical integration into subsequent stages of transportation allows carrier to increase coordination of transport processes and thus provide 'global logistics packages'. Integration of production into transportation allows to fulfill the 'transport gap' between subsequent stages of production. In some cases an integrating company can pursue strategic objectives to gain market power or to 'improve coordination beyond the price', because essentially this strategy allows to strengthen competitive advantages of the integrating company.

b. Which transaction costs in ports sector influence company's decision of vertical integration into a seaport?

Answer on this question required analysis of transaction costs in the port sector with particular emphasis on the bulk cargo traffic. As already stressed, there is not much existing academic research in this particular field. Considering a model of an export logistics chain at a seaport and relying on Williamson's framework of transaction cost economics, 15 sources of transaction costs at port sector were determined (section 3.3) and further elaborated (section 3.4) as factors which have potential influence on a company's decision to vertically integrate into a seaport. Among the main sources are: specific assets, specific technologies, frequency of shipments and volume of cargo flow, continuity of cargo flow, pricing, coordination, control, responsiveness, reliability and reputation, documentation flow, stakeholders, environment, human resource and shipper's business transactions. Internalization of port-related transactions under corporate umbrella, allows economizing on transaction costs caused by opportunistic behavior of parties involved in transshipment at seaport and thus decreasing total cost of transportation. It also allows to economize on transaction costs caused be bounded rationality of parties through simplified contracting and availability of reliable information. Frequency of transactions plays important role for integrating company as it allows to gain economies of scale through high utilization of a seaport's facilities.

c. What is the link between competitive advantages of a company and a seaport within the scope of vertical integration?

For a private company and a seaport, creation and development of CAs allows increasing overall level of competiveness, hence it is a prerequisite of success in modern international competition. Vertical integration of a company into a seaport can be considered as combining CAs of the both. As discussed in section 3.6, CAs of a seaport can be considered in twofold prospective: as an element of logistics

chain generating added value for a port user and as a part of corporate structure supporting core business of a company. Thus vertically integrating company has to compare CAs of optional seaports, as well as to assess their CAs with respect to own strategic interests. It was assumed that realization of CAs requires certain actions in which transaction costs will arise. Thus if to reduce transaction costs associated with certain actions it will strengthen corresponding competitive advantages. Based on Porter's 'extended diamond' of competitive advantages we identify links between factors influencing company's vertical integration into seaport and determinants of CAs of a seaport. As result the conceptual framework of company's vertical integration into seaport is proposed in section 5.2.1, figure 7.

2. What is the strategic position of the Port of Ust-Luga within the port network?

This question was answered with use of PPA in section 6.3 and SWOT analysis in section 6.5. It was determined that the Port of Ust-Luga has overall 'high potential' due to its significant average growth rate and relatively small market share within the port network. Dry bulk cargo traffic dominates in portfolio of the Port of Ust-Luga. Moreover the port is positioned as 'star performer' in dry bulk traffic within the port network. Given that first terminal at port commenced operations only 10 years ago, nowadays there are 9 operational terminals and most of them are specialized for particular commodities. Important to note that the port has a free land available for prospective growth and future development of new terminals. The port is also a subject for Federal program aimed to improve the port sector in the North-West region of Russia. Hence Russian government invests in the seaport infrastructure and development of the seaport hinterland. It is expected that in the next decade the Port of Ust-luga will not only remain its position of 'star performer' in dry bulk category, but will become an overall 'star performer' within the port network. Findings of SWOT analysis and 'extended diamond' based research showed that the Port of Ust-Luga has competences related to 5 out of 6 determinants of CAs. Principle sources of CAs of the Port of Ust-Luga are: geographic location and accessibility, harmonized governmental policy and privatization in the port sector, specialization in specific traffic categories and the seaport network. These competences of the seaport strengthen determinants of CAs of the vertically integrated company. In the meantime, economizing on transaction costs occurring at seaport, the company can develop 6 out 6 determinants of its own CAs. For a company specialized on bulk cargo traffic, Port Ust-Luga is the opportune seaport to integrate logistics activities with.

   a. What are the features of dry bulk cargo traffic, particularly of coal in Baltic Sea Region?

As noted in chapter 4, diversity of bulk cargoes implies strong specialization in transportation and storage of particular commodity. However there are certain basic principles that apply to a bulk logistics chain in general. Pursuing economies of scale on inland and sea legs, and reducing losses caused by intermediary transshipments, the bottleneck in a logistics chain occurs at a seaport. During the research it was found that specialization in coal seaborne trade existed for centuries, it is a commodity that could hardly be mixed with other cargoes. Taking into account considerably low price of the commodity, the whole logistics chain has to be very cost efficient. Considering continuity and volume of coal seaborne trade, dedication of berths and shipping allowed increasing overall coordination. Nowadays it is possible to implement special cargo handling equipment at seaport, which can

allow to reach high levels of productivity at seaport (L/D up to 4000/15000 tons per hour) and to match with requirements of ships operating in certain shipping area. In this respect it is important to note that Baltic Sea Region (section 6.1), besides physical restriction in terms of draught (up to 17m) and ice condition in some areas also has restrictions in terms of local regulations. Overall BSR can be characterized as very strict, highly competitive and expensive shipping area. Thus through vertical integration into seaport, particularly into a bulk seaport terminal is possible to ensure that it will efficiently serve particular cargo traffic, making it more cost efficient.

b. Which factors predetermine vertical integration into seaport based on perceptions of port and logistics managers at integrated company?

Referring to survey results, discussed in section 6.4, there are 9 factors rated by respondents as having crucial influence on the company's decision of vertical integration into the seaport. These are including: long term planning of company's activities at seaport, continuity of cargo flow at seaport and responsiveness of the seaport to demands of shipper, decrease of transportation cost, ability to cope with market volatility and ability to use price discrimination, loyal cooperation between shipper and PA, improve core business and overall level of competitiveness of integrating company. Factors related to contracting issues were rated as important for decision of vertical integration into seaport. As well respondents marked out logistics factors: coordination, control and logistics planning. Choice of these factors underline role of a seaport as the key element in a company's logistics chain. According to the conceptual framework of vertical integration into seaport, these factors allow company to develop its competitive advantages associated with: demand conditions, supporting industry, strategy, factor conditions, chance and governmental policy. Important to note that specific technologies, asset and human specificity were not rated as crucial factors for the company. It was explained that business priorities of the company are not limited by the necessity of investments in specific assets. This notion is proved by low rates of the factor determining ability to attract external investments. Important to note that perceptions of Russian business reflect growing environmental concerns and necessity to improve green image of the company. Summarizing the survey and verbal communication following can be inferred: for the company integrated into coal terminal, port constitutes the 'cost center'. Control over it allows reducing total costs of transportation by lowering actual costs of transshipment and transaction costs occurring at the seaport. Moreover vertical integration into the seaport contributes to the company's flexibility, increases its market power and allows pursuing contemporary strategies aimed to price discrimination. Vertical integration into the seaport allows company to develop CAs of the both and improve overall competitiveness of the core business.

7.1. Limitations and future research.

Every research effort has its own limitations. Given the focus on bulk traffic, first constraint was the lack of modern academic research in commodity based port systems (Pallis et al., 2011), particularly in spatial analysis of port networks and inland terminals. Considering dominant focus on containerized traffic in port sector it is important to direct more research efforts to other bulk traffic categories. Particularly future research can be pursued with respect to specialized bulk terminals and there role in particular logistics chain. Also it is important to investigate role of bulk cargo traffic in the development of port networks with other seaports as well as with inland terminals.

Another constraint of the research is predetermined by private character of port sector. Consequently there was no ability to conduct cost analysis at vertically integrated seaport terminal.

Current research was also constrained by availability of data about cargo throughput at ports, including split by traffic categories. It was possible to collect traffic data for 7 years (2005 – 2011), while 10 years data of PPA could give more meaningful results. Growth of analyzed ports represents interest to investigate other traffic categories in the port range.

Due to limited time frame, current research was focused on analysis of 5 ports in the range. Inclusion of other ports (Tallin, Riga, Ventspils) serving same traffic category could enrich PPA. Redistribution of cargo flows in the region influenced by development of new Russian ports can become an incentive to investigate competitive standing of analyzed ports as compared to other ports in Gulf of Finland and to look for dynamics of throughput in these ports.

Limited number of responds from Port of Ust-Luga did not allow to apply advanced statistics. Also ability to benchmark survey results from analyzed terminal with European prospective was limited due to low response rate from European ports.

Given the increasing trend of privatization and integration in port sector, future research efforts can be focused on investigation of vertical integration with respect to other traffic categories. Lack of transaction cost analysis in the port sector is evident. Future research can focus on coal traffic as well, but in other countries. Then comparison and overview of perceptions of integrating companies specialized on the same traffic category can be generalized and thus become a solid basis for port authorities, managers and regulators.

Taking into account that Port of Ust-Luga is the first PPP project realized in the Russian port sector it is important to investigate this new experience for the country and compare it with existing experience in other countries.

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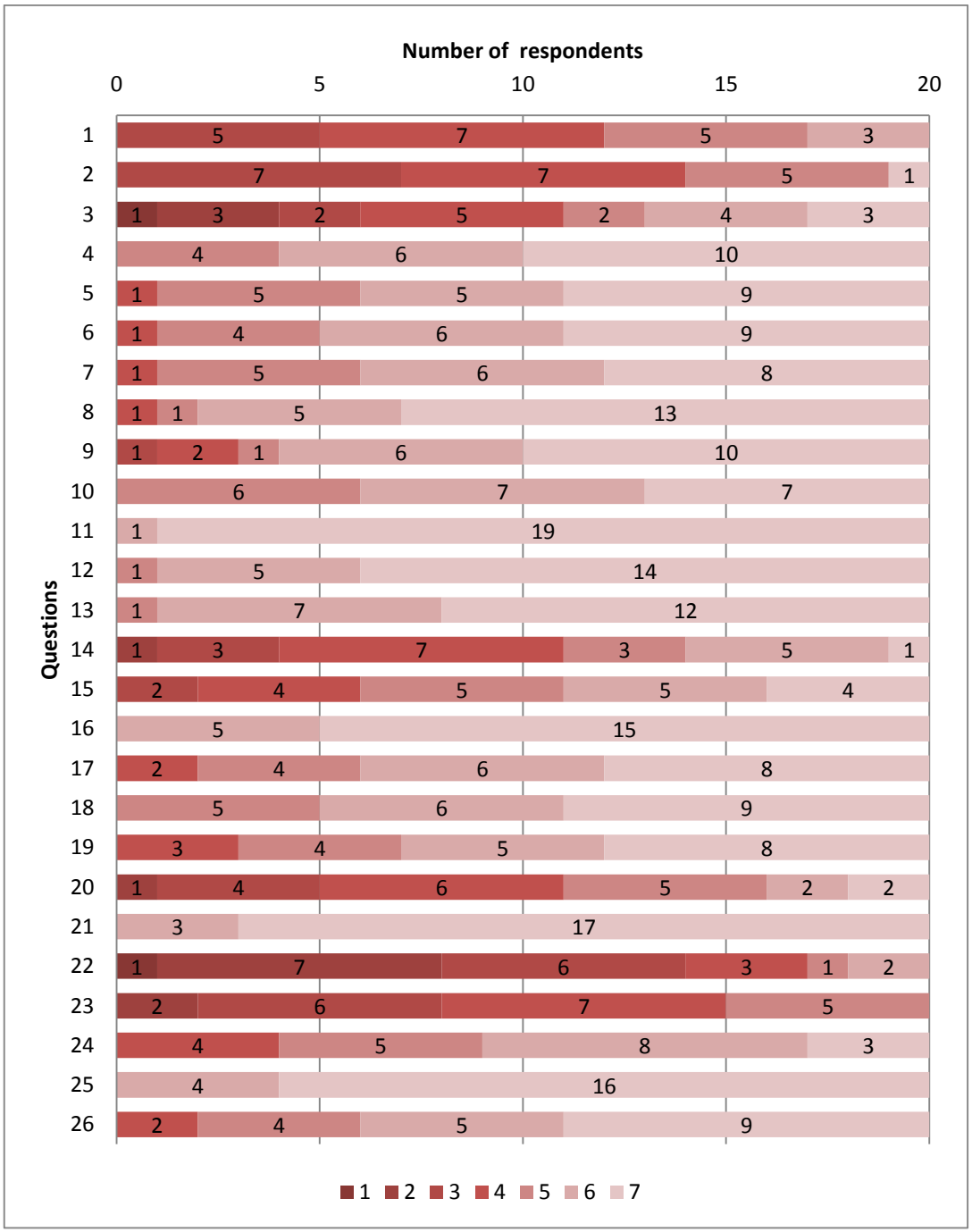
Appendices

Appendix 1. Visualization of survey responds from the Port of Ust-Luga



Source: elaboration of author

Appendix 2. Data for Port Portfolio Analysis.

	Traffic Categories, in million tons					
UST-LUGA	**DB**	**LB**	**GC**	**CONT**	**Ro-Ro**	**TOT**
Average Traffic	6,89	0,92	0,81	0	0,41	9,04
Share Traffic Category	76,22%	10,18%	8,96%	0,00%	4,54%	100%
Average Annual Growth						
2011-2012	35,39%	0,00%	22,56%	0,00%	133,54%	48,11%
2010-2011	20,26%	0,00%	27,13%	0,00%	-55,40%	13,65%
2009-2010	40,71%	0,00%	95,26%	0,00%	120,46%	50,04%
2008-2009	-5,81%	0,00%	-38,39%	0,00%	0,00%	-3,32%
2007-2008	80,00%	0,00%	237,08%	0,00%	0,00%	90,47%
2006-2007	580,93%	0,00%	32,56%	0,00%	0,00%	433,73%
2005-2006	-35,75%	0,00%	0,00%	0,00%	0,00%	-13,58%
Average Market Share						
2011-2012	59,91%	28,55%	6,96%	0,00%	4,58%	13,17%
2010-2011	85,28%	0,00%	10,94%	0,00%	3,78%	7,21%
2009-2010	80,59%	0,00%	9,78%	0,00%	9,63%	6,56%
2008-2009	85,93%	0,00%	7,52%	0,00%	6,55%	4,34%
2007-2008	88,20%	0,00%	11,80%	0,00%	0,00%	4,52%
2006-2007	93,33%	0,00%	6,67%	0,00%	0,00%	2,71%
2005-2006	73,16%	0,00%	26,84%	0,00%	0,00%	0,55%

	Traffic Categories, in million tons					
ST. PETERSBURG	**DB**	**LB**	**GC**	**CONT**	**Ro-Ro**	**TOT**
Average Traffic	9,23	15,22	15,37	17,04	0,23	57,09
Share Traffic Category	16,17%	26,65%	26,92%	29,85%	0,40%	100,00%
Total Growth						
Average Annual Growth						
2011-2012	-19,51%	-3,67%	8,52%	15,67%	53,19%	3,22%
2010-2011	16,84%	2,71%	10,67%	30,65%	63,67%	15,18%
2009-2010	-21,79%	5,17%	-25,81%	-21,69%	53,65%	-15,78%
2008-2009	-3,14%	2,65%	-8,40%	8,43%	0,00%	0,38%
2007-2008	24,80%	13,00%	-0,37%	10,91%	0,00%	9,93%
2006-2007	-25,64%	-16,61%	-3,03%	22,16%	0,00%	-5,60%
2005-2006	2,91%	16,25%	2,53%	35,94%	0,00%	12,29%
Average Market Share						
2011-2012	12,37%	26,24%	23,60%	36,64%	1,15%	34,81%
2010-2011	15,89%	28,14%	22,47%	32,72%	0,78%	35,53%
2009-2010	15,66%	31,56%	23,38%	28,85%	0,55%	31,92%
2008-2009	16,86%	25,27%	26,54%	31,03%	0,30%	37,60%
2007-2008	17,48%	24,71%	29,09%	28,72%	0,00%	37,70%
2006-2007	15,39%	24,04%	32,10%	28,47%	0,00%	39,14%
2005-2006	19,54%	27,21%	31,24%	22,00%	0,00%	45,32%

	Traffic Categories, in million tons					
VYSOTSK	**DB**	**LB**	**GC**	**CONT**	**Ro-Ro**	**TOT**
Average Traffic	3,32	11,00	0,00	0,00	0,00	14,33
Share Traffic Category	23,20%	76,80%	0,00%	0,00%	0,00%	100,00%
Total Growth						
Average Annual Growth						
2011-2012	38,41%	-18,45%	0,00%	0,00%	0,00%	-10,60%
2010-2011	-20,23%	-9,78%	0,00%	0,00%	0,00%	-11,58%
2009-2010	-1,69%	10,41%	0,00%	0,00%	0,00%	8,11%
2008-2009	-31,40%	7,25%	0,00%	0,00%	0,00%	-3,12%
2007-2008	4,88%	27,92%	0,00%	0,00%	0,00%	20,80%
2006-2007	17,14%	33,09%	0,00%	0,00%	0,00%	27,72%
2005-2006	12,90%	341,67%	0,00%	0,00%	0,00%	100,58%
Average Market Share						
2011-2012	23,85%	76,15%	0,00%	0,00%	0,00%	7,79%
2010-2011	15,58%	84,42%	0,00%	0,00%	0,00%	9,08%
2009-2010	17,27%	82,73%	0,00%	0,00%	0,00%	10,63%
2008-2009	19,00%	81,00%	0,00%	0,00%	0,00%	9,76%
2007-2008	26,82%	73,18%	0,00%	0,00%	0,00%	10,13%
2006-2007	30,90%	69,10%	0,00%	0,00%	0,00%	9,58%
2005-2006	33,69%	66,31%	0,00%	0,00%	0,00%	8,19%

	Traffic Categories, in million tons					
PRIMORSK	**DB**	**LB**	**GC**	**CONT**	**Ro-Ro**	**TOT**
Average Traffic	0,00	72,16	0,00	0,00	0,00	72,16
Share Traffic Category	0,00%	100,00%	0,00%	0,00%	0,00%	100,00%
Average Annual Growth						
2011-2012	0,00%	-17,16%	0,00%	0,00%	0,00%	-3,35%
2010-2011	0,00%	-13,68%	0,00%	0,00%	0,00%	-1,92%
2009-2010	0,00%	89,18%	0,00%	0,00%	0,00%	4,73%
2008-2009	0,00%	-53,08%	0,00%	0,00%	0,00%	1,83%
2007-2008	0,00%	0,00%	0,00%	0,00%	0,00%	12,33%
2006-2007	0,00%	0,00%	0,00%	0,00%	0,00%	15,24%
2005-2006	0,00%	0,00%	0,00%	0,00%	0,00%	28,66%
Average Market Share						
2011-2012	0,00%	100,00%	0,00%	0,00%	0,00%	43,59%
2010-2011	0,00%	100,00%	0,00%	0,00%	0,00%	47,51%
2009-2010	0,00%	100,00%	0,00%	0,00%	0,00%	50,13%
2008-2009	0,00%	100,00%	0,00%	0,00%	0,00%	47,48%
2007-2008	0,00%	100,00%	0,00%	0,00%	0,00%	46,93%
2006-2007	0,00%	100,00%	0,00%	0,00%	0,00%	47,68%
2005-2006	0,00%	100,00%	0,00%	0,00%	0,00%	45,22%

	Traffic Categories, in million tons					
VYBORG	**DB**	**LB**	**GC**	**CONT**	**Ro-Ro**	**TOT**
Average Traffic	0,78	0,08	0,28	0,00	0,00	1,13
Share Traffic Category	69,00%	6,65%	25,15%	0,00%	0,00%	100,00%
Average Annual Growth						
2011-2012	4,56%	-17,16%	-2,29%	0,00%	0,00%	1,25%
2010-2011	-16,85%	-13,68%	50,78%	0,00%	0,00%	-7,76%
2009-2010	-11,48%	89,18%	-31,28%	0,00%	0,00%	-10,84%
2008-2009	50,80%	-53,08%	-30,39%	0,00%	0,00%	16,36%
2007-2008	16,95%	0,00%	-50,15%	0,00%	0,00%	-7,77%
2006-2007	-10,31%	0,00%	240,86%	0,00%	0,00%	45,80%
2005-2006	-37,88%	0,00%	-36,64%	0,00%	0,00%	-37,60%
Average Market Share						
2011-2012	72,55%	6,91%	20,53%	0,00%	0,00%	0,64%
2010-2011	70,27%	8,45%	21,28%	0,00%	0,00%	0,67%
2009-2010	77,95%	9,03%	13,02%	0,00%	0,00%	0,75%
2008-2009	78,51%	4,26%	16,89%	0,00%	0,00%	0,83%
2007-2008	60,58%	10,55%	28,23%	0,00%	0,00%	0,72%
2006-2007	47,77%	0,00%	52,23%	0,00%	0,00%	0,89%
2005-2006	77,66%	0,00%	22,34%	0,00%	0,00%	0,67%