

Maritime cluster analysis on the Central Baltic region

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1 SUMMARY

SmartComp – Smart Competitiveness for the Central Baltic region is a Central Baltic INTERREG IV A Programme 2007–2013 financed project which aims to support smart, environmentally sustainable development, growth, competition and cooperation between maritime clusters, cities and universities in the Central Baltic region (CBR), i.e. in Estonia, Finland, Latvia and Sweden. In the midst of common challenges, how the maritime clusters in the CBR could improve their competitiveness?

It can be concluded that the maritime clusters of the CBR have several factors in common, but are still separate and often compete with each other. However, in the future they should find ways to combine their strengths in order to increase the competitiveness of the region's maritime sector. The risk of accidents, such as oil catastrophes, concerns all coastal states, and boosts the investments in technologies and processes aimed at increasing the safety of navigation. The legal framework for vessel traffic in the Baltic Sea is also tightening, the sulphur emission regulations giving the most recent example. The maritime clusters in the CBR have to make remarkable investments in finding and implementing new solutions to meet the regulations. Although challenging, the tightening environmental regulations could turn into an opportunity as well, making CBR countries forerunners in environmental-friendly technologies, life-cycle solutions and fuel efficiency. At the same time, the development of the Russian ports can increase the material flows in the region, and the other clusters have to make sure they are involved and make most of the business opportunities opening in the gigantic development projects of the Russian maritime cluster.

However, also the rising cost levels threaten the profitability of the maritime industry, and the global competition is tightening as particularly Asian clusters are competing with lower production costs. Instead of prices, the CBR maritime clusters could compete with quality and specialization, which, however, requires maintaining sufficient financial and scientific resources for innovation activities. Availability of qualified workforce is also a common problem in the maritime sector, both due to aging population and shifting of experts to other industries. This challenge has to be met by guaranteeing the sufficiency and quality of education and creating an appealing image for the maritime sector. Common branding and communication activities could improve the image of the maritime sector and increase awareness of its importance for the CBR countries.

Nevertheless, the CBR clusters are still small in a global scale and are facing common challenges which could be better answered with coordinated solutions. The cluster companies should not only strengthen their internal cooperation networks but also establish connections to other clusters abroad in order to increase their business opportunities, knowledge flows and joint research and development (R&D). Encouraging this, however, requires government support for SME internationalisation and innovation activities as well as new mechanisms to finance investments. However, the cluster competitiveness ultimately stems from companies and their efforts for continuous development. By viewing each other less as competitors and more as cooperative partners and by joining their forces around the Baltic Sea, the maritime clusters in CBR could better tackle their common challenges and compete with their large Asian counterparts.

2 INTRODUCTION

The maritime clusters in the Baltic Sea region are facing various new challenges. The competitive advantage of the Far Eastern maritime shipbuilders lies in producing series of standardized vessels at low costs, whereas the European shipyards with their subcontractors and suppliers provide specialized solutions and technologies. For the European maritime clusters, keeping one step ahead of the fast-growing Asian competitors is not an easy task. At the same time, the local environment is facing changes that affect also shipping companies, ports and port operators – for instance, the tightening environmental regulations as well as rising cost levels are currently shaping the maritime clusters' business environment in the Baltic Sea region. The political decision-makers as well as various interest groups and associations also strongly affect the maritime actors' playground. All these developments have their impact also on cluster competitiveness – how is the future outlook for the competitiveness of the maritime clusters in the midst of the rapidly changing business environment?

2.1 ABOUT SMARTCOMP AND THIS REPORT

SmartComp – Smart Competitiveness for the Central Baltic region is a Central Baltic INTERREG IV A Programme 2007–2013 financed project which aims to support smart, environmentally sustainable development, growth, competition and cooperation between maritime clusters, cities and universities in the Central Baltic region, i.e. in Estonia, Finland, Latvia and Sweden. The partners involved in the project include Union of the Baltic Cities, Commission on Environment Secretariat (Lead Partner, Finland), University of Turku/Centre for Maritime Studies (Finland), University of Turku/Turku School of Economics (Finland), Centrum Balticum Foundation (Finland), Åbo Akademi University (Finland), Tallinn University of Technology (Estonia), University of Tallinn (Estonia), Riga International School of Economics and Business Administration (Latvia), and Latvian Maritime Academy (Latvia). Through triple helix cooperation, this consortium seeks new opportunities for the maritime clusters in the Central Baltic region. The project is divided into four Work Packages: (WP1) Management, (WP2) Research and analysis, (WP3) Training and consultation, and (WP4) Policy development and branding. This publication is the first research report of WP2¹, describing and analysing the maritime clusters in the Central Baltic region. This report provides the general basis for further project research as well as for the work in the other SmartComp Work Packages.

Regarding earlier research on maritime cluster competitiveness in the Central Baltic region, various studies have been conducted focusing on specific sectors of the maritime cluster (e.g. *Community of European Shipyards' Associations – Annual Report 2010–2011* by CESA 2011; *The Finnish Offshore Industry 2012* by NAG Partners; *Drivers of demand in cargo and passenger traffic between PENTA ports* by Lappalainen et al. 2012; *Baltic Port Barometer 2012 – views of the Baltic Ports for the year 2013* by Holma & Kajander 2012) and/or on a certain geographical area (e.g. *The role of Maritime*

¹ See also the *Baltic Rim Economies Special Issue on the Future of the Maritime Sector in the Baltic Sea Region* published under SmartComp project, eds. Jouttenus A., Laaksonen, E. & Mäkinen, H., available at www.cb-smartcomp.eu.

Clusters to enhance the strength and development of European maritime sectors by PRC 2008; *Suomen meriklusteri 2008* by Karvonen et al. 2008; *Estonian maritime cluster* by Portsmouth et al. 2011; *Development of the Latvian Maritime Policy; A Maritime Cluster Approach* by Gailitis & Jansen 2012). However, no earlier studies were found to discuss the maritime cluster competitiveness in the Central Baltic region. In addition, there are several projects underway studying the dynamics of the maritime industry (e.g. *StarDust Innovation Project* co-financed by the European Union's Baltic Sea Region Programme 2007–2013 and *MariTime Hubs Project – best practices for the structural changes in the maritime industry in the EU* partly financed by European Social Fund), which, however, do not focus on the business and innovation cooperation within the Central Baltic region area. While the maritime clusters in this region are facing new challenges regarding their competitiveness and while these clusters could presumably benefit from joint cooperation, there is obvious demand for such research and analysis in order to discover and make the most of the joint cooperation possibilities. This report is to meet this demand and to fulfill this research gap.

More specifically, the main research question when carrying out the research has been how the maritime clusters in the Central Baltic region could improve their competitiveness? This has been further divided into the following sub-questions: (1) What are the key competences of the maritime clusters in the Central Baltic region? (2) What kind of challenges are these clusters facing in terms of competitiveness? (3) How could the maritime clusters jointly contribute to their competitiveness and, thus, what kind of actions should be taken? Regarding theoretical background on clusters and competitiveness, the following sub-chapter presents the framework for our research and analysis.

2.2 CLUSTERS AND COMPETITIVENESS

Today competition does not take place only within companies but increasingly within networks. The competitive advantage of a company is largely determined by the characteristics of the network the company belongs to and by the way it organises the activities and uses the resources in its value chain relative to its competitors. (Lakhal et al. 1999) Due to the global nature of markets, specialization and innovation are essential in maintaining competitive advantage. In this process the establishment of networks is a quintessence (Álvarez et al. 2009), allowing companies to focus on and develop their core activities.

A cluster is a specific type of network – a geographic agglomeration of companies that are vertically and horizontally linked by channels for business transactions, cooperation and/or competition. They share a localized support infrastructure, labor markets and services, and are faced with common market opportunities and threats. (Padmore and Gibson 1998; Chiaroni and Chiesa 2006; Ketels 2012) While global competition continues to drive clusters towards higher levels of specialization and innovativeness (Porter et al. 2008), it is widely accepted that both competition and cooperation relationships may contribute to the development and competitiveness of the involved cluster companies (Benito et al. 2003; Álvarez et al. 2009). Geographical proximity facilitates mutual visibility and transparency among the cluster companies (also competitors), by which companies are able to observe each other's competitive developments and improve their own operations. Thus, the competitiveness of the local industrial cluster increases. (McCann 2008)

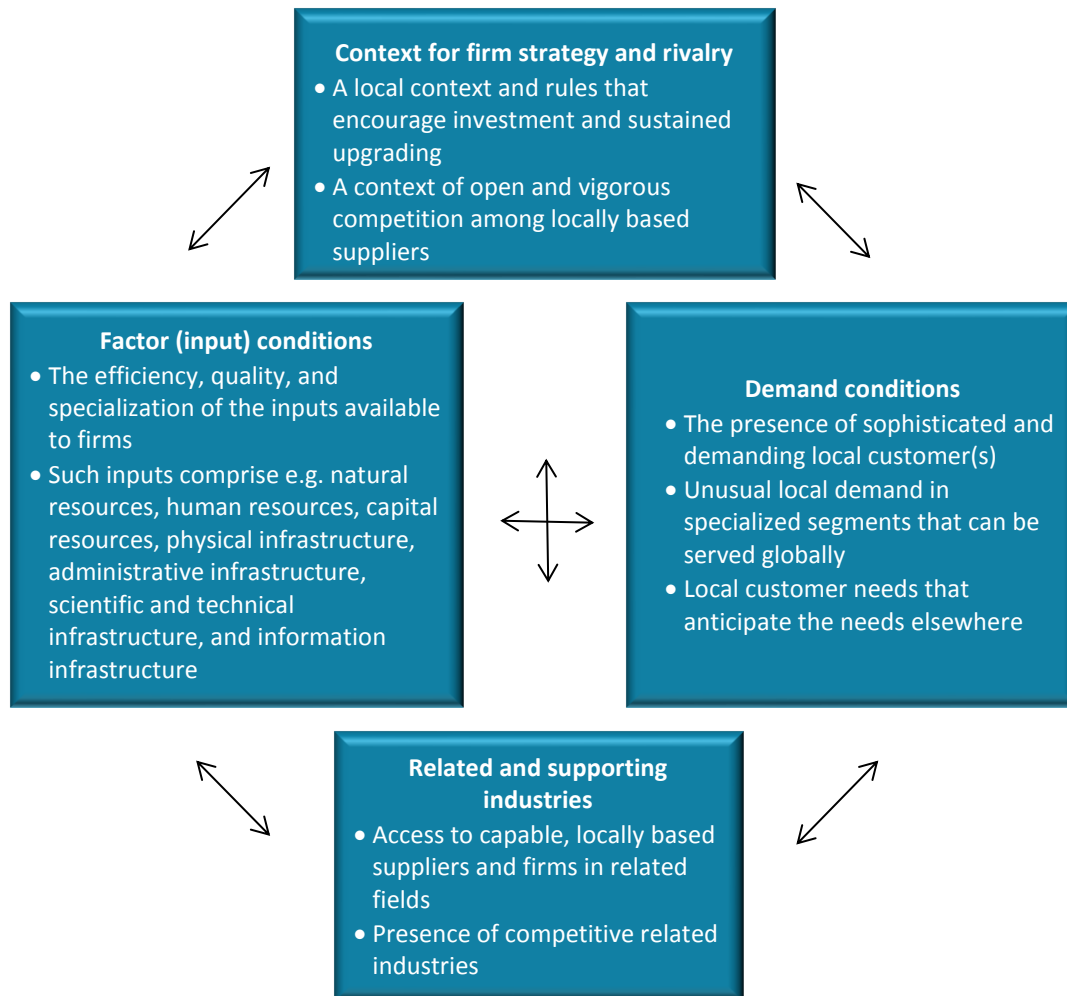
Clusters are of importance also in terms of knowledge creation and innovation cooperation. Within a local cluster there is a thick web of information, knowledge and inspiration which circulates between

the actors of a cluster. This 'local buzz' consists of information flows, knowledge transfer and continuous updates as well as of learning opportunities in both organised and spontaneous meetings. However, to avoid lock-in, supra-regional linkages or 'pipelines' are of great importance. Through such pipelines to other clusters, new information about market developments and technologies is pumped into the local cluster and its networks, further stimulating the local buzz. However, building access to trans-local pipelines requires considerable efforts, commitment, time and money – the interaction depends on trust between the partners, who, at the same time, should be on the same 'wavelength' and share context that is similar enough to enable joint problem-solving and knowledge creation. Through such strategic partnerships of interregional and international reach, cluster firms may continuously combine and re-combine similar and nonsimilar resources to produce new knowledge and innovations. (Bathelt et al. 2004; Bathelt 2008) Fruitful inter-cluster environment for innovation generation would be of great importance also in maritime industry, where retaining competitive edge requires continuous innovations and product and process innovations.

However, it must be noted that competitiveness of a company is never solely a matter of its networks or cluster capabilities – the business environment where this agglomeration operates has a significant impact on its development by determining the opportunities for a company to increase its capabilities, to make competitive choices and to generate output from its assets. Reference to the surrounding business environment, however, means that almost everything eventually matters for competitiveness and no single policy, for instance, can create competitiveness. (Porter et al. 2008) Nevertheless, through governmental policy strategies, the cooperation among local cluster companies as well as with external networks can be promoted, providing the cluster firms a greater direct accessibility to complementary firms and sectors, R&D activities, and innovation systems (Porter 2000b; Doloreux and Shearmur 2009). Furthermore, in any given cluster at a particular time, there are few elements representing the key barriers that restrain the companies from reaching higher levels of productivity. If these key barriers remain unsolved, improvements in some other areas of the business environment may have little or even negative effects on productivity. (Porter et al. 2008) Thus, identifying and tackling the main bottlenecks would provide the most efficient way to support the competitiveness of a given cluster.

Regarding the issues that affect the competitive advantage of a cluster, the economic business environment comprises four main groups of factors: (1) the context for firm strategy and rivalry, (2) input conditions, (3) demand conditions, and (4) the related and supporting industries (Porter 1990, Porter 2000a, Porter et al. 2008). This framework, often referred to as *the competitive diamond*, is presented in Figure 1.

Figure 1 Sources of locational competitive advantage



Source: Combined from Porter 1990, 133; Porter 2000a, 258; and Porter et al. 2008, 55.

Based on the four facets presented above, the value creation potential of clusters stems from the environment in which they operate. All the diamond factors are important in creating a well-functioning industrial cluster, but the complicity of influencing these factors resides from the fact that they are all highly interconnected. (Benito et al. 2003) While the role of private sector in cluster upgrading is present in all parts of the diamond, effective solutions on improving the local business environment often require governmental actions (Porter 2000).

Consequently, also in the case of the maritime cluster in the Baltic Sea region, the way to increase its competitiveness derives from identifying the key challenges related to this particular industry network and location. Although Porter's cluster theory (1990) has faced criticism for its profundity (e.g. Martin and Sunley 2003), it has proven by far the most influential tool for cluster environment analysis and has become a standard concept in the field (Martin and Sunley 2003). For this research, the competitiveness diamond together with the literature on clusters, networks and joint knowledge

creation provides a general yet comprehensive framework for analyzing the situation in the maritime clusters of the Central Baltic region.

2.3 RESEARCH GROUP AND STRUCTURE OF THE RESEARCH

This research report was produced in July–December 2012 by the project research group comprising Kari Liuhto, Eini Laaksonen, Hanna Mäkinen and Akseli Jouttenus from the Pan-European Institute at Turku School of Economics at the University of Turku (Finland); Alari Purju and Eva Branten from Tallinn University of Technology (Estonia); Veiko Spolitis and Valters Bolevics from Riga International School of Economics and Business Administration (Latvia); and Annemari Andrézen and Jenni Junnelius from Åbo Akademi University (Finland). Brief descriptions of each member of the multidisciplinary research group are presented next.

WP2 leader **Kari Liuhto** is Professor in International Business (specialisation Russia), Director of the Pan-European Institute at the University of Turku, Finland, and Director of Finland's Baltic Sea region think tank called Centrum Balticum. His research interests include EU-Russia economic relations, energy relations in particular, foreign investments into Russia and the investments of Russian firms abroad, and Russia's economic policy measures of strategic significance. Liuhto has been involved in several Russia-related projects funded by Finnish institutions and foreign ones, such as the Prime Minister's Office, various Finnish ministries and the Parliament of Finland, the European Commission, the European Parliament, and the United Nations. M.Sc. (econ) **Eini Laaksonen** is Project Researcher at the Pan-European Institute. She has specialised in International Business with an emphasis on the economic development of the Baltic Sea and Barents Sea regions. Energy and maritime sectors are of particular interest to her. She has been involved in several research projects and has published articles concerning business prospects and risks in the Barents and Baltic Sea regions, most recently focusing on the maritime cluster developments. **Hanna Mäkinen** holds Master of Arts in General History, Political Science and Contemporary History from the University of Turku. She currently works as Project Researcher at the Pan-European Institute. She has been working in various research-related positions at the Pan-European Institute since 2008 and has been involved in several research projects. Her main research interests include economic and political development of the Baltic Sea region, recently focusing particularly on the maritime cluster developments, and contemporary history of the Baltic States. **Akseli Jouttenus** is Research Assistant at the Pan-European Institute. He is also studying accounting and finance at Turku School of Economics.

Alari Purju is Professor of Public Economics at Tallinn University of Technology, School of Economics and Business Administration. His research areas are public economics and taxation, comparative institutional economics and development economics. **Eva Branten** graduated from Tallinn University of Technology, School of Economics and Business Administration in 2012. She is Project Research Associate in SmartComp project at Department of Public Economics at Tallinn University of Technology.

Veiko Spolitis has been working as the parliamentary secretary of the Latvian Ministry of Defence since November 2010. He has been lecturing at the Riga Stradins University (RSU) from 1998, and from 1998–2000 directed the Baltic chapter of the nonprofit Civic Education Project. In 2003 he received DEA from the Graduate Institute of International Studies at the Geneva University. In 2005

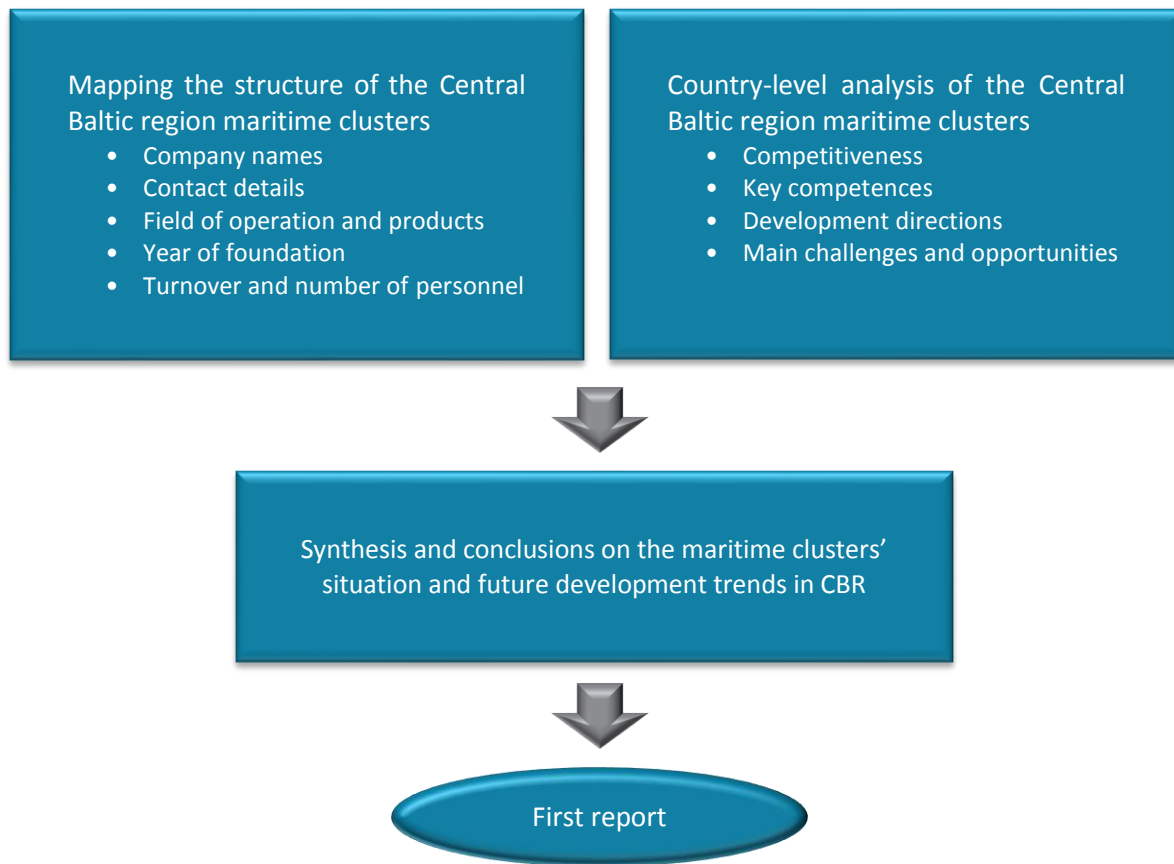
he resumed his lectureship at RSU, and freelance journalist's travails in the Estonian Broadcasting Corporation. From 2005-2009 he was elected into the Salaspils Town Council and since 2006 he is continuing his doctoral studies at the University of Helsinki. Ph.D. oec Can. **Valters Bolēvics** has years of experience and knowledge at high quality of quantitative analyses and practical, evidence-based business and public policy advice. The scope of analyses he has executed includes economic impact studies, scenario analysis, macro policy assessments, regional analysis, efficiency and effectiveness analysis of port governance and management, regional maritime cluster analysis, strategic national level development plans, policy research and development, social cost-benefit analysis, public private partnership and government funding, and other assignments.

M.Sc. (econ) **Annemari Andrén** works as a Researcher at Åbo Akademi University, Laboratory of Industrial Management and as a manager at PBI Research Institute. She has conducted extensive research for the marine industry for over 15 years. Her areas of expertise are business relations (customer, supplier and employee relationships) and business model development. She has been involved in several research programs and strategic assignments regarding value creation, business logic and business model development in project-based firms. She has carried out close to 1000 personal interviews across the world and produced solutions to complex problems relating to customer management and value-adding. M.Sc (econ) **Jenni Junnelius** is working as Junior Analyst at PBI Research Institute at Åbo Akademi University. She also holds a bachelor's degree in sociology from Helsinki University. At PBI she has focused on projects related to the marine industry.

To start with, the research group mapped the maritime cluster construct in Finland, Estonia and Latvia, and created an excel sheet comprising the basic data and contact details of all the cluster companies. This data was useful for analysing the cluster actors and will be used as a contact base for the forthcoming company surveys and interviews. At the same time, the research group conducted a vast desk study on earlier studies and reviewed recent developments in maritime-related media. Semi-structured expert interviews² were also conducted in Finland to provide further insight into the key phenomena affecting the clusters' future development. Figure 2 shows the structure of research behind this report.

² Expert interviews in Finland: Mr Christer Gorschnik (27.8.2012) Finnish sea captain (ret.) and Master of Economic Sciences with a long career in various positions in the marine industry (e.g. Wärtsilä); Mr Tapio Karvonen (12.9.2012) Finnish Senior Researcher at the Centre for Maritime Studies at the University of Turku with over 10 years of research experience in the maritime field, particular focus being in maritime industry and shipping companies; Mr Jorma Taina (12.9.2012) Professor Emeritus on shipping and economy from Turku School of Economics at the University of Turku; Mr Janne Känkänen (4.10.2012) Head of Division, Industrial policies and enterprise financing, Ministry of Employment and the Economy.

Figure 2 Structure of the research



Based on the research findings, the group constructed this research report based on the WP2 Work Plan. The country chapters were authored as follows:

- The Estonian maritime cluster – Alari Purju and Eva Branten
- The Finnish maritime cluster – Annemari Andréén, Eini Laaksonen and Hanna Mäkinen
- The Latvian maritime cluster – Veiko Spolitis and Valters Bolevics
- The Swedish maritime cluster – Jenni Junnelius and Annemari Andréén

The concluding analysis was conducted in cooperation among the research group.

The report gives a fruitful basis for the following SmartComp reports, which will tackle the competitiveness of the Central Baltic region maritime clusters, firstly, from the company representatives' perspective and, secondly, in comparison with other strong maritime clusters and global market developments. For more information about the forthcoming SmartComp publications, please see the WP2 Work Plan at www.cb-smartcomp.eu.

3 THE ESTONIAN MARITIME CLUSTER

By Alari Purju and Eva Branten

3.1 OVERVIEW

An economic cluster is a group of companies where the internal connections are stronger than the connections of this group of companies with the external environment. Clusters represent geographically concentrated economic activities, which are interrelated and dependent of each other. Concept of cluster has a regional aspect because geographical location and proximity of companies is an important factor in clustering. That geographical factor emphasizes competitive position of regions in providing high quality living and business environment.

Another aspect of concept clusters is that this is not reflecting just ex post efforts of companies in creating business connections but also has ex ante dimension as a policy tool. The aim of clustering policy is to promote connections between companies and initiate new activities creating closer connections between companies or making already existing integration more close and efficient. The following description of Estonia's maritime cluster is based first of all on former studies and policy development documents.

The total turnover of sea-related activities and their impact on the economy have been analyzed in several studies (Purju et al. 2003; Lend et al. 2007, 2008; Portsmouth et al. 2012). Especially in the 1990s, due to big flows of transit trade oil from Russia to Western Europe, the maritime sector has been considered as an important industry for Estonia. Oil was transported by trains from Russia, and loaded to ships and transported to other ports all over the world. The service sector incidental to water transportation was the main producer of value added in this cluster³. In 2000, that industry produced approximately 7–8% of Estonia's GDP (Purju et al. 2003). In 2000s, the importance of this business decreased in relative but also in absolute terms. The construction of seaports around St. Petersburg took over step by step an increasing part of this trade. The political tension related to the Russian minority in Estonia in 2007 also had an impact on the transit trade flows.

³ A substantial part of oil is transported through Estonia via railway, and thereafter, is loaded on ships. From the different transportation services, the railway transportation with the share of 86,8% and marine transportation with the share of 77,2% for transit trade have been very much dependent on services related to flow of goods and services through Estonia. The share of transit was 58% of value added in transport and storage sector in 2000. This sector as a whole created 9,9% of the GDP. The value added created by transit goods and services was 5,6% of the GDP. Taking into account also indirect impact of transit trade to other sectors, it is possible to conclude that 7–8% of the Estonian GDP was created by transit trade (Purju et al. 2003).

The marine sector's activities were at the same time diversified and deepened. Estonia's EU membership starting from 2004 supported the demand for new products and services provided by marine sector companies. The number of tourists has been permanently rising, supported by Estonia's membership of Schengen agreement (visa free movement of people from EU, but also from other countries like USA and Canada). Marine transportation developed very rapidly especially in the 2000s. Freight transportation changed structurally, as containers created a new source of revenues for sea and coastal transport companies but also to services and cargo handling companies. Shipbuilding and repair also developed further.

Consolidation of business and takeovers in these sectors supported achieving fast growth of turnover and employment, especially during the economic boom before 2008. Supporting sectors provided different additional services. This brought together new sub-clusters of goods and services – for example passenger transportation is accompanied by retail sales, accommodation and different tourism related services at sea and on the coast. Sea container transportation and distribution related services have been a new permanently growing area in the sector. That diversified the list of provided services and also created a new set of companies connected to transportation of containers and logistics related to treatment of goods transported by containers.

From the sectors, shipping, ports, port operators, maritime services and intermediate commercial transactions, shipbuilding and repair have been, first of all, developing according to business principles. Estonia's geographical position on the coast of the Baltic Sea and business logic of international flows of goods and services has been the main accelerator of these sectors.

The owners of these companies belong first of all to the private sector, except the ports sector where the biggest company Tallinna Sadam AS is in state ownership. Nevertheless, investments of this company haven been made from earned profits and practically no support from the state budget has been provided.

The public sector has an important role in developing the regulatory framework and financing high and higher education in different fields related to marine cluster activities. Furthermore, Estonia's development plan for marine sector policy 2011–2020, has been worked out by the Ministry of Economic Affairs and Communication and was adopted in 2009 (Riiklik Arengukava 2009). The development plan depicts situation in the marine sector and gives also a comprehensive overview of other development plans related to the marine sector (the total number of such kind of documents is 20).

It is underlined that in Estonia's economy the overlapping of tourism, transport and logistics and marine clusters is taking place. The main reason for this is that approximately 60% of Estonia's exports and imports are transported by sea, and of passenger transportation also 60% of international traveling and 5% of domestic traveling uses marine transportation (Portsmouth et al. 2012). This should be taken into account when possible new perspectives and challenges are discussed in the Baltic Sea Region.

3.2 SHIPBUILDING INDUSTRY

In Estonia, this sector includes the following activities: building of ships and floating structures, building of pleasure and sporting boats, and repair and maintenance of ships and boats. The sectors of shipbuilding and ship repair and maintenance are very closely connected. The largest company in the area is the Baltic Ship Repair Company (BLRT), which formally by classification belongs to the repair and maintenance sector. The BLRT Group AS had a turnover of 347,3 million EUR in 2011 which is around 75% of the total turnover of the shipbuilding and ship repair sector in Estonia. The group has 4000 workers, out of which 1800 are working in Estonia (AS BLRT Grupp 2012). BLRT Group AS includes 69 affiliate companies and 8 joint venture companies. The group's activities include shipbuilding, ship-repair, production of large-scale metal constructions, metal processing, machine building, medical and technical gases.

The BLTR group purchased Turku Repair Yard in Finland in 2007 which has the biggest dry dock in Northern Europe. The joint venture of Fiskerstrand BLRT was formed together with Norwegian Fiskerstrand Verft shipyard also in 2007. The main products of the joint venture have been barges for the fish farming industry. Together with the Norwegian company, the BLRT bought a Norwegian ship design company named Multi Maritime in 2010. In 2010, the BLRT Group bought a shipyard Baltijos Laivu Statykla and Baltic Engineering Centre in Klaipeda, Lithuania. After these purchases, the BRT Group has two shipyards, one in Tallinn and another in Klaipeda. A Finnish company Wärtsilä and the BLRT Group set up two joint ventures, one in Estonia (the joint venture is owned 51% by Wärtsilä and 49% of the BLRT Group) and another in Lithuania. The establishment of these service companies is an integrated part of applying the total service supply concept (Wärtsilä 2012). The group's structure is quite diversified as there are several subsidiaries dealing also with oil transit and cargo services, as well as production of gas used in welder works. The group has a port in its territory in Tallinn, Kopli peninsula (The Russian-Baltic port).

The second largest shipbuilding company is Baltic Workboats AS in Saaremaa, with a turnover of 19.8 million EUR in 2011 and around 100 workers. The company produces aluminum boats using knowhow of Finnish workboat producer Marine Alutech OY. The company has produced, for example, aluminum pilot boats for Estonian, Latvian and Lithuanian pilot services. The company manages the entire production process from design to launch (Baltic Workboats AS 2012). Other companies located in Saaremaa are building pleasure and leisure time boats. The companies are AS Luksusjaht, renovating and building yachts with a turnover of 10.6 million EUR in 2011 and AS Saare Paat, building small fishing boats with a turnover of 1.5 million EUR. Saaremaa started to be a location for a small cluster of companies building small ships and boats for fishing. The activities of these companies have been supported by a cluster development program, started by the Enterprise Estonia in 2008. The particular program supported the development of a cluster of building small ships in the Estonian islands and Western Estonia (Enterprise Estonia 2012).

Competitive situation

BLRT has been the largest company in the Baltic States. It has developed well and combined its production capacities to meet the needs of sophisticated markets with specific demands. The company has been producing floating structure for Norway's fisheries and for wind farms located in sea area (offshore wind farms). The company diversified its production capacities, especially in Estonia and Lithuania, and managed to keep a competitive quality-cost ratio. The other companies in the sector are small and medium size companies and producers of niche products. They use local resources and their labor costs have been competitive. There is a small cluster of producers on the Estonian islands where cost are lower and local tradition plays an important role in developing this sector.

Main challenges and opportunities for the industry's development

The demand for niche products is fluctuating. Demand for some products depend on public support for particular activities and have been declining during economic crises. The increase of costs what stopped during the economic decline could be a threat during economic recovery. The BLRT has corporate governance issues related to owners' rights and dividend policy which have been discussed in media and the number of qualified labor force in Estonia could be a problem. The company has been using welder specialists from China, Ukraine, and Romania, and there is a permanent problem related to the limited number of work permissions for workers from non-EU countries. The requirements of sulphur emission control area (SECA) regulations starting from 2015 could have an impact on production and could create extra costs. That concerns first of all extra costs related to better quality fuel for ships and fulfillment of additional quality standards in shipbuilding.

3.3 SHIPPING COMPANIES

In Estonia, this sector comprises the sea and coastal passenger water transportation and sea and coastal freight water transportation. The Tallink Group AS is the biggest company in this sector with a turnover of 980 million EUR and 6610 employees in 2011. The company is providing passenger and ro-ro cargo services on the Baltic Sea. The main lines being operated are Tallinn–Helsinki, Tallinn–Stockholm, Riga–Stockholm, and Paldiski–Kapelskär. Together with its subsidiaries, the group operates four hotels in Tallinn and one in Riga. The Tallink Group also started a taxi company in Tallinn in 2010 (AS Tallink Grupp 2012). In 2006, Tallink purchased Silja OY AB and that enlargement made Tallink the largest company in the Central Baltic region providing passenger water transportation services.

The passenger transportation is accompanied by sea and coastal cargo services, towage services, ship repairs, retail sales, accommodation and other tourism related services. The company developed through subsidiaries a network of services accompanying passenger transportation (taxi from port to city and accommodation in hotel). The company can combine cruise and one-way transport services with overnight stays in all of their markets. In Tallinn and Riga these are mainly hotels belonging to the Tallink Group, in other destinations Tallink has agreements with local hotel chains (in Stockholm and Helsinki). In the winter months Tallink sells hotel ski packages with ferry transport to Finnish and Swedish ski destinations (AS Tallink Grupp 2012).

Regarding the sector of freight transportation, the three largest companies are AS Baltic Scandinavian Lines with a turnover of 13.7 million EUR in 2011, Tschudi Lines Baltic Sea AS with a turnover of 13.7 million EUR and Tschudi Lines Nordic Sea AS with a turnover of 9.1 million EUR. The two last mentioned companies are 100% owned by investors from Norway. Transportation companies are using services provided by cargo handling and bunkering companies. Transportation also depends on public services like ice breaking during winter and pilot services.

Competitive situation

The investments of the Tallink Group into a modern fleet built in 2000 or later exceed 1.3 billion EUR. The group deploys currently the most advanced ferries in the Baltic Sea. In 2011, the group carried 58% of the passengers and 49% of the ro-ro cargo on the route between Tallinn and Helsinki and 55% of the passengers and 34% of the cargo between Finland and Sweden. The group is the only provider of daily passenger transportation between Estonia and Sweden as well as Riga and Stockholm (AS Tallink Grupp 2012). The group has a diversified local cluster, which provides a network of services.

Main challenges and opportunities for the industry's development

The risks could be classified as demand and supply side risks. The demand side risks are related to market and customer behavior, the possible substitutes being one business related risk (that is air transportation, or in tourist industry attractiveness of other destinations etc.). The macroeconomic development, aggregate demand but also inflation and level of interest rates in the Baltic States, Finland and Sweden could be considered as one risk. On the supply side, the increase of fuel prices and interest rates is a crucial area of potential negative impacts. Relations with trade unions have been considered important by the group. This issue has different aspects in the Baltic States and Finland and Sweden, and concerns hiring conditions of personnel in different countries, and possible impacts of collective agreement. The Tallink Group is listing accidents and disasters as the first risk area of the group. The Finnish Gulf is a location of very tight marine transportation flows which increases the probability of accidents. This could have a crucial impact on the marine transportation business, especially regarding passenger transportation. Changes in laws and regulations are also considered to constitute a particular type of risk in the group's annual report (AS Tallink Grupp 2012). This reflects the issue that business conditions are connected to regulatory activities of the state and services provided by the public sector. The requirements of sulphur emission control area (SECA) regulations starting from 2015 will have an impact on fuel costs.

3.4 SUPPLIERS OF MARINE INDUSTRY

According to the classification of industries, this sector includes the activity of manufacturing of instruments and appliances for measuring testing and navigation. The largest companies in this sector are Enerpoint Saare OÜ, (located in Saaremaa, 100% of shares belong to Finnish investors), producing automatic regulation equipment with a turnover of 12.2 million EUR and with 160 workers (Enerpoint Saare OÜ 2012); Aswega AS, located in Tallinn and producing heat and flow meters and adapters with a turnover of 3 million EUR and with 102 workers (Aswega AS 2012); and Dicro Eesti OÜ, located in Rakvere and producing cable and electronic assemblies with a turnover of

1.4 million EUR and with 102 workers (90% of shares belong to Finnish investors) (Dicro Eesti OÜ 2012).

Competitive situation

The other companies in the sector are small and medium size companies and producers of niche products. They have managed to use local resources and their labor costs have been competitive. Regarding the cases of Enerpoint Saare OÜ and Dicro Eesti OÜ, the production has been relocated from Finland to Estonia due to lower labor cost.

Main challenges and opportunities for the industry's development

The production is dependent on the demand from a limited number of customers. Production development takes place in Finland and new products could be introduced in other countries. The owners of the companies have underlined geographical closeness of Estonia to Finland and close languages of Estonian and Finnish used in communication as a competitive advantage.

3.5 OTHER RELATED BUSINESS

In Estonia, this sector includes the renting and leasing of water transport equipment. The big groups like BLRT and also Tallink Group AS have complicated corporate governance structures, which includes a long list of companies providing different services. The AS Tallink Baltic is renting ships from other companies of the group owning the ships. Another larger company in Enterprise Register in this field is Vikerkaar Transport AS with a turnover of 1.8 million EUR in 2011 and a 100% Russian ownership.

Competitive situation

Comprising these activities into vertically integrated structures has made especially big groups like Tallink Grupp AS or AS BLRT Grupp relatively independent from outside services. These companies developed respective capacities inside of their own group.

Main challenges and opportunities for the industry's development

Probably all advantages of market competition have not been achieved through this kind of corporate governance. The very complicated corporate structure with ownership problems could be an obstacle for future development, especially for companies listed on stock exchange, due to transparency problems.

3.6 PORTS AND PORT OPERATORS

In Estonia, this sector comprises service activities incidental to water transportation, and cargo handling.

Ports

There were 117 ports in Estonia's port register in 2011 (Estonian Maritime Administration 2011). The number of merchant shipping ports was 42, and 35 ports have been open for international

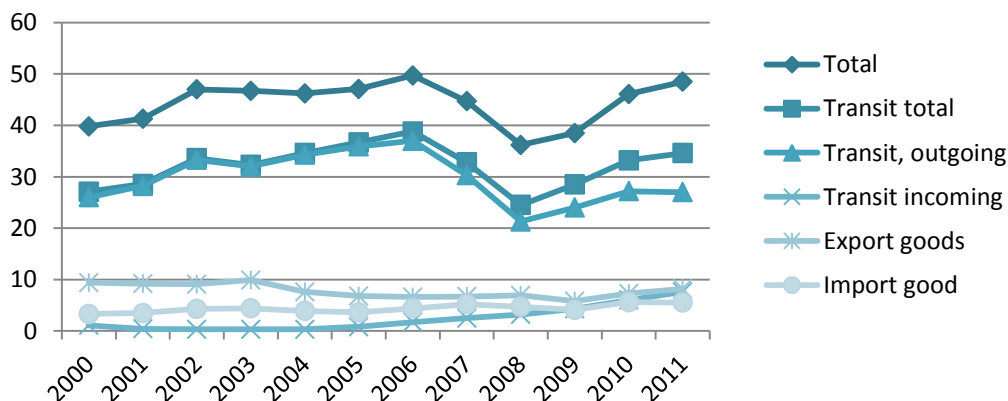
transportation. The total amount of goods transported through Estonian ports was 46 million tons of which 72% has been transit trade in 2011. The number of passengers passing the Estonian ports was 9 million in 2011. (Statistics Estonia 2012)

The sector of ports provides mainly services of port operations and use of fairways. The other types of services are related to stevedore works and handling of cargo. The Tallinna Sadam AS (Port of Tallinn) is the largest company which consists of Old City Harbour (mainly passenger transportation), Muuga Harbour (dominantly freight transportation), Paldiski South Harbour, Paljassaare Harbour, Saaremaa Harbor and Old City Marina Harbour (which is a part of Old City Harbor). The consolidated turnover of the company was 89.2 million EUR and operating profit 42.7 million EUR in 2011, the operating margin being as high as 47.8%. The turnover of Tallinna Sadam AS is approximately 70% of the total turnover of the Estonian ports (AS Tallinna Sadam 2012).

The second largest company in the sector is Sillamäe Sadam AS with a turnover of 14 million EUR. Sillamäe Sadam is located in Eastern Estonia, close to Russian border. Its location enables efficient transportation of transit products from and to Russia. (Port of Sillamäe 2011) Other larger independent ports outside of Tallinn or Harju county are Pärnu port with a turnover of 9.3 million EUR (mainly timber and wood products), and Kunda port (belongs to Kunda Nordic Cement AS, part of international Heidelberg Cement Group, and is used mainly for exports of cement and limestone rubble). In Tallinn area, the other smaller ports not belonging to Tallinna Sadam AS are Paldiski North harbor, Vene-Balti port (belongs to BLRT Group), Miiduranna Sadam AS, and Tallinna Bekkeri Sadam OÜ.

According to the estimates of Tallinna Sadam AS, the total cargo volume amounted to 403 tons on the East coast of the Baltic Sea. The amount of cargo handled by Tallinna Sadam AS was 36 million tons which was 14% of the total cargo volume on the Eastern coast of the Baltic Sea. The market share of the Russian ports (Primorsk, specializing in oil products; Ust-Luga having the largest growth in 2011 by 91% and concentrating on liquid oil and coal; Vyssotski; and St. Petersburg port) was 53%, Latvian ports (Riga and Ventspils) 19.4%, Estonian ports 14.1%, and Lithuanian ports (Klaipeda) 13.1% in 2011. The total increase of cargo was 5.4% in 2011 and the greatest influence on the changes in the ports' volumes and market position has been created by the growth of general cargo (mainly containers) and dry bulk (coal and fertilizers) (AS Tallinna Sadam 2012).

Figure 3 Transport of goods through Estonian ports



Source: Statistics Estonia 2012.

Figure 3 portrays the outgoing transit consisting of products which have been transported to Estonia by railway or car transportation, loaded to ships and transported by ships from Estonian ports. Incoming transit is transported to Estonian ports, loaded on railway tracks or cars and transported out from Estonia. The main destination of outgoing transit and also source of incoming transit has been Russia. A small proportion of transit trade has also been related to Ukraine, Kazakhstan and Belarus. There have been negotiations with representatives of ports of China about a possible route of ships with containers from China targeting the markets of countries around the Baltic Sea. Exports consist of products produced in Estonia and imports consist of products for Estonian domestic market. A part of imports and exports is the import of components or semi-finished products for manufacturing in Estonia which are re-exported to third countries after processing in Estonia.

Competitive situation

The ports are central agencies in organising and coordinating activities of other companies providing different services in ports. The turnover and competitive position of a particular port demonstrates also the amount of potential businesses for other companies, nevertheless, there is an active role for operators in different areas to attract particular trade flows to ports.

Ports have active role in developing the infrastructure for ships and loading operations. Ports have also an important role in attracting operating companies in different fields of activities related to handling of transported goods. The role of ports providing land and other infrastructure for distribution centers and logistics companies as well as manufacturing companies adding value to transported goods is crucial for the future development of this cluster. The Port of Tallinn's share has been stable when looking at transported volumes of different products through the ports at the Baltic Sea.

Main challenges and opportunities for the industry's development

The amount of products transported through Estonian ports has been increasing but the biggest proportion is for transit trade. The dependence on international transit channels is very high and political developments have had substantial influence on business opportunities in this area. Political relationships between Estonia and Russia have played an important role here, nevertheless, the development of economic relationships have not only been depending on political issues.

The volume of transported goods depends on the capacity of other infrastructure. Particularly in the case of transit trade, the railway connections have been a bottleneck.

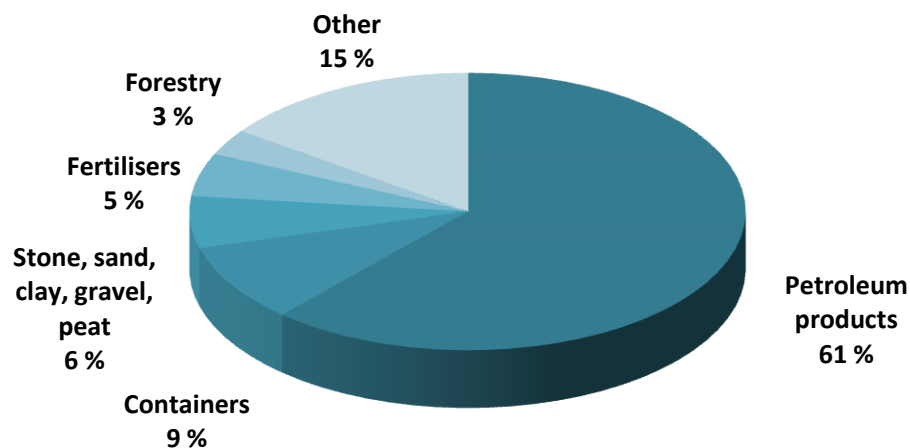
Port operations

Other services provided by companies which are included into this group are related to bunkering of ships and other services. The largest companies are Oilken Bankering AS with a turnover of 7.2 million EUR (Muuga port in Tallinn), and Global Bunkering AS with a turnover of 1.5 million EUR (Muuga port in Tallinn). There are companies organizing services related to passenger transportation such as Väinamere Liinid OÜ with a turnover of 20.7 million EUR (located in Kuressaare, Saaremaa island), and AS Saarte Liinid dealing with freight transportation with a turnover of 4.4 million EUR, and Shipco Transport Eesti AS with turnover 7.4 million EUR (Danish investors own 100% of the shares).

The company AS Eesti Loots is providing pilot services and has a turnover of 9.5 million EUR. AS Viking Life-Saving Equipment Estonia with a turnover of 3 million EUR (100% Finnish ownership) is producing different products to guarantee safety of marine transportation.

Cargo handling companies are providing services on the territory of different ports. The largest companies have been Dekoil OÜ (located in Tallinn on Kopli peninsula) with a turnover of 7.2 million EUR (Dekoil AS 2012), SilSteve with 3.5 million (in Sillamäe port), AS Coal Terminal with 2.9 million EUR (Muuga port Tallinn), TankChem AS with 2.9 million EUR, and OÜ Palstve with 2.8 million EUR (in Paldiski port) in 2011.

Figure 4 Goods handled in Estonian ports, 2011



Source: Statistics Estonia 2012.

The largest proportion of products transported through Estonian ports has still been for petroleum products with 61% of total turnover in 2011 (Figure 4). The petroleum products were transported predominantly from East to West which determined a dominating position of outgoing transit in Estonian marine transport. The growth of the transported product flow, as it is possible to read from the Port of Tallinn annual report, has been coming from other areas like containers and fertilizers. Different product flows, however, demand different services, and if expansion of container transportation increases, that will also have an effect on the network of companies providing various transportation services.

Competitive situation

The peak of cargo handling was in 2006 and after that, the volume of products going through Estonian ports and served by different cargo companies has been smaller. There was a decline in 2007 and 2008 due to problems between Estonia and Russia related to the bronze statue crises in Tallinn. Afterwards, the economic crises have had an impact on transit flows. Russia has also developed rapidly its ports in St. Petersburg area, which took over some transit trade from the Baltic States' ports. Nevertheless, the competitive position of Estonia's ports is relatively good in some areas and a lot of investments have been made into ports infrastructure in Tallinn, but also in Paldiski and Sillamäe.

Main challenges and opportunities for the industry's development

The great domination of petroleum products in cargo flows is a business risk, although the infrastructure and know-how of operators and infrastructure owners is biased towards this business, partly due to the historical experience of 1990s. Diversification of cargo flows and increase of products, with a need for distribution centers and further manufacturing is a challenge in this sector. In these new areas, the logistics and IT knowledge could be better used and more added value produced.

3.7 INTEREST GROUPS AND ASSOCIATIONS

Eesti Sadamate Liit (Estonian Ports Associations)

The main goal of the association is to encourage cooperation between Estonian ports and to contribute to the development of the maritime culture and maritime policies (Eesti Sadamate Liit 2012).

Eesti Logistika ja Ekspedeerimise Assotsiatsioon (Estonian Logistics and Freight Forwarding Association, ELFA)

Main goals of the association: to represent and protect the common professional interests of members of ELFA; to prevent unfair competition; to contribute to the development of legislation related to the field of the association and to the distribution of all relevant information (Eesti Logistika ja Ekspedeerimise Assotsiatsioon 2012).

Logistika ja Transiidi Assotsiatsioon (Estonian Logistics and Transit Association)

Main goals of the association are participation in developing strategies and policies of logistics and transit in Estonia; enhancement of competitiveness of Estonian transit in international trade; cooperation within logistics chain (Logistika ja Transiidi Assotsiatsioon 2012).

Enterprise Estonia is the government agency in governance area of Ministry of Economic affairs and Communication distributing funding for projects on competitive bases. The funding comes from EU Regional Development Fund. The clusters' program is a relatively new program, which started in 2008 and continued until the end of 2012. The supported activities were related to common marketing strategy, including market research, coordination of common use of production capacities, preparation of training programs for employees and forecasting of labor needs, and preparation of development programs. There were two stages for projects: pre-stage and full stage projects. In the pre-stage phase, for example, the cluster of building small ships in Estonian islands and Western Estonia was supported. Among the full stage projects were, for example, a project "Development of Estonia's logistics cluster" coordinated by Estonian Logistics and Transit Association, in which the partners were Tallinn airport Tallinn's, Paldiski and Sillamäe ports, Estonian Railway, AS Smarten Logistics, Tallinn Technical University and several cargo and logistics services providing companies (Enterprise Estonia 2012).

Rahvusvahelise Mereõiguse Eesti Assotsiatsioon (Estonian International Maritime Law Association)

Main goals of the association are related to research in the field of theoretical and applied problems of maritime law connected with navigation, fishery, carrying out of scientific researches of the World oceans, protection of sea environment, maintenance of safety, development of studies of legal doctrines, principles and norms promoting Estonian sea policy on international level, participation in projects, dedicated to international maritime conventions and acts, acquainting the public with the foreign legislation, contractual practice, documents of international organizations and conferences, informing scientific and business circles of other countries on the domestic doctrine of maritime law (the legislation and practice in this area) (Rahvusvahelise Mereõiguse Eesti Assotsiatsioon 2012).

Eesti Meremeeste Sõltumatu Ametiühing (Independent Trade Union for Estonian Seamen)

Main goals of the union are collective contracts with employers, enhancement of awareness of maritime sector's workers, cooperation between members of the trade union and with other interest groups and related organizations (Eesti Meremeeste Sõltumatu Ametiühing 2012).

Eesti Laevajuhtide Liit (Association of Estonian Deck Officers)

Main goal of the association is to contribute to the development of the Estonian maritime sector, enhancement of vocational skills of members of the association, legal consultation of members, international cooperation, and enhancement of public awareness of the profession of deck officers (Eesti Laevajuhtide Liit 2012).

Eesti Laevamehaanikute Liit (Association of Estonian Ship Engineers)

Main goal of the association is to contribute to the development of the Estonian maritime sector, to support economic and social interests of members of the association, enhancement of vocational skills of members of the association, and enhancement of public awareness of the profession of ship engineer (Eesti Laevamehaanikute Liit 2012).

SUMMARY: THE PROSPECTS OF THE ESTONIAN MARITIME CLUSTER

SHIPBUILDING INDUSTRY

- Challenges: fluctuating demand for niche products; increase of costs; lack of qualified workforce; environmental regulations, e.g. sulphur directive.
- Opportunities: a good quality-cost ratio in shipbuilding; shipbuilding and repair companies' successful production of specialized ships for the clients; their good reputation and good market share on these niche markets; strong financial position of most of producers because their growth has been more based on reinvestment of profits than on bank credits.

SHIPPING COMPANIES

- Challenges: macroeconomic development, such as inflation and level of interest rates; increase of fuel prices; changes in laws and regulations; the increasing risk of accidents in the Gulf of Finland; environmental regulations, e.g. sulphur directive.
- Opportunities: a good market share of the shipping companies in the region; Tallink Group AS has the most modern ships in the CBR and has no need for new orders at least in the short and medium term; substantially improved financial position and profitability of Tallink during 2012.

SUPPLIERS OF MARINE INDUSTRY

- Challenges: narrow customer base.
- Opportunities: geographical closeness to Finland; similarity of Finnish and Estonian languages.

OTHER RELATED BUSINESS

- Challenges: complicated corporate governance structures of BLRT and Tallink Group AS.
- Opportunities: a reasonable demand from major industries for services of this sub-sector; the good quality-cost ratio of the sub-group.

PORTS AND PORT OPERATORS

- Challenges: dependence on international transit channels; influence of political developments; capacity of other infrastructure, e.g. railway connections as a bottleneck; diversification of cargo flows and increase of products; need for distribution centers and further manufacturing.
- Opportunities: the use of logistics and IT knowledge in new areas.

4 THE FINNISH MARITIME CLUSTER

By Annemari Andr sen, Eini Laaksonen and Hanna M kinen

4.1 OVERVIEW

The Baltic Sea has always shaped the living conditions in Finland. It has been an important gateway to other parts of Europe and even the world, and offered a source of livelihood for many. The sea, long coastline and extensive inland waterways have enabled the development of seaborne traffic and trade. The oldest port in Finland, the Port of Turku, was mentioned in written sources already in the 12th century, and the history of shipbuilding in Finland extends to the Middle Ages as well. After the Second World War, war reparations payments to the Soviet Union fostered the development of the Finnish shipbuilding industry. The Soviet Union demanded goods that bear little correspondence to pre-war Finnish industrial production – shipbuilding and metal industry goods that had never before been manufactured in Finland. Although reparations were a heavy burden at the post-war period, they compelled Finnish industry to go through a rapid development process and achieve performance levels that later benefitted the entire national economy. (Prime Minister’s Office 2012) Due to the long and extensive experience, the Finnish shipbuilding competence has reached the high levels of today. Sea traffic and ports have also retained their significance for the Finnish economy and well-being.

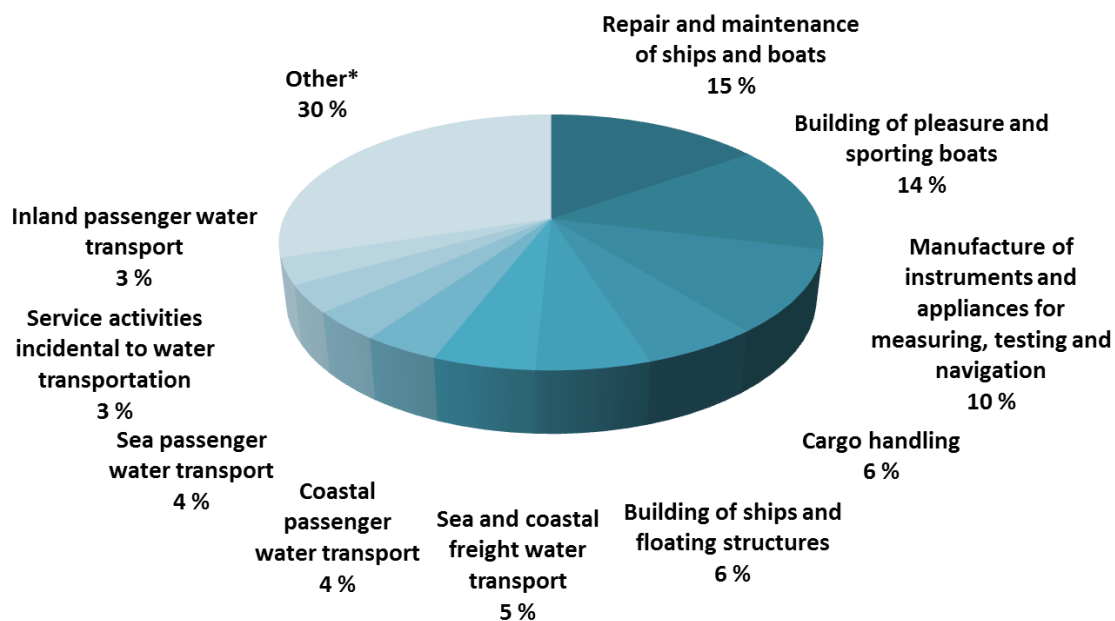
During the recent years, the state of uncertainty has overshadowed the Finnish maritime cluster. Shipyards have suffered from poor profitability and breaks in order books, and their subcontractors have been forced to look for business opportunities elsewhere. Production costs, particularly labour costs, have risen to a level that significantly bothers the competitiveness of Finnish industries. Competition in shipbuilding at a global scale is also constantly increasing, as for instance Asian companies are catching up in know-how. On the other hand, the Finnish marine sector is suffering from the lack of qualified workforce – during lay-offs experts have shifted to other industries and the image of the sector does not appear appealing to students. The shipping companies and ports have both been affected by the economic crisis and are still struggling with profitability. The sulphur directive which will decrease the sulphur emissions of ships from the current limit of 1% to 0,1% by 2015 is estimated to increase the freight costs significantly and cause great challenges for shipping companies. The competition between ports is also increasing, particularly in the Gulf of Finland as Russia is investing heavily in the development of its ports. Thus, the Finnish maritime cluster is facing various challenges and constant development is needed in order to maintain the competitiveness of the cluster.

The Finnish maritime cluster consists of 2 000–3 000 companies depending on the definition and the methods used in company data gathering. According to the latest available study covering the whole maritime cluster (Karvonen et al. 2008; data from 2006), the total turnover of companies’ activities related to the marine sector is over EUR 13 billion. The cluster employs directly some 45 000 people whereas the indirect employment effects of the cluster concern half a million people in Finland. Furthermore, 85% of the Finnish foreign trade is seaborne – approximately 90% of Finnish exports and 80% of Finnish imports are transported by sea (National Board of Customs 2012a). Thus, the maritime cluster is of great significance for the Finnish national economy and the society as a whole.

The importance of the maritime sector has been acknowledged by the Finnish Government as well. The marine industry is classified as an abrupt structural change sector in Finland which includes a jointly drawn plan to solve the crisis and earmarked appropriations to support investment and development projects in the sector (Ministry of Employment and the Economy 2012). In addition to R&D and innovation promotion, the government for instance assists in internationalization of the companies through export partner groups and by giving aid for export promotion projects. The state can create the preconditions for the competitiveness of entrepreneurship but in the end the competitiveness stems from the companies themselves, not from state subsidy. (Känkänen 2012; Taina 2012)

The Finnish maritime cluster comprises companies with a wide range of fields of operation and the competence regarding various fields is extensive. The ten largest fields of operation in terms of the number of companies are illustrated in Figure 5. Specialization and advanced know-how, good quality, and reliability are among the key strengths of the Finnish maritime cluster. Innovation activity is also significant, supporting specialization and the discovery of new solutions. (Karvonen 2012) The specialization in several narrow areas of expertise has given a positive label for the whole cluster as a locus of special know-how. For instance, the demands of climatic conditions have created cumulated Arctic know-how in the Finnish maritime sector.

Figure 5 The Finnish maritime cluster



*includes the other fields of operation that fall outside the ten largest ones

Source: Fonecta 2012; Author's calculations.

The Finnish maritime cluster companies are rather well networked with each other and cooperation among them is, in general, functioning well. However, enhancing the cooperation networks further could have a positive effect on the competitiveness of the cluster. The majority of the maritime cluster companies are small and they often have insufficient resources and skills for internationalization, lack the contacts and references, and face difficulties in competing for large-

scale international projects. However, strong consortiums would be needed in order to succeed in competitive biddings of the shipyards. (Karvonen 2012) There is also a lack of practical level cooperation deriving from attitudinal factors, mainly from the lack of trust between companies (Gorschelnik 2012). Companies are cautious in protecting their own interests and a lot of work is needed in order to create trustworthy domestic networks (Karvonen 2012). Free flow of ideas among and between companies and increased cooperation with universities and other research institutions could lead to innovative solutions. The companies also face common challenges that could sometimes be better answered with coordinated solutions.

4.2 SHIPBUILDING INDUSTRY

The Finnish shipbuilding competence is on a high level due to long and extensive experience, fostered by the war payments to the Soviet Union after World War II, which forced Finland through a rapid industrialization process. Through consolidation and increased specialization during and after this time period, the previously small Finnish shipbuilders became relevant actors on the international market. However, the Finnish shipyards have been suffering from poor profitability and changes in ownership. After the bankruptcy of Wärtsilä Meriteollisuus Oy in 1989, Masa-Yards was formed. In the mid-90's Norwegian Kvaerner purchased Masa-Yards and Kvaerner Masa-Yards was born. In 1991 the shipbuilding businesses of Hollming Oy of Rauma and Rauma-Repola of Rauma on the west-coast of Finland were merged to form Finnyards. This company was later purchased by Aker and became Aker Finnyards. In January 2005 Kvaerner Masa-Yards and Aker Finnyards merged and formed what was called the "new" Aker Finnyards Oy. Since 2008, these Finnish shipyards are owned by Korean STX. STX Europe AS, a subsidiary of the South Korean STX Corporation, is the largest shipbuilding group in Europe and the fourth largest in the world. They operate 15 shipyards in Brazil, Finland, France, Norway, Romania and Vietnam. The company has three business areas: Cruise & Ferries, Offshore & Specialized Vessels and Other Operations and has its headquarters in Oslo, Norway. The Finnish shipyards go under the name of STX Finland Oy. STX Finland Oy has three shipyards in Finland: Turku Shipyard, Rauma Shipyard and Arctech Helsinki Shipyard Oy (STX Europe 2012).

Turku shipyard has specialized in cruise vessels and is currently constructing a passenger ferry for Viking Line, which will use LNG as fuel, as well as a cruise vessel for TUI Cruises, a joint venture between TUI AG and RCCL. TUI Cruises has also placed an order for a second vessel, the construction of which is planned to be delivered in 2015 (STX Europe 2012). As the market for cruise vessels has been quiet and the main customer RCCL's order for project Sunshine was lost to Meyer in January 2011, the shipyard has been forced to look for alternatives to cruise vessels and has been looking for new business areas, such as offshore and offshore wind. They constructed, among other things, a small offshore installation vessel for Meriaura, with special features such as dynamic positioning, and it is the first double acting dry cargo ship (DASTM) in the Baltic. The vessel can also be used for preventing oil pollution, with large tanks that when in use will double the Finnish oil pollution prevention capacity (Meriaura 2012). Moreover, the vessel uses bio-oil as fuel.

The Rauma shipyard is specialized in ferries, but has lately been working with other type of projects, as an example they have recently finalized constructing a research vessel for fishing for the Namibian government. They are also moving strongly into offshore, of which the order of two

offshore supply vessels (worth more than 300 million Euros) from Eide in November 2011 is a good example.

The Helsinki shipyard was some years ago facing to be closed down as it was deemed too small for constructing cruise vessels and considering the market situation at the time, three shipyards were too much. However, the Russian OSK came for its rescue, and it is now called Arctech Helsinki Shipyard Oy and is owned 50% by STX and 50% by the Russian OSK. The shipyard specializes in arctic shipbuilding technology, e.g. building icebreakers and other arctic offshore and special vessels. As the Helsinki shipyard has constructed 60% of all ice-breakers operational today worldwide, and Russia needs to renew its icebreaker fleet, while simultaneously investing in its shipyards and shipbuilding competence, the cooperation gives the Russian corporation a good opportunity for learning; i.e. so called technology transfer. At present, the cooperation model is such that hulls are constructed in Russia (e.g. Kaliningrad or Vyborg shipyard) and taken to Helsinki for outfitting. Current projects are two offshore vessels for Sovcomflot and an emergency and rescue vessel for Russian Ministry of Transport, with new spill combat technology and the ability to move sideways with the help of three azimuthing propulsors.

In addition to the STX shipyards, there is the Turku Repair Yard which is owned by Estonian BLRT. The shipyard carries out different types of repair work, refurbishing, conversions etc. (Turku Repair Yard 2012). There is also a shipyard in Pori, owned by French Technip, which is specialized in offshore contracts, such as Spar hull and mooring systems, drilling rig conversions, offshore construction services and heavy industrial products. The shipyard has recently acquired substantial new orders (Technip 2012).

Competitive situation

Finnish shipyards have provided vessels for shipowners around the world, for example world class cruise vessels operating in the world seas. The two biggest passenger ships built so far, the sister ships Oasis of the Seas and Allure of the Seas, were built for RCCL in the Turku shipyard 2006–2010. They are now operating in the Caribbean and have proved to be very profitable for their owner. There is a chance that a third vessel in the series will be built if financing can be arranged. Besides cruise ships, Finnish shipbuilding is specialized in passenger ferries, ice breakers and warships.

Finnish shipyards' main competitive advantage lies in a high degree of specialization and innovation, as well as fast delivery times and reliability in keeping those. The competitiveness of the Finnish shipbuilding cluster is highly dependent on the vessel type. For standard vessels, competitiveness is on a low level due to the fact that the production process is aimed at specialized vessels, as the strategic choice has been made to focus on these instead of on standard cargo vessels. This means that the Finnish shipyards have a different cost structure than the large Asian (mainly Korean and Chinese) shipyards which are specialized in serial production of standard vessels and can deliver them to a price that is very hard to compete with.

The competitiveness of Finnish shipyards regarding highly specialized vessels, e.g. cruise and passenger vessels involving much design work is higher, as these require a high level of expertise and innovation, which means that competition is scarcer. On the other hand, these kinds of vessels are more seldom produced in series of more than two or three. So called one-offs are very expensive to

design and construct and as a rule, the profits from shipbuilding come from constructing series of vessels, where most profit is made after the first few vessels. The margins made by the Finnish shipyards are quite small, and therefore shipbuilding is not highly profitable business.

Finnish shipbuilding is especially strong in hydrodynamics and conceptual development, for example in the area of energy saving which is becoming increasingly important for ship owners. Project management skills can also be considered high. As an example, the Finnish shipyards have by applying concurrent engineering managed to shorten lead times significantly. The trend has for many years been towards increasing outsourcing; of design to design companies as well as manufacturing of larger areas (cabins, public spaces, HVAC etc.) to so called turnkey suppliers. Conceptual and basic design is kept in-house. However, it has been questioned whether this development has gone too far and the shipyard should regain control of some of the outsourced areas, such as piping or other technical installation behind interior linings.

In terms of operational effectiveness, some investments in increasing productivity have been made. The shipyard has for example invested in 3D design; for example the passenger ferry being constructed for Viking Line is fully designed in 3D. However, the changes in ownership and management of the Finnish shipyards are considered as a drawback which has resulted in a lack of long-term thinking and have influenced investments negatively.

Although the EU has banned direct subsidization, there has been a large amount of support aimed towards the industry through government actions, such as export guarantees, innovation support and supporting R&D through large research programs involving companies from the whole cluster. Shipbuilding has high prestige and is regarded as nationally important in Finland as it has a big impact on employment (20 000 people are directly or indirectly employed by shipbuilding), although it cannot be said to be a healthy business. There is still plenty of competent personnel to be found in Finland, although there is a worry that the younger generation is not as interested to study the subject of shipbuilding. Therefore, attempts have been made to improve the image of shipbuilding (Merioske program) as well as to review the current education programs and anticipate future needs (Poukka 2010).

There continues to be a demand (although not that large by numbers) for cruise vessels and ferries as the number of people choosing a cruise for their vacation is increasing globally. The cruise market is characterized by the need to bring in new vessels with new features on a regular basis in order to attract new and repeat customers. Moreover, the ferry fleet in Europe is aging and is in need of renewal. New segments such as offshore and renewable energy are also in a need of vessels with a high degree of innovation. Simultaneously, the competition is fierce as there is plenty of free capacity in the shipyards globally. This leads to pressed prices which Finnish shipyards have a hard time to compete with. The customers are rarely local, except for Viking Line and Meriaura, who have recently ordered vessels from the Turku shipyard.

It can be concluded that it is not easy to enter the market for vessels requiring a high degree of specialization, which is why Asian shipyards (except Japanese Mitsubishi shipyard which received an order for two cruise vessels for Carnival in 2011) are still behind the European counterparts, and e.g. the construction of cruise vessels has up to now been concentrated to a few European yards (STX in Finland and France, Fincantieri in Italy, Meyer Werft in Germany). Of these, Meyer has lately been

mentioned as the leading yard, which is shown in the many orders they have received during the past years. Meyer's advantage lies in its family ownership, which has ensured a long-term commitment to invest in production improvements, as well as in securing a functioning partner network, whereas in Finland the cooperation with the network has at times been strained due to cost pressure.

When choosing shipyard, vessel price is naturally a strong determining factor, but delivery times and reliability of the shipyard also play a strong part. Customer relationships are very important, especially when it comes to construction of tailor-made cruise vessels, which can be seen in the long history that the companies have with certain clients. Co-creation is a strong element in the cooperation as the cruise companies normally participate strongly in defining the concept for the vessel. For instance, STX Finland has primarily been depending on one customer, Royal Caribbean Cruise Lines, for the past decade, as Carnival Cruise Lines that built its Spirit class in Finland now primarily uses Italian Fincantieri. It is a custom that the competing cruise companies use different shipyards in order to maintain the secrecy around their newbuildings. However, Meyer Shipyard is an exception also in this sense as they are constructing vessels for several competing companies simultaneously.

Main challenges and opportunities for the industry's development

The main challenge lies in staying competitive in order to secure future orders. This means keeping control on costs but also investing in further developing facilities, competences and ways of working to ensure maximal efficiency and a high degree of innovation. Modularization is one area that has been developed in order to enable mass customization and further decrease lead times, material technology is another very important area to e.g. reduce ship weight, improve safety etc. As energy prices have increased rapidly, a main focus area has already for some time been energy efficiency. Any innovations that save money for the customer in operations phase form a major opportunity for the innovator. Fuel technology is a major opportunity as the environmental regulations by IMO are becoming stricter and place a demand for new fuel types and machine technology solutions. For example, the upcoming Energy Efficiency Design Index (EEDI) includes directives for new buildings regarding fuel usage, meaning that current vessels which are constructed for heavy ice conditions are too powerful. Further, there is an increasing focus on environmental friendliness by governments, regulatory bodies and consumers alike. The sulphur oxide (SOx) and nitrogen oxide (NOx) regulations are getting sharper, which means for example that in the long term new fuel types need to be found to replace heavy fuel oil, especially in the ECA areas (Emission Control Areas). These developments provide an opportunity for the shipyard to come up with designs for vessels that meet the new criteria. To meet these needs and capitalize on the opportunities, the shipyards would need to focus on further improving the way of working with their subcontractors, to ensure a sufficient amount of long-term product development through joint R&D projects and co-creation also between current projects.

The offshore segment provides an opportunity for the shipyards, for example as subcontractors to Norwegian contractors. There are also opportunities to increase the life-cycle activities of the shipyards as this area has a lot of underused potential. For example, the more stringent environmental regulations provide opportunities regarding retrofits, conversions etc.

4.3 OFFSHORE INDUSTRY

Offshore industry refers to businesses that support the search and production of oil and gas from the sea bottom as well as the production of wind power, wave power and solar power offshore (SOT 2012). The world's largest oil and gas related offshore markets are currently located in the Gulf of Mexico, the North Sea and the Norwegian Sea, and on the coasts of Africa and Brazil. Possibilities for offshore oil and gas production in the Arctic areas of Russia, the US and Canada are also under active exploration. Simultaneously, offshore industry is increasingly investing in offshore sea wind, wave and solar power production plants, particularly in Germany, Denmark and Great Britain (SOT 2012).

The offshore industry is one of the world's most globalized industries and even the smallest companies providing technology for the offshore industry often operate at the global scale. For Finnish companies the customers are mainly situated abroad and the operations are exports. The target regions, however, differ. Offshore industry in countries such as Brazil, Russia and Norway is dominated by state-owned oil companies which aim at developing their own national offshore cluster and thus set restrictions for foreign participation in their projects. The other half of offshore fields is, in turn, operated by multinational exchange-listed companies which, instead of favoring one country, focus on maximizing their profits through high-technology solutions despite the nationality of the solution provider (SOT 2012). Finnish companies work for finding business opportunities within both of these groups, and currently most of the Finnish offshore exports flow to Northern Europe and Asia (SOT 2012).

Competitive situation

The offshore industry's turnover in Finland totaled over EUR 1,2 billion and exports approximately EUR 1 billion in 2012. Although the industry in Finland is estimated to comprise through various activities approximately 170 companies, only the 10 largest, however, are responsible for the majority of the total exports (SOT 2012). The industry's significance for the traditional Finnish maritime cluster companies is increasing and in the coming years its growth is expected to reach 10% annually, significantly exceeding the general economic growth. (SOT 2012) In Finland the industry network comprises technology companies which provide offshore industry with special know-how in propulsion, mechanical engineering, lifting, electrics, and measuring technology. Several design companies, in turn, have focused on developing floating structures and analysing marine conditions. Traditional maritime industry shipyards also increasingly serve the offshore industry which is replacing the production deficit caused by the lack of large cruiser orders (SOT 2012). Particularly the large offshore orders of Arctech, STX and Technip support the offshore industry's development in Finland. A large network of subcontractors, such as small machine shops or materials handling companies with special know-how, again support the shipyards by delivering steel, copper, chemicals and other materials to the needs of the offshore industry. Several Finnish companies are, in fact, global leaders in their own niche markets, such as ABB with propulsion solutions, Technip with the Spar platforms, KONE with the lifting solutions, and Napa with ship design software. (SOT 2012)

As the oil and gas resources in the coastal areas start to run out and as the oil world market prices continue to rise, the production is shifting towards more demanding climatic conditions deeper under the sea and further North. Simultaneously, the increasingly accessible Northern Sea Route

creates new opportunities for shipping, although in harsh environment without an existing logistical infrastructure. The Finnish know-how is of great value in the related maritime projects, and the most interesting growth areas from the perspective of the Finnish offshore industry are Norway, Brazil, Russia, and the Arctic areas of USA and Canada. In order to beat the international competition rising particularly from Asian clusters, more cooperation is needed among the Finnish expert companies. Namely, international buyers increasingly prefer buying larger product packages than Finnish SMEs with their current supplier networks can offer (SOT 2012), which can be seen as one of the industry's future challenges, in addition to the rather high cost level and maintaining the position at the forefront of the global innovation development. The production of the metal hulls, for instance, has largely shifted to South Korea, Singapore and China, and these countries increasingly invest also in technology development (SOT 2012).

Main challenges and opportunities for the industry's development

Finnish technology companies have world-class expertise to offer for offshore supply vessels (OSVs) and drilling vessels, and due to the country's location, these companies also have valuable experience in applying such solutions into Arctic conditions. In fact, offshore ice management segment, including icebreakers and the related services, is one of the most interesting development areas in the Finnish maritime cluster. Simultaneously, the ability to design and build innovative multipurpose vessels is of demand as such ships can be of use in various functions all year round (Karvonen et al. 2008).

Finnish companies also benefit from the reputation of being reliable project partners, keeping to the schedules and, most importantly, working with excellent quality and high-level know-how. As an example, Arctech Helsinki Shipyard is to finish the Arctic offshore vessel Vitus Behring four months ahead of time. The ship was ordered together with its sister ship by Russia's largest shipping company Sovcomflot, and they are to serve the oil and gas production platform of Exxon Neftegas Limited in the Russian Far East. (Arctech 2012) Arctech Helsinki Shipyard is simultaneously working on another order from Russia, to build a multipurpose icebreaker together with Yantar Shipyard JSC in Kaliningrad. The project uses the icebreaking and oil destruction solutions developed by Aker Arctic Technology Oy (Arctech 2011), a Finnish company which has a unique ice model test laboratory in Helsinki and which is currently involved also in designing several Arctic icebreakers, for instance to China and Canada (Aker Arctic Technology 2012a; 2012b). As another example, STX Finland Oy in Turku is currently working on the steel structures and coating of two large offshore modules which are to be delivered at the end of 2012 to Norway for finishing and mobilisation (STX Finland Oy 2011).

As the offshore production of oil and gas is shifting further from shore to more demanding conditions (drilling in deep waters with thick ice and darkness, kilometers under the sea bottom), the importance of logistical issues as well as security matters rises accordingly. Consequently, in such conditions, the platforms are designed and built to operate also as production and storage facilities, requiring investments of billions of euros. In addition, to avoid accidents in harsh yet sensitive environments, the security demands will further increase in the future, especially in offshore oil drilling platforms. For this kind of projects, multinational oil and gas corporations require state-of-the-art design and supreme quality, and in this field price competition has not, at least yet, overrun the markets, and it is profitable to operate in offshore business at the Finnish price level (SOT 2012).

In the global markets there is demand for specific know-how in offshore-related technologies, services and materials, which enables the specialisation of Finnish SMEs in certain niches. These companies often lack the resources to go international on their own, but as subcontractors for larger companies they get their share of the orders in international projects. Moreover, as there are not many domestic customers for Finnish offshore industry companies, many of them conduct their offshore operations through overseas units closer to foreign customers. On one hand such units support the development of offshore know-how in Finland, but on the other hand the lack of direct customer contact sets challenges for product development in Finland. (SOT 2012)

In addition to inadequate resources for internationalisation, Finnish SMEs and startups often lack the contacts, references and international reputation to get to the supplier lists of international offshore projects – in such expensive projects the buyers want to secure their investments and do not easily give chances for newcomers (SOT 2012). Thus, the existing contact networks, both national and international, are of crucial importance in winning bids for international offshore projects. Particularly in the Russian market, investments are needed to keep up the contact networks when the key persons in these international relations retire. Russia is expected to offer great potential for Finnish offshore and Arctic know-how in the future as the plans for developing the Arctic oil and gas resources are proceeding and the Russian fleet requires modernisation. The existing contact networks are of indispensable importance when bidding for these multibillion projects. Moreover, as a cluster Finnish offshore companies would have more resources and also more services to offer to meet the needs of the customers. Consequently, more cooperation and networking is needed among the industry actors. In this regard, Finnish companies find for instance cooperative development projects interesting. An example of such projects is IFCO (Innovative Finnish Business and Product Concepts for Offshore Industry) which aims at developing the business models of the Finnish offshore industry network for the growing offshore markets in Russia and Brazil. The project is funded by Tekes and coordinated by Offshore Technology Center Oy. (SOT 2012; IFCO 2012)

Nevertheless, in addition to the existing customer relationships, ownership structures (such as in the case of Arctech and STX shipyards) strengthen the future of business cooperation within Finnish and foreign offshore clusters. The role of foreign ownership is significant for instance also in Aker Arctic Technology, ABB Marine and Rolls-Royce Oy Ab (Karvonen et al. 2008). Foreign ownership may strengthen the competitiveness of Finnish companies as they can then specialize in certain solutions within the company and benefit from a large sales network, but the con is that the decisions are eventually made at the corporation headquarters, restricting the Finnish subsidiaries' choice of specialization areas and investments for R&D and innovations (SOT 2012).

In addition to contacts and ownership structures, the state in Finland has rather strong influence on the offshore industry's development. The lack of skilled workforce is one of the major future challenges for the Finnish offshore industry, and more education should be assigned for the needs of the offshore-industry in order to secure and develop the expertise in Finland. Educated workforce is needed rapidly to learn from and to replace the retiring experts. There is also notable demand for Finnish offshore experts abroad, for example in the booming Norway (SOT 2012). Securing the retaining of the top-class offshore know-how and international contacts in Finland requires actions also related to the field's image so that the young choose this path and end up working for this industry and to do it in Finland.

At the same time, when the state needs to find ways to economise, requests for expanding the shipbuilding subsidies to the offshore industry as well as for ensuring export guarantees and other financing with moderate terms for offshore projects have been expressed from the industry's side (SOT 2012). Another political issue is that investments in securing the icebreaking services at the Baltic Sea region are necessary, whereas investments in commercial Arctic offshore activities are not. During the past four years, the offshore activities have been unprofitable for the state, until a deal was made with Shell Offshore to rent multipurpose icebreakers Fennica and Nordica to its oil and gas search operations for 2012–2014. However, involvement in offshore activities at the coast of the US puts the state of Finland under the liability of damage in case an oil accident takes place, which causes a large deep pocket risk. At the same time the Finnish icebreakers require large renovation investments. The suggested solution to sell the state's offshore business and multipurpose icebreakers would mobilize funds for renovating and strengthening the traditional icebreaker fleet and also provide work for Finnish companies, even shipyards. (Hernesniemi 2012) However, according to contradictory opinions, such decision would limit the development of the Arctic offshore know-how and innovations, which again might form a significant threat for the industry's future competitiveness in Finland. (SOT 2012) In 2010, Finland published the country's strategy for the Arctic region, but it mainly focuses on foreign policy issues rather than on economic policy and on the development of a competitive Arctic cluster. As a consequence and in the light of the current situation, financial support from the state for developing Finnish Arctic offshore cluster may be modest in the foreseeable future.

Even though the law of the feed-in tariffs was updated in 2012 to increasingly support the production of electricity from renewable energy resources, no significant support is expected for the development of wind power or other renewable offshore energy production methods either, which does not boost the development of the related technologies. (FINLEX 2011; TEM 2012b; SOT 2012) When it comes to the offshore production of wind power, wave power and solar power, the future lies strongly on political will and financial support. Increasing the production of renewable energy is one of the priorities in European countries, but while the industry relies on political support, it develops rather slowly, depending only on few projects at a time. In Europe the offshore wind power plants under construction in the waters of Great Britain and Germany will determine this segment's profitability and development for the years to come – are countries in Europe and around the world going to invest in this development in the future. However, even though 95% of the world's offshore wind power capacity is currently in Europe, for this offshore know-how there is growing demand also outside Europe, particularly in China and Southeast Asia (SOT 2012).

Although domestic demand is not expected to provide significant support for the offshore industry's development in Finland, international business prospects in the Russian, Brazilian, Asian and North American markets continue to look promising. Furthermore, the global offshore industry is characterized by preferring excellent quality and supply reliability over low prices, and consequently the work of Finnish companies is expected to remain competitive also in the future, and maritime cluster companies are increasingly interested in the developments in this field. However, there is no room for business for every company in this sector either, and keeping the technical lead over competitors requires continuous investments both in skilled workforce and R&D activities. More resources and support should be dedicated also to the internationalization and networking of Finnish SMEs holding state-of-the-art know-how. In addition, to ensure the visibility in large project

tenders, the Finnish offshore industry actors should form a strong offshore cluster. Particularly in the Russian and Brazilian markets, the high profile support of politicians as door openers is in some cases essential for the success of Finnish companies in getting their share of the forthcoming offshore investments.

4.4 SHIPPING COMPANIES

Finnish shipping business⁴ has changed quite much over the years. Historically, there have been large Finnish shipping companies with liner traffic even outside of Finland, strongly supported by local industry (such as FÅA/Effoa, Finnlines). Due to inflexibility of labour unions, cost pressure and globalization, Finnish industry has looked elsewhere and increasingly shifted to foreign suppliers. In the same time, shipowners have increasingly flagged out their vessels to save costs. As a consequence, the percentage of Finnish tonnage handling exports/imports has decreased from 49% in the 1970's to 29% in 2011 (Meriliitto 2012).

The Finnish industry is largely dependent on shipping as more than 80% of goods are transported by sea. In 2011, the amount of transported cargo grew by 4% to 107 million tons. Imports amounted to 62 million tons and exports to 44 million tons. 41% of the latter consists of forestry products. The main export markets are Sweden and Germany, whereas the largest part of imports (consisting of crude oil, oil products, coal and coke) comes from Russia (Tulli 2012).

There are around 30 active shipowners in Finland. In 2011, 683 vessels belonged to the Finnish merchant fleet with the average age of 16 years. These consist of own as well as chartered vessels (Meriliitto 2012). Of these, slightly less than 120 vessels employ the Finnish flag (SMU 2012).

Competitive situation

Recent developments in the world economy have led to an overcapacity of vessels globally and as a consequence; low rates and poor profitability for most segments in shipping, as well as bankruptcies and consolidation among shipping companies.

Finnish shipping can be said to be at a crossroad. The recession in 2009 hit shipping hard and many companies saw a sharp fall in profits, from which they have not yet fully recovered. Freight rates still remain low, in comparison to the situation before the recession, and competition for contracts is fierce. Furthermore, the Finnish shipowners are suffering somewhat from the long distance to the market. The average age of the Finnish fleet is higher than that of other shipping nations, and in addition, the fleets are in need of renewal due to the new environmental regulations and poor efficiency. Due to the above, many shipowners struggle with profitability and suffer from overdependence on a few local customers. On the positive side, there have been investments in new vessels during the past years, lowering the average age of the fleet somewhat.

⁴ This chapter is largely based on findings from another research project and report by the author (Andrésen & Koshelev (2012) Present state analysis, Phase 1 in research project "Future of shipping in Finland 2015 and beyond").

The Finnish shipping companies employ different business models. A common factor is that most of the companies are relatively small on an international scale and are limited to the near market and mainly domestic customers. Industry customers such as the forestry and metal segments are highly represented. Although the material flows are in general expected to grow in the Baltic Sea, the structural changes in the Finnish industry have already caused changes in material flows in terms of closed down factories. Especially the main export field, forestry, is anticipated to further decline and the loss in volumes will not be recovered by the increase in biofuel exports. On the other hand, mining activities are, although not unproblematic, expected to grow to about 5 million tons annually. The much debated SOx limit of 0,1 coming into effect in 2015 has been calculated to increase freight costs by 30–50% and to cost Finnish industry 600 million euros (Lähteenmäki 2012), and is feared to further enhance the development of moving production away from Finland. For example, UPM has already threatened to close down a paper machine as a consequence.

The Finnish customers are quite focused on price but also look at the service offering and value reliability of supplier. The shipowners are not integrated enough with their customers and are viewed more as suppliers who compete with prices than as strategic partners. Finnish shipowners are perceived to offer better value for money than foreign competitors, yet most companies primarily choose their logistics supplier based on cheapest price and make quite short term contracts, typically for one year, whereas the shipowners are hoping for longer contracts as a guarantee for newbuildings. Among the key competences of the Finnish shipping companies is the knowledge about operating in harsh ice conditions. The competence of the crew members is also seen as an advantage, as well as reliability in keeping promises and schedules. Even though a general trend is towards larger size vessels to achieve economies of scale, having a fleet with vessels of a small size can be seen as an advantage for short-sea shipping, as lots are small and distances short and there is a need for frequent traffic.

The image of shipping in Finland is considered poor by the shipping companies themselves and the government is criticized for poor competitiveness of shipping compared to other European countries. However, shipowners are already heavily subsidized in terms of tax exemptions and due to the strict EU rules regarding subsidies and competition, there are few things that can be done by the government to further support the industry, also as there is pressure on the Finnish government to cut costs in its budget. The Ministry of Transport and Communications has set up a working group for creating a common strategy for shipping, shipbuilding and harbours, which is to be completed in 2013, and which will hopefully contribute to increase competitiveness of the cluster in the future.

On a positive side, Finland has finally managed to get the tonnage tax in place, which puts Finland in a similar position as other countries which have already had the system in use. This has been very well received by the shipowners, and results of this are already seen in terms of flagging in vessels and orders for newbuildings.

Main challenges and opportunities for the industry's development

The main challenge for the time being is presented by the before mentioned emission control changes, mainly the SECA (Sulphur emission control area) regulations, stating that the sulphur level of vessels in this area cannot exceed 0,1 after 2015 (IMO 2008). This means a need to change fuel to either diesel oil or LNG, or to use scrubbers for cleaning the emissions. Also the stricter NO_x and ballast water regulations call for a need of investments in the fleet. Upgrading very old vessels is often not economically viable, which is why also newbuildings are needed. However, few companies have the money for this after some rough years and financing is harder to come by than before as the banks have become more risk averse after the financial crisis. In addition, as mentioned before, it appears that the industrial customers are more reluctant than before to make long contracts regarding their logistical solutions, rather they want to optimize the costs on a relatively short term, 1–3 years.

A closer cooperation is needed between ship owners, suppliers, customers and harbours in developing competitive solutions based on efficient cargo handling and environmentally-friendly solutions. Instead of everyone optimizing their own profit, it should be of national interest to explore how cooperation could benefit all parties long-term. Overall, the shipping companies need to become more integrated with their customers and enter into a continuous dialogue with them in order to be able to offer them solutions to optimize their logistics. Through more dialogue and long term cooperation instead of short-term optimization, logistical solutions could be co-created that would benefit the customers, the shipping companies and the Finnish society at large. Suppliers could be involved more in developing these solutions as has been done in shipbuilding.

The shipowners should review their offering and see what can be done to extend the services they offer to their customers. The business models should include a network of partners for fulfilling the needs of those customers who look for outsourcing the whole logistical chain or parts of it. Several business models are needed in order to maintain flexibility to serve different types of customers in changing markets. Based on future material flows, customers outside of Finland should also be actively sought to avoid becoming too dependent on 1–2 companies.

The shipping companies in general need a more positive attitude towards developing innovative, flexible and environmental-friendly solutions together to the benefit of their customers, which means rather fighting the competition from other countries and means of transportation than each other. Meriaura is a positive example, who has managed to differentiate and innovate in a successful manner as their turnover grew by over 56% and the profitability is on a high level. Meriaura has invested in new types of vessels for offshore wind farm construction, as well as using biofuel as main fuel source. Meriaura's biofuel is made of fish waste in their own plant (Meriaura 2012).

Although the situation at hand is challenging, there are also positive signals related to increasing material flows, new vessels coming in and tax benefits. Viking Line has opened the game regarding LNG, which is already resulting in investments, and others may well follow. As the Finnish shipowners are dominated by small companies with only a few vessels, consolidation may be an alternative that should be seriously considered. Also pooling has been brought up as a possibility to offer more flexibility to the customers in terms of a larger fleet to choose from. Joint procurement of vessels is another possibility brought up in discussions with representatives of shipping companies.

Material flows will most likely become more concentrated in the future; perhaps harbours will also specialize increasingly on certain material flows. In general it can be said that containerization is increasing as even raw materials are increasingly transported in containers, and this may mean significant changes to the current logistics processes.

4.5 SUPPLIERS OF MARINE INDUSTRY

Despite the foreign ownership of the Finnish shipyards, still today a large amount of the components in new built vessels in Finland are produced in Finland, over 90% in some cases (TEM 2012a). Thereby the competence in Finland regarding shipbuilding is extensive and forms a cluster of its own, in terms of the network of suppliers present on the Finnish market. There is a wide variety of suppliers, ranging from equipment suppliers to design companies and turnkey delivery companies taking responsibility for larger wholes of the vessels. As the tendency has been towards outsourcing, the number of shipyards' own personnel has decreased and a network of suppliers has instead been created around it. Some of these suppliers are large, international companies such as Wärtsilä, ABB and Rolls-Royce, who serve a variety of customers worldwide. However, there are also a large number of smaller suppliers who are almost fully dependent on the local shipyards for business.

Competitive situation

The competitiveness of the Finnish marine suppliers is largely depending on the product and service offered, which is why it is difficult to say anything general about it. The large international companies are quite competitive as they are main players in their field and serve a variety of customers and industries, utilizing a life-cycle perspective with a high level of after-sales services. They are therefore less sensitive to market fluctuations. The smaller companies would need to widen their customer base and internationalize but lack the skills and resources for that. Language skills are a challenge for many of the smaller companies, as well as the lack of sufficient marketing material, such as proper homepages (Andrésen et al. 2009). However, due to the low order book at the local shipyards during the past years, the suppliers have been forced to look for business opportunities outside own country borders or even outside the marine field. This development can be considered healthy as flexible business models are important in a changing and unstable environment. The challenges of internationalization further depend on the product; design work is naturally easier to export even to the other side of the world than bulky products, e.g. cabins. However, the local cabin manufacturer who is part of the STX group has successfully entered the offshore market by producing living quarters for drilling platforms, as well as the construction market by providing e.g. modular hotel rooms and container apartments. Other companies have also increased their business on the land side and have entered or are trying to enter the offshore business.

As has been stated before, competitiveness largely relies on product development and innovations especially regarding energy efficiency and environmental friendliness. As cost cutting continues to be a focal area to most end customers, solutions that save energy and space are in demand. Cruise lines want to offer something unique in their new vessels what RCCL calls the "wow" element. These requirements place a high demand on R&D and investments which are needed to maintain competitiveness in the future.

Apart from the before mentioned large equipment manufacturers, who are experts on ship power generation and propulsion, Finland has a good knowledge in marine consulting, design and engineering. Companies such as Deltamarin and Elomatic have managed to establish a name also internationally. Finnish engineering companies have been frontrunners in developing 3D design and are also known for efficient project management. They have also followed the model of many industrial companies in outsourcing part of the more basic work, such as detail design, to lower cost countries.

Most international marine players, such as Wärtsilä and Cargotec, have established themselves strongly in Asia. This development stems from the fact that the market has moved more towards Asia as the major part of vessels are constructed there. The companies need to be close to the market, and therefore many have started joint ventures or set up subsidiaries in e.g. China and Korea.

Main challenges and opportunities for the industry's development

For the suppliers of the maritime cluster, who have a high dependency on the local shipyard, the situation was quite difficult in 2010–2011, but the new orders brought some intermediate relief to the situation. Although most shipyards have a strong local network of their own, it is also possible for foreign players to attain orders from them. An example is the HVAC provider Koja who managed to win the order for Sunshine at Meyer Werft through a superior product (KOJA 2012).

The main opportunity is brought by the ability to innovate and come up with attractive solutions. The suppliers should focus on constant development of their products and offerings, in order to meet the need for innovation that is a prerequisite for shipbuilding. An important consideration in product development is, besides the earlier mentioned energy efficiency, a combination of design, functionality and user-friendliness. A challenge is that many suppliers have been very product-centered, and the life-cycle services are underdeveloped. The after-sales market is still widely unutilized by many companies who are more focused on selling new products than maintaining and upgrading already sold units.

More focus should therefore be put on developing services as an integrated part of the product and to enlarge the scope of supply through adding new products and services in order to serve a wider range of clients based on their needs. These services can consist of e.g. installation, project management, documentation, delivery management, after-sales services in terms of spare parts, repair work, predictive and preventive maintenance, inspections/audits, and upgrades to their own products or competitors' products. The suppliers should strive to tie closer into the customers, both the shipyard and the shipowners, e.g. through service agreements, joint R&D efforts or equivalent.

Financing is harder than before to acquire due to the financial crisis that has hit Europe and threatens the euro. This is a dilemma particularly for the shipowners as newbuildings are very large investments, but also the suppliers suffer from this. The Finnish cost structure is a challenge as production costs are lower in e.g. Eastern European countries. This has already caused many companies to localize production elsewhere. A good example is Cargotec's Dry Cargo Division, who mainly manufactures in Asia, whereas R&D, design, sourcing and project management are handled

from Finland. Recently plans to list the marine unit on the Singapore Stock Exchange by the end of 2013 have been published (Helsingin Sanomat 2012).

The special know-how of arctic conditions is considered an opportunity, which is especially important in the offshore segment. Overall, getting a foothold in the offshore field is an opportunity as there are large projects going-on and being planned both near (North Sea, Russian territory) and far (Brazil, Africa). The Finnish companies are not yet very strong in the field regardless of the arctic know-how possessed. Renewable energy is another opportunity as investments in solar, tidal and wind power are being made in Europe thanks to EU targets for renewable energy followed by local government actions. Especially offshore wind is an area where a new type of vessels for installation and maintenance are in demand. For engine manufacturers or fuel producers, solving the problems caused by the more strict environmental regulations is a key success factor. The scrubbers sold by e.g. Wärtsilä are however not yet fully functional, moreover, the investment cost is high and not all vessels can be retrofitted with scrubbers. New fuel solutions are needed in a near future. LNG is the most viable alternative at present. This may result in a high demand for LNG in the future and as a result, higher prices. In addition, investments in biofuel are made in Finland which may provide opportunities.

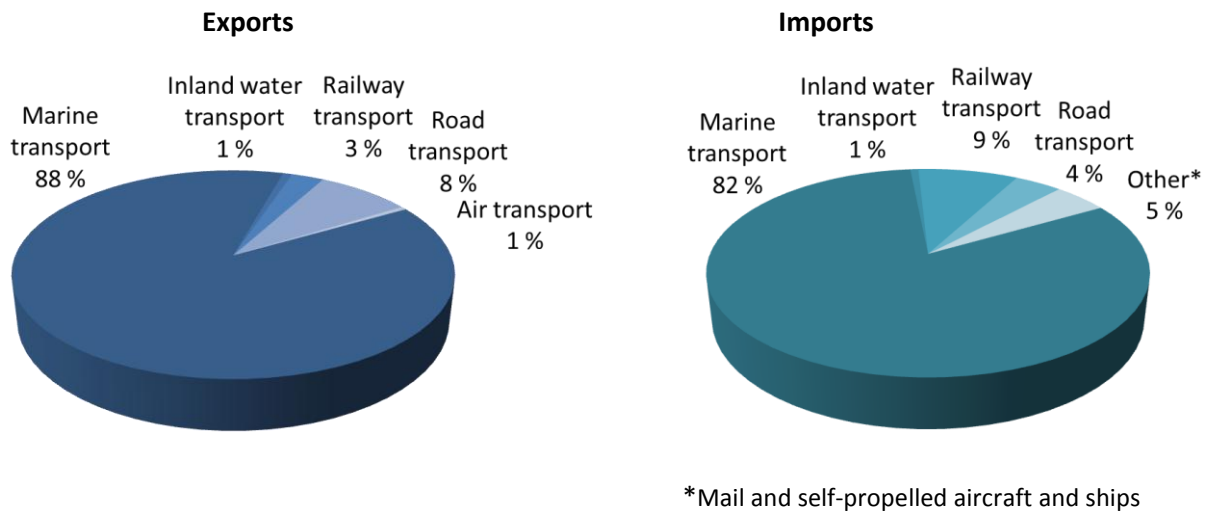
Refurbishing projects provide opportunities as there is a number of aging vessels in need of renewal. Finnish companies such as Almaco and Merima have succeeded in this field. Almaco's focus is on the refurbishment market, and Merima has done refurbishment work in France and is also involved in land-based applications, such as Porvoo theatre (Merima 2012). Another positive example is Rauma Interior, who has invested in their marketing by e.g. creating new web pages, developed both a marine and land-based business area and has also managed to get a foothold in offshore projects, such as Valhall platform living quarters (Raumainterior 2012).

4.6 PORTS AND PORT OPERATORS

Due to geographical conditions, Finland has long traditions for seafaring. The sea, long coastline and extensive inland waterways have enabled the development of seaborne traffic and trade, and connected Finland to other parts of the Baltic Sea region. The oldest port in Finland, the Port of Turku, was mentioned in written sources already in the 12th century. For long, the ports were able to operate only when the sea was unfrozen due to which shipping was strongly seasonal. The industrial development, particularly the growth of the forest industry, created the demand for all-year sea-traffic, and the first winter harbor in Finland was built in Hankoniemi in the latter half of the 19th century. Even today, all Finnish ports are covered by ice during average winters.

The seaborne trade and ports have retained their significance for the Finnish economy. Marine transports account for almost 85% of the Finnish foreign trade – exports by sea almost 90% of all exports and imports over 80%. Figure 6 illustrates the distribution of Finnish exports and import by means of transport. In 2011, Finland's foreign trade transports by sea totaled almost 90 million tonnes, growing 6% year-on-year, and the value of foreign trade marine transports was over 92 million euros. (National Board of Customs 2012a)

Figure 6 Finnish exports and imports by means of transport, 2011 (measured by weight)



Source: National Board of Customs 2012a.

On the other hand, the demand outlook of the Finnish ports is largely depending on the development of the foreign trade. For instance, regarding the Finnish exports, the share of the products of chemical and metal industries and machines has increased during the last decade, whereas the share of wood and paper products and electronics has decreased (National Board of Customs 2012b). Finnish industry's demands for transportation and material flows are changing due to the industry's structural changes, such as the restructuring of the production of the Finnish forest industry and the possible growth of the mining industry.

The number of ports compared to the size of the Finnish economy is relatively high. There are some 50 ports in Finland handling foreign trade, of which around 10 are inland ports. Regarding the foreign shipping traffic, the largest ports in 2011 were Kilpilahti (18,4 million tonnes of total cargo carried by vessels), HaminaKotka (13,1 million tonnes), Helsinki (11,1 million tonnes), Kokkola (7,3 million tonnes), Naantali (6,7 million tonnes), and Rauma (6,1 million tonnes). (Finnish Transport Agency 2012) Kilpilahti Port situated in Porvoo is Neste Oil Company's port specialized in both export and import of oil and oil products. Port of HaminaKotka, specialized in Russian transshipments, was created in 2011 as a merger of the Ports of Kotka and Hamina. Port of Helsinki is an important universal port regarding both exports and imports. Although numerous, the Finnish ports are quite far specialized and have their own operating profiles (Karvonen et al. 2008).

The majority of the Finnish ports are municipality-owned but there are also some privately owned ports. Some private ports are owned by an industrial company serving mainly the company's factory somewhere near the port, such as Kilpilahti, whereas some are public ports serving external customers, such as the Port of Helsinki. However, the municipal legislation concerning ports is under renewal and municipal ports are likely to be incorporated in the coming years due to the EU's competition legislation and the partial reform of the Finnish municipal legislation. The incorporation is likely to take place during 2013–2014. Although challenging for ports, the incorporation can create

them opportunities to improve competitiveness and develop business operations. (Rönty et al. 2011; Lamminsivu 2012) Thus far, the municipal ownership has largely determined the operating sphere of the ports and hindered them from extending to other ports or abroad (Karvonen et al. 2008).

Competitive situation

The global economic situation has affected the Finnish ports as well. Since 2008, the profitability of the Finnish ports has remained very low, and during the beginning of 2012 the cargo flows have decreased. So far, the Port of HaminaKotka has suffered the most – for instance, in the Port of Hamina the amount of handled cargo has decreased for 25% during the first half of 2012. Thus, the Finnish port operators are also suffering from the weak economic situation. The port operator company Stevedco has, for instance, recently announced that it will end its operations in the Port of Hamina completely by the end of 2012 because of the weak profitability, leading to the discharging of approximately 100 employees. Indeed, competition between cargo ports has intensified particularly in the Gulf of Finland where there is a lot of overcapacity compared to the traffic demand. Russia has increased its port capacity during the recent years, and particularly the new Ust-Luga port has taken its part of the marine transports. Russian transshipments are of great significance to Finnish ports of which they are also competing with the ports in the Baltic countries. Regarding Finnish ports, the intensified competition has particularly affected the transport of cars to Russia which has decreased significantly during the recent years and is likely to decrease further in future. Also the transport of paper has decreased. (Lamminsivu 2012; Yle Uutiset 23.9.2012)

Finnish ports have to maintain their competitiveness in comparison to Russia and other ports in the Gulf of Finland for instance by specializing (Lamminsivu 2012). Finland has, for instance, developed into a logistical hub for Russian valuable imports. The competitive advantages of Finland as a transit route include for instance the safety and reliability of the route, and the availability of storage capacities for valuable goods. Investments in ports create new ship traffic and thus facilitate the growth and increase the revenues. However, this may have negative impact on the economic situation of other ports in Finland as part of this ship traffic is probably transferring from other ports. (Karvonen et al. 2008)

The competition between Finnish port operators has traditionally been quite minimal because of the small cargo flows and small ports. However, the competition is gradually increasing as the material flows and the size of ports are growing. (Karvonen et al. 2008) Many ports, particularly the larger ones, already have several port operators – for instance, more than 10 different companies operate in the Port of HaminaKotka and around 10 in the Port of Helsinki. Some larger companies operate in several ports and often provide a wide range of logistic services. Stevedco, for instance, provides vessel loading and discharging, cargo handling, forwarding, transport, warehousing and ship's agency services (Stevedco 2012). Stevena, on the other hand, provides port operations, such as stevedoring, as well as warehousing and cargo handling in seven Finnish ports. Stevena is also a part of the Backman-Trummer Group which provides logistics solutions, including port operations, freight forwarding and international transports, in ten Finnish ports. (Backman-Trummer 2012) As a contrary to this “full service trend”, some port operators specialize in a particular type of cargo handling. In addition, the internationalization of the ownership has gradually started. (Karvonen et al. 2008)

The supporting infrastructure and various services offered in the vicinity of ports are very important for the competitive situation of the ports and the inadequacy of infrastructure hinders their development. Good road and rail connections and the fluency of traffic have great impact on ports' competitiveness. For instance, the Finnish-Russian border with its truck traffic jams is a major bottleneck for the traffic via the Finnish ports. (Karvonen et al. 2008) Furthermore, the vessel size is constantly increasing in the Baltic Sea which creates multiple challenges for ports and port operators and requires the development of port and terminal infrastructure (Vanaale 2012). Regarding the passenger traffic from Finnish ports, the cruise business is expected to grow steadily but it requires the development of functional port infrastructure for the fast and efficient boarding and loading of cruise ships. New technologies can offer possibilities for the development of these functions. (Fagerström 2012).

Main challenges and opportunities for the industry's development

Cold weather and ice create specific challenges for the Finnish ports. In order to secure the competitiveness of the Finnish ports and shipping industry, the safe and smooth winter navigation has to be guaranteed for example by the availability of icebreaker assistance. The know-how related to winter navigation and icebreaking is among the key competences in Finland. On the other hand, the Finnish port and port operations sector is rather sensitive to strikes which harm the sector's international reputation regarding the reliability of delivery.

Environmental issues are to create great challenges for marine transport and ports in the coming years. Answering to those challenges will require technological development and investments from ports as well. Currently the most urgent issue is the tightening sulphur regulation for the Baltic Sea area which will necessitate changes in ships and is likely to have implications on ports as well. (Lamminsivu 2012) From the beginning of 2015, the maximum sulphur content of the fuels used by ships operating in the Baltic Sea will be limited to 0,1%, as defined in the revised Annex VI of the International Maritime Organisation's MARPOL 73/78 Convention (IMO 2008). Possible fuel options for ships after the regulation comes to force are low sulphur fuel (diesel), liquefied natural gas (LNG) or biofuels. Alternatively, ships can continue to use heavy fuel oil and use scrubbers to reduce their sulphur emissions. (Hernesniemi 2012) Currently, either the use of diesel or scrubbers is seen as the most likely option for old vessels. However, for new ships, LNG could be the most feasible solution as the emissions it produces are very low, although its price in large-scale use remains a question mark. (Karvonen 2012; Taina 2012)

Both the use scrubbers and LNG are likely to have implications on ports as well. If the use of scrubbers in ships becomes general, ports may have to develop facilities to receive and process waste from scrubbers (Lamminsivu 2012). The large-scale use of LNG as a shipping fuel in the Baltic Sea will require investments from all stakeholders, including ports, shipowners and shipyards, as well as LNG providers. Regarding ports, the use of LNG as shipping fuel would require the building of bunkering infrastructure. Currently it seems that all the stakeholders are waiting for the other to take the first step in investing in LNG and the lack of cooperation is slowing down the development of LNG facilities for shipping (Schrøder Bech 2012).

In the long run, marine transport is likely to face other tightening environmental regulations as well. For instance, another IMO convention, the International Convention for the Control and

Management of Ships' Ballast Water and Sediments is close to ratification (IMO 2004). If entering into force, the Convention would define standards for the management of ships' ballast water. This could mean that ports will also have to develop reception facilities for ballast water. (Lamminsivu 2012) Furthermore, adapting to new regulations and adopting new technologies requires educating the employees of ports and port operators, and availability of skilled workforce in these sectors can also create challenges for Finland.

The tightening environmental regulations can also cause a partial change of traffic from sea to road which would have a negative effect on ports (Fagerström 2012). Marine transport routes through Finnish ports may in the future compete increasingly with for instance Russian railroad and truck traffic. On the other hand, in the long run Russia's WTO accession can have a positive effect to Finnish ports in the form of increasing Russian transports when tariffs are lowered. However, it is likely to contribute more to the increase of commodities imports rather than containerised imports (Vanaale 2012). In the more distant future, the North-East Passage could also challenge the current East-West shipping routes.

In the face of various challenges and the growing competition, Finnish ports have to develop their operations in order to maintain their competitiveness and to develop their financing methods. After the incorporation of the ports, they have to cover their expenses and investments with their revenues which can be challenging particularly for smaller ports. Increasing the cooperation between different ports and developing the networking among the ports is seen as one solution to respond to the future challenges. Cooperation can lead to a merger of ports, as happened with the Port of HaminaKotka, or to looser forms, such as cooperation in marketing or administration in order to cut the expenses. In addition, attracting external investors to participate in port activities could facilitate the financial and functional development of ports – in Sweden for instance external investors are already involved in port activities. (Lamminsivu 2012) Indeed, due to incorporation and merging, the number of ports in Finland, particularly small ones, is likely to decrease in the future (Taina 2012). The changing environment creates challenges also for the port operations and infrastructure, and investments are required for the development of new functions and technologies.

4.7 INTEREST GROUPS AND ASSOCIATIONS

The Finnish maritime cluster comprises various interest groups and associations which aim at contributing to the sector's general development in Finland or promote the interests of the cluster employers or employees. The maritime cluster is obviously also affected by various international-level organisations. The key interest groups and associations influencing the Finnish maritime cluster are presented next.

The Finnish Maritime Society (Meriliitto) is a society with the purpose of working for the benefit of the Finnish maritime culture and to act as a marine cooperation forum for companies and associations operating in the Finnish maritime cluster. The society arranges various meetings, excursions and exhibitions to spread information, and to support cooperation among its members, and provides a channel for influence towards political decision-makers, the press and the general public. (Meriliitto 2012)

The Finnish Port Association (Suomen Satamaliitto), in turn, works for the benefit of its member ports for instance by promoting Finnish legislation that affects port-specific transport and logistics and by offering information and expert services. At the international level, the Finnish Port Association cooperates with the European Sea Ports Organisation (ESPO), through which it aims at influencing the EU-level policy-making. (Suomen Satamaliitto 2012)

The Finnish Association of Purchasing and Logistics (Suomen Osto- ja Logistiikkayhdistys ry, LOGY) is a voluntary association of approximately 3600 individual members and 250 corporate members specialising in logistics in general. The objective of the association is to develop procedures for the purchasing of materials and services, and to promote the skills of its members in logistics. At the same time, the aim is to increase the internal and external integration of logistics, to develop the utilization of computer processing and data interchange in logistics, and to represent Finnish logistics services. (LOGY 2012)

The members of **the Finnish Shipbrokers' Association** (Suomen Laivameklariliitto ry) include companies which engage in activities such as ship's agency, acting as chartering broker of ships and cargo, acting as broker in the sale and purchase of ships, acting as dockyard broker, liner agency, etc. The association has 73 member companies, working in all Finnish ports. The association aims at promoting the success of the business activities of its members by e.g. contacts to national and international institutions and authorities. The Finnish Shipbrokers' Association is also a member of FONASBA, **the Federation of National Associations of Ship Brokers and Agents**. (FSA 2012)

Regarding the legal environment, **the Finnish Maritime Law Association** (Suomen Merioikeusyhdistys) operates under the **Comité Maritime International** (CMI), a non-governmental organization that contributes to the unification of maritime law in all its aspects. The CMI holds every 3–4 years a conference which discusses the achievements of international working groups and international sub-committees. (CMI 2012)

When it comes to the labour organisations, **the Finnish Seamen's Union** (Suomen Merimies-Unioni SMU ry) promotes the interests and defends the rights of over 10 000 seafarers working in maritime and inland water transportation. The members of the union represent over 50 professions from ratings working in a ship's engine room to shop sales personnel. The Finnish Seamen's Union concludes collective bargaining agreements that define e.g. the minimum wage limits, working hours, overtime remuneration and holidays. It has 11 local trade union branches, and altogether is a member of the Central Organisation of Finnish Trade Unions (Suomen Ammattiyhdistysten Keskusliitto SAK). (SMU 2012)

Transport Workers' Union (Auto- ja Kuljetusalan Työntekijäliitto AKT ry) is also affiliated to the Central Organisation of Finnish Trade Unions. Transport Workers' Union represents and promotes the interests of more than 50 000 transport professionals, negotiating and concluding agreements in 20 sectors, e.g. road transport, stevedoring, vehicle maintenance, tourist transportation and diverse forwarding businesses. The union's primary aspirations comprise improving the terms of work and pay, developing occupational health and safety, and raising the social standing and training level of the membership. (AKT 2012)

At the employers' side, **the Finnish Port Operators Association** (Satamaoperaattorit ry) represents the interests of 40 member companies operating in 25 different ports in stevedoring and terminal services and other materials handling and logistics operations in Finnish ports. The mission of the association is to protect and improve the sector's operating conditions, for instance through representing its members in labour market negotiations, monitoring the sectors development and maintaining active contact network with various interest groups and decision-makers. (Satamaoperaattorit 2012)

The Finnish Freight Forwarders' Association (Suomen Huolintaliikkeiden Liitto), in turn, aims at improving the operating conditions of approximately 70 member companies working in the forwarding sector. Also this association monitors domestic and international development within the sector, maintains contacts with interest groups, and negotiates collective labour agreements and works to prevent labour disputes. The Finnish Freight Forwarders' Association is a member of the Confederation of Finnish Industries (Elinkeinoelämän keskusliitto EK) and its affiliated Service Sector Employers (Palvelualojen työnantajat PALTA), and represents its members at the international level through the International Federation of Freight Forwarders Associations (FIATA). (SHL 2012)

The Finnish Shipowners' Association (Suomen Varustamot ry) represents 27 Finnish shipping companies and 101 ships with an interest in industrial and labour market policies. The association is to improve maritime safety and develop maritime technology by cooperating with the Finnish Transport Safety Agency (TraFi) and the Finnish Ministry of Transport and Communications as well as through international maritime organisations. (Suomen Varustamot 2012)

Various international organisations also have strong influence on the maritime sector's development. One of the key organisations is **the International Maritime Organisation** (IMO) which is the United Nations' specialized agency with the responsibility for the safety and security of shipping and the prevention of marine pollution by ships. In addition to the 170 member states, including Estonia, Finland, Latvia and Lithuania, the IMO has three associate members and several intergovernmental organisations with observer status and non-governmental organisations in consultative status contributing to its work. For instance in 2008, IMO adopted the amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL) which introduce the Baltic Sea as a special area by adding new discharge requirements for passenger ships while sailing in this area. (IMO 2012)

At the Baltic Sea region level, **the Helsinki Commission** (HELCOM) aims at protecting the marine environment of the Baltic Sea from all sources of pollution through intergovernmental co-operation between Denmark, Estonia, the European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. HELCOM is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, which is often referred to as the Helsinki Convention. HELCOM works as an environmental policy maker, an information centre, a supervisory body in regard to environmental standards, and as a coordinating body in case of major maritime incidents. (HELCOM 2012)

As the European shipyards and equipment makers mostly share common interests, concerns and policy objectives in the increasingly challenging market conditions, **the European Ships and Maritime Equipment Association** (SEA Europe) represents the European maritime technology

industry as a whole with the aim of having “a strong united voice at the heart of Europe”. SEA Europe is to conduct its work through working groups dealing with specific market segment matters. At the focus is LeaderSHIP2020, the initiative of Antonio Tajani, Vice-President of the European Commission, to build a new comprehensive industry policy for the sector. (SEAEurope 2012)

Approximately 40 ports in the Baltic Sea region have established the **Baltic Ports Organisation** (BPO). The organisation’s main objective is to improve the competitiveness of maritime transport in the Baltic region by increasing the efficiency of ports, marketing the Baltic region as the strategic logistics centre, improving the infrastructure within the ports and the connection to other modes. BPO’s vision is to “promote the Blue Maritime Highway in the Baltic Sea”. (BPO 2012) Port operators also have a European-level presentation, i.e. **the Federation of European Private Port Operators** (FEPORT). The association comprises member associations in EU member states, EFTA and accession countries, with an objective to inform and advise its members and to discuss and formulate common points with regard to European policy matters. (FEPORT 2012)

What is their effect on the Finnish maritime cluster?

During the past few years, for instance the Transport Workers’ Union has received a lot of media visibility due to the strikes of stevedores. As an example, in March 2010, the strike lasted for a bit over two weeks, during which the stevedores of the ports in Helsinki, Turku, Kotka, Uusikaupunki, Naantali, Kokkola and Hanko were out. The dispute between the employer and the employees was about the protection against dismissal, the issue which had not been fully concluded during the previous agreement negotiations. The purpose of the strike was to speed up the negotiations, but while shutting down the Finnish ports, it caused severe losses for the Finnish exports. (Helsingin Sanomat 2010) For instance, in Finnish forest industry Stora Enso reported losses of EUR 2,5 million and UPM EUR 3 million each day during the strike (Mäntylä 2010a). As a result, the public discussion largely criticized the actions of Transport Workers’ Union, particularly when the stevedores’ protection against dismissal was already better than in other industries (Helsingin Sanomat 2010). In addition to the breaks in exports and imports, worries were presented about Finland losing its reputation as a reliable business partner due to the delivery problems, for instance in the eyes of Asian customers – in that culture such strikes are hard to understand (Metsäteollisuus 2010). Concerns about the Russian transit traffic being redirected elsewhere were also presented. However, according to other opinions, in Finland there have been strikes in the key industries already before, without significant effect on the country’s reputation, and there will also be more to come in the future (Mäntylä 2010b).

Nevertheless, due to the dispute, the Confederation of Finnish Industries started a discussion about restricting the right to strike, which again aroused public discussion and resulted in a walkout in almost all the ports in Finland, to protest also against the use of strike-breakers during the strike. The Finnish Port Operators Association found the walkout outrageous due to its illegality after accepting the proposal for settlement. (YLE 2010) Restricting the right to strike is not likely to be possible even though such an agreement could be made at national level – it would be against the civil rights agreements of International Labour Organisation (ILO), and for instance Norway was not allowed to restrict the strikes at the oil drilling platforms, although the industry is of strategic importance to the country’s economy (YLE 2010).

International cooperation among interest groups has also taken place. As an example, in September 2012, the Transport Workers' Union supported Estonian stevedores and their union EMSA by stopping the cargo handling of five shipping companies in the ports of HaminaKotka, Helsinki, Rauma and Hanko. Those shipping companies have regular liner traffic between Finland and Baltic ports in which stevedores do not have labour contracts. Problematic ports were for instance Muuga and Paldiski. The purpose of the few-hour strike was to support the formation of a comprehensive labour contract for all the workers in the ships. (YLE 2012) Regarding the changes in the international maritime arena, for instance the Confederation of Finnish Industries (EK) has recently voiced its opinion particularly about the tightening sulphur regulation. According to EK, Finnish export companies will end up at an unequal position compared to other EU countries because of the rise in transportation costs brought by the sulphur directive. EK demands the Finnish Government to find out possible solutions to compensate these costs to the companies. (EK 2012a; 2012b)

Consequently, due to the key role in running the Finnish exports and imports, these associations have a major impact not only on the development of the maritime cluster but also on the Finnish economy as a whole. The interest groups strongly support the working conditions and wages of their members, which on one hand guarantees a good working environment for the member employees, but which on the other hand supports the rising cost level of the Finnish maritime workforce and may result in the Finnish maritime cluster losing business opportunities to more cost-effective clusters. The international organisations, in turn, have a notable impact on the working environment of the maritime cluster actors – for instance the new emission restrictions set by IMO require large investments, but on the other hand may boost the development of the related technologies and know-how in Finland.

SUMMARY: THE PROSPECTS OF THE FINNISH MARITIME CLUSTER

SHIPBUILDING INDUSTRY

- Challenges: high cost structure; price competition; dependence on few customers/segments; lack of investments by Korean owner.
- Opportunities: innovations regarding energy efficiency, environmental friendliness and passenger experience; closer cooperation and co-creation with subcontractors and customers; increasing activities and finding new customers in offshore segment; expanding life-cycle services.

OFFSHORE INDUSTRY

- Challenges: foreign ownership hinders own R&D activities; SMEs have difficulties in winning bids in large-scale offshore projects; lack of workforce with special know-how; state economies reduce public support for the industry's development; no possibilities for price competition against Asian markets.
- Opportunities: reputation of excellent project management as well as reliable and good quality services and products; increasing business opportunities due to the demand for excellent quality as well as special niche know-how and technology e.g. related to the Arctic conditions.

SHIPPING COMPANIES

- Challenges: poor profitability; aging fleet which does not meet new environmental regulations; rising costs for industry which threaten future material flows; lack of cooperation within field; dependence on few customers.
- Opportunities: innovations regarding energy efficiency, environmental friendliness and other smart solutions; closer cooperation and co-creation with each other and with customers, harbours and subcontractors; new material flows such as mining.

SUPPLIERS OF MARINE INDUSTRY

- Challenges: high cost structure; dependence on local shipyard; financing.
- Opportunities: innovations regarding energy efficiency, environmental friendliness and functionality; increasing activities and finding new customers e.g. in offshore or renewable energy segment or land-based; developing services in addition to products, e.g. expanding life-cycle services.

PORTS AND PORT OPERATORS

- Challenges: changes in material flows; increasing competition; incorporation; financing; tightening environmental regulations; road and rail connections and the fluency of traffic; sensitivity to strikes; availability of skilled workforce.
- Opportunities: increasing specialization; developing new functions, services and infrastructure; innovations related to e.g. environmental friendliness and functionality; increasing networking and cooperation with each other and with shipping companies, customers and other actors.

5 THE LATVIAN MARITIME CLUSTER

By Valters Bolēvics and Veiko Spolitis

5.1 OVERVIEW

In Latvia, maritime cluster is spread between major ports of Riga, Ventspils and Liepaja, comprising three smaller maritime clusters. Companies operating in these ports have business in one to all three together, namely stevedores and terminal operators, which corresponds to cluster overlapping of research and investments where spill over of knowledge is a positive side effect. Maritime cluster in Latvia is widely linked to railway, as today not only in Latvia but worldwide no major port which operates in transit cargo business could operate without direct railway access. There are good examples in the World with no railway access, ports which are ranked amongst top in terms of cargo volume, but these ports are transshipment hubs as Singapore, Jebel Ali and others, but for the case of Baltic Sea, all major ports have direct access of railway. The immovable assets of the Baltic States are the 1520mm rails (the CIS countries use these ports due to the same rail width) as well as the well-developed port and terminal handling infrastructure and nautical accessibility.

5.2 SHIPBUILDING INDUSTRY

The Latvian shipbuilding sector comprises four major enterprises (Riga Ship Yard, Tosmare Ship Yard, Bolderaja Ship Yard, Mangali Ship Yard) which are predominantly active in the ship repair sector, although some amount of new construction work has also been carried out at two of the enterprises (Riga Ship Repair Yard and Tosmare). All enterprises have been privatised since 1995, and the economic impact of the sector accounts to approximately 0,4% of the GDP.

Within the shipbuilding industry and maritime cluster, knowledge is considered to be informal and tacit by nature and difficult to codify, articulate and transfer. Therefore, transfer of knowledge requires long-term and trustful relationships between companies within the cluster. Transfer of information and knowhow is a requirement for developing a high degree of learning capacity. As an example, the Riga Shipyard, established in 1913, today continues to serve European and Scandinavian customers focusing on ship repair, conversion and shipbuilding. Riga Shipyard co-operates with all classification societies, major equipment and paint manufacturers, logistics and shipping companies, and today is one of the largest yards in the Baltic region repairing more than 100 seagoing vessels per year. These lines of arguments provide important reasons for how territorial specific learning capabilities are created in clusters and how essential they are for further competitive advantage improvements. The learning capacity of firms in a cluster is related to the proximity of many companies in the same or adjacent industries. In other words, clusters are assumed to shape the networking in a particular way. The knowledge of network characteristics, which promote clusters, is limited. Usually, networking is described by concepts such as size (number of direct and indirect ties), structure (density, redundancy, bridges etc.), the type of resources that flow through the relations, the degree of material or immaterial investments in the relations, and the governance structure (trust, contracts etc.). (Wijnolst et al. 2008) The knowledge of shipbuilding industry in Latvia dates back to 16th century, when the port of Ventspils held one of the biggest naval ship building yards within today's European continent, and throughout the Soviet

period a major naval base was built in the port of Liepaja as well as a major shipbuilding and ship repair company today known as Riga Shipyard. Latvia holds assets of history and knowledge within shipping and transport field, thus still marks of centuries long-lasting wars and regimes played part to develop this sector as it could be seen today for instance in Germany or Finland.

Competitive situation

In terms of strength and weaknesses of the Latvian shipbuilding sector, labour costs are low in comparison to Scandinavian Baltic Sea yards. This provides a clear cost advantage, although this is undermined in part by higher levels of overhead costs and lower productivity. In Latvia, Riga shipyard holds ageing assets of experienced marine and naval shipbuilding engineers and labour force, as well as mechanical equipment as floating docks, cranes and machinery awaits improvements and investments. At the same time, the capacity in ship repair and shipbuilding yards holds physical scope to increase outputs, either through improving productivity or by increasing employment. Meanwhile not only skilled labour and technology play a role in securing successful business but essentially also the knowledge of neighbouring countries markets and the lack of language barriers with Russia, Ukraine, Belarus and other CIS countries.

Main challenges and opportunities for the industry's development

The main challenge lies in being ahead of competitive advantage of neighbouring yards, not only in terms of costs but also general business development and overall market strategy. For instance, the size of Russian market and fleet owned by Russian government speaks for itself, thus there is no major secret that it is almost impossible to safely and keeping in mind safe working practices to repair existing fleet within Russian Federation, not speaking of new building programme approved by President of Russia, which corresponds to fact that at least good portion of total basket are and will be repaired and built at the outskirts of Russian Federation. Niche market such as offshore business (drilling platforms, rigs, mechanical equipment, special customized cranes, floating barges and other) is also an opportunity not to be missed and today Riga Shipyard is very active within the markets of Ukraine (Black Sea region particularly), where it has recently been very successful and signed two major deals.

5.3 OFFSHORE INDUSTRY

The world's offshore industry is widely owned and developed by states or state-controlled entities, but Latvia does not directly possess any stocks or joint stock companies that operate within offshore industry. Nevertheless, companies like JSC Riga Shipyard have expertise and mechanical equipment to produce offshore supply vessels, tugboats, floating specialized barges, floating cranes and floating drilling rigs. Although the offshore sector is important worldwide, Latvia has little or no experience of producing or exploring gas and oil. Therefore, the offshore sector is not developed in Latvia and is not expected to have a significant role in the GDP in the next ten years.

Competitive situation

Offshore sector plays a part in Latvia's neighbouring countries, such as Norway, Russia, Ukraine, and Finland but none of the Baltic States have vital resources or knowledge of the sector. Meanwhile,

the competitive advantage lies in the possession of good yards to supply offshore industry with necessary mechanical equipment.

Main challenges and opportunities for the industry's development

The offshore industry provides opportunities for the supplying industry. Especially the markets of Russia and Ukraine are very attractive for Latvia's entrepreneurs and within the last few years there have been signs of actual cooperation taking place in the form of already signed contracts. This is both an opportunity, and on the other hand, a challenge.

5.4 SHIPPING COMPANIES

In Latvia there are only a few shipping companies of which JSC Latvian Shipping Company is the biggest one and sailing under Latvian ship registry (Latvian flag). The others are too minor to be discussed here with only one to three ships in direct ownership or business being based on chartering contracts. JSC Latvian Shipping Company is an oil product and other chemical cargo shipper. In the handy and medium-sized tankers category the company is among the leading tanker owners in the world – the fleet consists of 20 modern up to standard tankers. Cargo shipments provided by Latvian Shipping Company cover a wide geographical area – from the Baltic Sea and Northern Europe to the Black Sea, Mediterranean Sea, the Atlantic Ocean, the Caribbean region as well as the Far and Middle East regions. Since 2002, the largest shareholder of JSC Latvian Shipping Company has been JSC Ventspils Nafta owning 49,94% of the share capital (JSC 2012).

Competitive situation

JSC Latvian Shipping Company's competitiveness lies in operating in the middle-range product tanker segment, providing to its customers highly qualified services in compliance with international safety standards and strict environmental protection policy. The others, notably the ones who possess only one to three ships, are niche market players and primarily chartered out to third parties – in only few examples shipowner also runs cargo activities linked or merged to stevedoring business.

Main challenges and opportunities for the industry's development

A main challenge comes from the lack of efficient cooperation between ship owners, stevedores, terminal operators, Freeport authorities and legal entities, rather within the EU level than national level. For example, the sulphur emission problem shows no dialogue between shipping companies and the EU level policy makers.

5.5 SUPPLIERS OF MARINE INDUSTRY

In Latvia there is a wide variety of suppliers, ranging from heavy metal machinery and production of it to in-house ship design and interior, electronic parts and devices, as well as different tools produced in Latvia. Riga Shipyard is one of the key companies supplying the marine industry producing not only ship hulls but also heavy welding works, machinery and electronic equipment according to highest safety standards and international codes. The competence of shipbuilding in Latvia has a vast historical background and knowledge shaping it into a small cluster on its own, including cooperation in research and development with Russia, Ukraine and Western European

countries. In Latvia, the business profile has changed from outsourcing to manufacturing in Latvia, including production from scratch to state-of-the-art electronic equipment and machinery, supplying vessels and the marine industry in general. Local marine industry suppliers are dependent on primary resources, such as metal and electronic parts which in most of the cases are imported from Russia and China, and then the final product is produced, designed and assembled in Latvia with the highest return on investment and efficiency measures.

Competitive situation

The competitiveness of the Latvian marine suppliers depends on and gains at the same time from lower costs of labour, general costs of primary resources such as metal and machinery, as well as of knowledge and use of information technology products and after sales services. Knowledge of business strategies and the absence of language barriers with Russia and Ukraine are also important and in some cases play a pivotal role in securing investments and contracts. Product development and innovation in ship design, energy efficiency, information technologies and trends in environmental policy are also key elements of competitive advantage, as well as a general cost cutting policy and meeting deadlines above par.

Main challenges and opportunities for the industry's development

The main challenges for the suppliers of the marine industry can be narrowed down to innovation, research and development, after sales services, and information technologies. Innovation is among the main challenges, in respect not only to general efficiency, cost cutting and budget consolidation trends, but also regarding heavy works as welding, building hulls, ship design, offshore industry platform design and the use of new state of the art materials, e.g. less welding, more glues and special metals such as aluminium and its components. Research and development is one of the key pillars in order to grow the business in the medium to long term as without innovation there is no progress in technology and return on investment. Despite the fact that Latvia's government is not actively involved in financing specialized maritime and transport research projects, large companies, compared to the 1990s, have shifted business from general assembly to investments in research in order to come up with new solutions and use them in actual production – in some cases to patent technology and sell it to other competitors or align with competitors to gain the newest technological trends.

After-sales services and information technologies are gaining popularity and increasing their share of the total marine supply business as companies tend to hire less in-house but outsource more in order to reduce costs and increase efficiency. Currently the investments in labour and top management are risky decisions as the labour migration and other restrictions are missing, which may lead to the leaving of experts from companies. Therefore, more motivation factors should be brought in place in order to satisfy workforce. At the same time, companies who do not seek to invest in staff education, outsource services to other companies. Here after sales services and information technologies come in as one of key elements to run business successfully, through cost reductions and higher returns on investments.

5.6 OTHER RELATED BUSINESS

Railway

Railway is among the core elements related to the Latvian maritime cluster. Latvian Railway (LDz) concern is one of the biggest companies in the country, employing more than 11 600 people and being the biggest payer of social and resident income taxes to the state budget. Within the Baltic States, Latvia is among the leaders in the amount of rail freights operated. State Joint Stock Company LDz increased its portfolio by 10 million tons and reached 59,4 figure in 2011 (Latvian Railway 2012). LDz is the largest social tax payer in Latvia and in 2011 was also ranked the third most valuable company in the country, which shows the recognition of its international competitiveness in the transport sector. In 2011, freight operations in Latvia reached 20% increase compared to the same period in the previous year, while there is no increase in rail passenger sector – with 25 500 passengers carried by rail last year. The tendency of increase in the sector is quite moderate in other CER countries as well. Due to economic crisis and other circumstances, many neighbouring countries experienced a decline in the freight operation sector. Latvia did not experience a significant decline in the rail sector, even during the hardest years of economic crises. Therefore it was easier to recover and strengthen the rail freight operation sector.

Liquid cargo

Ventspils Nafta Group is one of the largest groups of companies in Latvia and essential maritime cluster field player. The core companies of the group are the crude oil and petroleum products terminal Ventspils nafta termināls Ltd, which is the largest in the Baltics; the largest Latvian-Russian joint venture in the Baltic States LatRosTrans Ltd, which provides transportation of petroleum products by the main diesel pipeline and which also owns the main pipeline for transport of crude oil; as well as the joint stock company Latvijas kuģniecība, which owns one of the largest global fleets in the medium size and handy tanker segment. The group's parent company JSC Ventspils nafta manages investments in all the companies of the group and provides management services. The key task of the parent company is to promote continuous development of the group of companies, to ensure growth in value of each individual company, and thereby increase the group's joint value. Strek Ltd, which specialises in processing, screening, crushing and magnetic cleaning of coal, is presently the largest stevedoring company in the Port of Riga and Latvia in general, and also the largest coal handling and storage terminal in the Baltic States.

5.7 PORTS AND PORT OPERATORS

The maritime cluster and its core elements, ports and railway, play an important role in the national economy. Latvia has for long established itself as a transit country (mainly for Russia, Central Asia, and Belarus) and its ports handle more than 65 million tons of cargo per year. The main ports are Riga and Ventspils (and to a lesser extent Liepāja). Overall, logistics activities account for 13% of the GDP (and were relatively resilient during the 2008–2009 crisis). There are 10 commercial ports in the Republic of Latvia. The sector is very diverse. It ranges from major all-purpose ports (such as Riga, Ventspils and Liepāja); fish and fish processing ports (such as Salacgrīva); specialised timber and

timber products ports (such as Skulte) to smaller ports catering tourists and providing maritime yacht services (such as Lielupe and others).

The size and role of each port is influenced by many factors. The physical attributes are important, in particular the size and nautical accessibility, as ship sizes continue to increase particularly on the long distance routes, limiting their manoeuvrability. Location is also a major driver, with regard to both major shipping lanes and inland transport networks (road and rail) for freight and the destination in the case of passengers. Whether the port is close to a major industrial or urban area on land, an industry that relies heavily on imports of bulk raw materials or export markets, fish stocks also play a part. For smaller ports focused on recreation (Lielupe, Engure, other), proximity to attractive coastline, flora or fauna, or a heritage site is also influential. History and developments in the wider economy also shape each port.

The sector is governed by the 1994 Law on Ports (and subsequent amendments and complementary laws such as the 2000 Freeport of Riga Law, the 1997 Freeport of Ventspils Law, etc.). Port Authorities are established as public entities, which enter into contractual agreements with private operators for land use, development of activities and in some cases general (common) services. For each port, the Port Authority is supervised by eight board members (four representatives from the municipality and four representatives from the government). National Ports Council, consisting of representatives of the State, the ports and the concerned Municipal Councils, oversees sector policies at the national level.

The ownership and governance structures of ports are varied. Major port authorities, such as Ventspils and Riga, manage the port in accordance with the procedures stipulated by the “Law on Ports”, the “Freeport of Riga Law” (Freeport of Riga Law 2012) and “Freeport of Ventspils Law” (Freeport of Ventspils Law 2012) and other regulatory enactments as a legal body governed by public and private law. Common hydro-technical constructions, piers, stream-regulating structures, breakwaters, embankments, berths, waterways, navigation equipment and tools within boundaries of the port are in the possession of the Freeport’s Authority (Freeport of Riga Regulations 2006). Berths may also be the property of other legal and natural persons. Pursuant to the procedures stipulated by the “Law on Ports”, “Freeport of Riga Law”, and “Freeport of Ventspils Law”, Freeport Authority has the right to use the land, owned by natural and legal persons in the territory of the port, for the needs of the port.

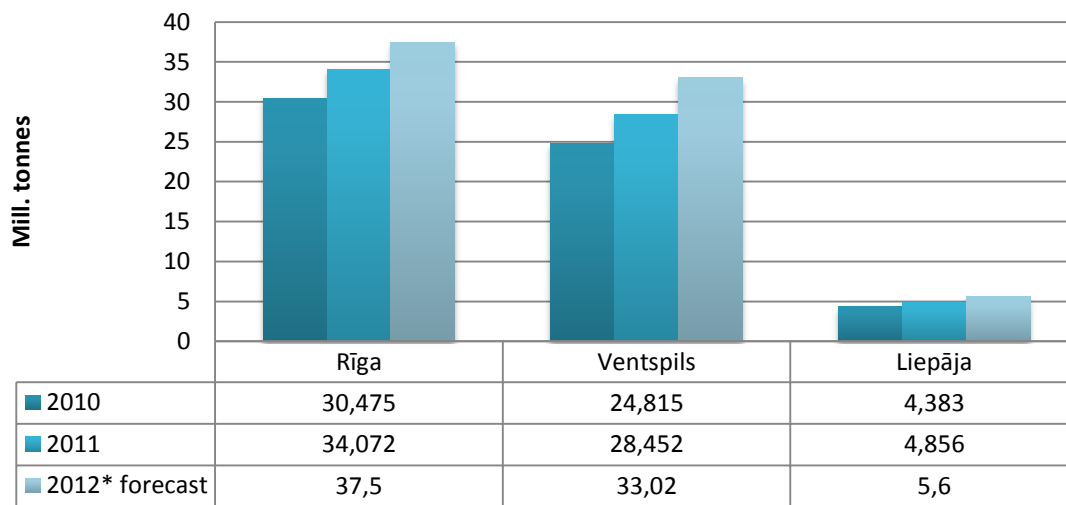
Competitive situation

One of the key elements of the Latvian maritime industry’s competitiveness is the railway accessibility and the well-developed port infrastructure in Riga and Ventspils which are ranked amongst the leading ports in the Baltic (Freeport of Riga 2012; Freeport of Ventspils 2012). The economic importance of the maritime cluster in Latvia is significant. Moreover, it has considerable presence in the surrounding economic framework, since its activities benefit business and employment in other industrial and service companies, in that they produce an indispensable multiplier effect for third companies.

The Ports of Ventspils and Riga are land-lord type ports which do not handle any cargo themselves but only own and develop port infrastructure. They offer the infrastructure to the different operators for handling cargo and providing service for passengers.

Port competitiveness is considerable in Latvia, due to the fact that it is almost impossible to substitute a port with any other mode of transport due to the location of the country and its role within the relevant transportation chains. The bulk of the cargo entering Latvia comes from Russia (mostly oil products, fuels and coal) and is transported through the country to other ports in Europe (mostly in the UK, Sweden and the Netherlands).

Figure 7 Cargo turnover in the ports of Latvia



Source: National statistics centre of Latvia and author's forecast.

The income of ports from the transit of products is comprised of the fees accruing from terminals and the port dues accruing from ships. Ports and stevedores provide services in the logistic chain of transporting products from Russia and other CIS countries to the West. Four main logistic links in the chain are identified: the railway, the terminals, the ports, and the ships. Although terminals and ships buy services from the ports, in the end the services of all four units in the logistic chain are actually indirectly or directly bought by the owners of the cargo transported from Russia or other CIS countries to the western countries. In terms of cargo and business volume, Latvia exceeds its neighbouring countries by almost twice the size, due to several key distinctive advantages. One of them is that the owners of the cargo decide from whom to buy the above mentioned services directly, which means that the use of different retailers has decreased and port significance increased. Although the cargo owners make their choices within various transit chains based on different criteria, they are mostly guided by the price. The cargo owner calculates the overall price of suitable transit chains by adding up the prices for using single units in the chains. Overall, maritime cluster in Latvia has gained strength within the last years and terminal productivity has increased dramatically as cargo turnover has skyrocketed. Meanwhile, new terminal development plans are still in process, thus corresponding to the fact that port capacity allows further growth with only marginal investments in a pipeline.

Main challenges and opportunities for the industry's development

Over the last decade, we have seen a transformation in the role of internationally traded services in Latvia and have also seen growth in demand for international maritime services. Latvia has many of the key attractions for the maritime industry such as low taxation (Freeport regime in ports of Riga and Ventspils, and special economic zone status of Liepaja) (Liepaja Special Economic Zone 2012a; 2012b), English and Russian speaking population, skilled workforce, stable taxation policy and political environment, well-developed infrastructure, and integrated transport planning policies across the sector, particularly between the maritime cluster and the freight logistics sectors. However, according to industry field research, Latvia lacks three essential elements in which further development directions are inevitable:

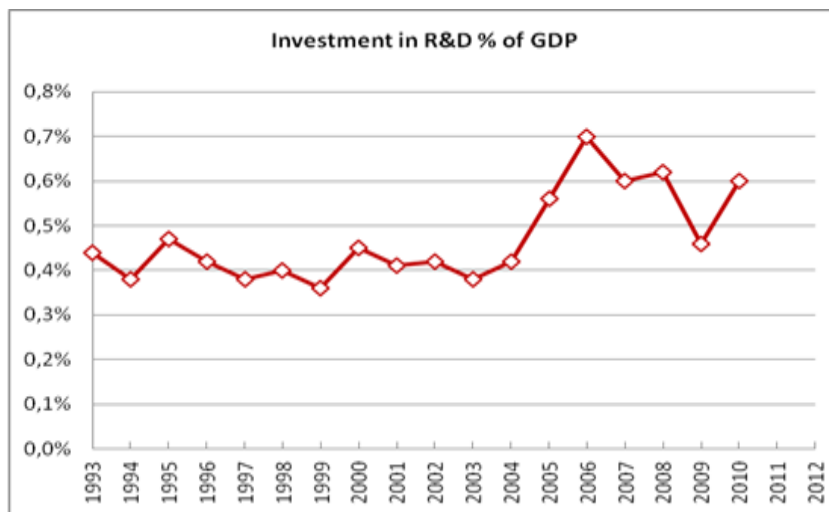
- A strong track record in maritime finance and financial solutions. Banks are not focused or specialised on financing maritime services and lack know-how of the sector. Thus, getting financing for maritime development projects is time-consuming, which causes a need for a fundamental platform for development of special government backed financial programmes.
- Internationally recognised maritime research and development centre to facilitate further growth with a specific focus on the value added activities and clustering initiatives. The export profile is expected to continue its change to more high-value knowledge-based products, yet there is little research or economic profiling to indicate the impacts these changes will have on the sector and national economy.
- The drive to reduce logistics costs throughout the supply chain continues to exert pressure to integrate transport modes including the use of satellite-based technologies for seamless route, traffic planning, RFID tags, 3pl-4pl logistic services, dry inland ports and logistic parks. Latvia lacks innovation and capacity in this area.

Further development plans and overall strategic development planning are essential for involved partners, such as Freeports and Latvian railway concern, in order to facilitate growth and positive impact on the national economy through value added activities. We have narrowed down the main challenges discovered in this research to four elements which shall affect directly or indirectly the future development of the maritime cluster in Latvia:

1. education and labour;
2. innovation and knowledge networks;
3. specialization;
4. internationalization and competitiveness.

These four main challenges are interdependent; each challenge cannot be met successfully without investing in the other three. Innovation and the labour market strengthen each other as innovation is the product of both knowledge and skills.

Figure 8 Investment in R&D % of GDP

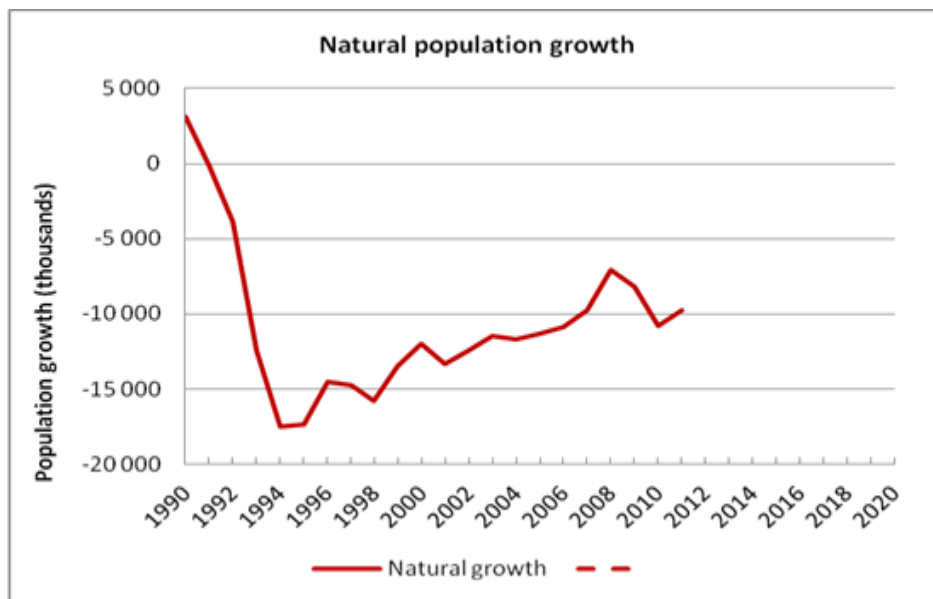


Source: National statistics centre of Latvia.

Likewise, international control functions cannot be pursued successfully unless both the innovative climate and the local labour market are able to attract and support such (foreign) investments. Furthermore, specialization and the creation of internationally competitive niches cannot be accomplished without the ample availability of international connections, highly-educated and highly-skilled labour and sources of cooperative R&D. Research and development and investments in education and labour are one of the few elements which contribute to further growth of the maritime sector. Within the last few years, in Latvia this sector has received less direct investments from government, corresponding to an overall decline in the economy after the global crisis. Now there are signs of progress and good will to reassess the macroeconomic figures and to achieve 1,5% investments in research and development of the total gross domestic product by 2020. Meanwhile, research and development within the maritime and logistics sector is one of key pillars to achieve further growth and it is essential to address the issue of value-added activities within ports and the railway corridor.

To meet the future challenges of the Latvian maritime cluster, all four challenges need to be addressed simultaneously. Interestingly, although leaders of industry acknowledge the role of the government as a facilitator, they place most of the responsibility for meeting these challenges on themselves. Some of the main challenges the industry members have addressed are the local mismatch in demand and supply of labour, due to the ageing workforce and the lack of skilled and young professionals entering maritime industry, which could lead to an increase in international personnel or moving part of the business activities abroad. Overall, the ageing problem is not only an essential topic for Latvia and its parliament but for the whole EU and its policy as well, and particularly for maritime cluster hubs such as the Netherlands and Belgium that are facing similar issues. Although the level of employment in the maritime cluster has only been marginally hit by the economic crisis, industry top managers show concerns in our interviews about the inflow of new talent on the local labour market. The growth of the local labour market and growth of natural population do not seem to be enough to sustain growth ambitions, or even to ensure replacement of retired employees in the years to come.

Figure 9 Natural population growth



Source: National statistics centre of Latvia.

Today, in the Baltic States the population growth and demography problems are addressed at the highest political level. Speaking of maritime industry, in most sectors, over half of the vacancies are hard to fill, with nautical engineering and welding professionals on top. Ageing is a particularly important challenge for the Latvian maritime cluster, as the cluster's labour market age is well above the Latvian national average. Ageing in the (maritime) transport sector in Latvia is increasingly pressing; the percentage of people above 55 years old in the labour force has increased dramatically and is forecasted to increase even further. The mismatch between labour demand and labour supply has led to a war for talent, and it is likely to intensify as the maritime economy grows in the coming years.

Gross domestic product per capita in Latvia is the lowest within the Baltic States. However, the last two years have shown growth patterns and positive potential for years to come which corresponds also to other statistical data – the flow of highly skilled professionals abroad has decreased and the situation reversing as people are moving back to Latvia. The main reason for this is that economy has now been well balanced and turned from consumption and real estate bubbled economy to export of manufactured goods and services.

The local mismatch between labour demand and supply has a few important effects on the maritime cluster:

- Maritime companies seek their personnel increasingly outside of the cluster. The internationalization of the maritime labour market and the influx of international labour into the maritime cluster are likely to increase in the future. This development contributes to an increased diversity in the Latvia maritime cluster.

- Companies tend to pull in skilled workforce from CIS countries to fulfil growing business needs and expand business further in Latvia, which politically is evaluated as a positive knowledge spill over effect trend.
- Some companies have decided to invest (FDI) in neighbouring countries or move part of activities out of the Latvian maritime cluster to more attractive labour market regions, particularly to CIS countries, and by doing so, they apply the strategy of having headquarters in Latvia but having the physical work actually done elsewhere (e.g. Belarus, Ukraine, Russia).

5.8 INTEREST GROUPS AND ASSOCIATIONS

The Latvian maritime cluster unites several interest groups and associations with the obvious mission to add value to the sector's general development in Latvia, the Baltic States and CIS countries, and to protect the interests of the cluster employers and employees. The association of Latvian large ports (Riga, Ventspils and Liepaja) backs interests of previously named ports at a national level, namely by working daily with policy measures, government, the parliament and public institutions such as environmental agencies and NGO's, and by defending the interests of ports internationally and regionally. The performance of Latvian ports and the maritime cluster presents great growth potential. Performance has been considerable with great assets such as well-developed infrastructure and nautical access (in the case of Ventspils and Riga), which could be turned into decisive competitive advantages. Recent legal improvements have removed obstacles and brought port governance in line with European practices, but it is clearly too early to see its full effect. In all likelihood, this will translate into a more positive perception of port clients as well as to greater efficiency and competitiveness. Ports are operating in a competitive environment, contending with ports such as Klaipeda and Tallinn that have managed to capture parts of the Russian cargo flows. The port authorities have become more proactive and commercial but are falling behind of some of the largest Baltic Sea ports, such as Stockholm, in this respect. An essential element for improving the maritime cluster performance is increased regional co-ordination between ports and ports associations – this is where the interest groups and associations play a key role and are essential for further sector development.

The Association of smaller ports in Latvia protects the interests of 7 regionally located seaports and inland ports (Lielupe) based on river beds. In many places worldwide, a tendency toward port regionalisation has made the design of the supply chain critical. It includes the alignment of different seaports, inland ports, multimodal platforms and logistics centres. Thus, associations and NGO's such as logistics association, transit associations and railway associations are present in Latvia and in most cases work directly with the corresponding ministry (Ministry of Transport and Communication), government, Saeima and NGOs to protect business interests. There are common interests and complementarities, because the different ports and transport sector members have different functions and different specialisations. However, in addition to co-operation, regional co-ordination is called for. Synergies can result from closer co-ordination between ports and other economic actors in the Baltic region, for example with respect to value added logistics, energy and the car industry.

Apart from the previously mentioned maritime associations there are several other important interest groups. These are Latvian Transit Business Association (LATDEA 2012), Baltic Association – Transit & Logistics (BATL 2012), National goods expeditors association (LAFF 2012), Latvijas Auto hauling association (LAUTO 2012), Latvian National shipping brokerage association (Port of Liepaja 2012), Latvian logistics association (LLA 2012), Latvian transport association for education and development, and Latvian stevedores association (LATAIA 2012). These associations mostly work in the field of promoting trade or business interests of their sector. Because most of the trade in Latvia is East–West oriented, it is rather obvious that most of the associations work for promoting trade in the CIS region. In addition to the employer’s associations, particularly in the maritime sector, the trade unions have been traditionally strong in Latvia. After the collapse of the USSR, the strongest trade unions were the state sector employees. However, the maritime sector has two of the strongest trade unions – The Seafarer’s Union of the Merchant Fleet and Water Transports Union Federation – which are the Latvian Free Trade Union Association members and among the largest by the number of members in Latvia (LBAS 2012). The maritime associations in Latvia have not been particularly transparent, and while the smaller trade associations work openly, the two most influential big and small ports associations have not yet reached the traditional standards of transparency as accustomed in the EU. International cooperation with the Baltic Sea partners would probably be of help here.

The maritime cluster in Latvia is deeply embedded in the regional economy. This is a great opportunity for the regions of Daugavpils, Jelgava, Liepaja, Ventspils and the capital Riga. In contrast to most other port cities in Western Europe, the flows of goods in Latvia are disconnected from high value-added activities – goods pass through the territory of Latvia but advanced maritime services and research are concentrated in Stockholm and Helsinki. However, signs of improvement may be seen in the ports of Ventspils and Riga. This makes regional co-operation and coordination even more important.

SUMMARY: THE PROSPECTS OF THE LATVIAN MARITIME CLUSTER

SHIPBUILDING INDUSTRY

- Challenges: ageing labour and its migration to other developed EU countries; efficient work and business efficiency; regional competitors; cooperation and cross-sector coordination.
- Opportunities: value added services and new market strategic development; cooperation with neighbouring countries to secure further growth and market capita; R&D and innovation opportunities; use of IT; further cost cutting policy.

OFFSHORE INDUSTRY

- Challenges: absence of the industry; low knowledge and R&D; lack of skilled offshore industry labour.
- Opportunities: development of offshore business supply elements such as rigs, tugboats, supply vessels, and barges; exploration of resources onshore such as gas and oil (namely Kurzeme, as oil been discovered there); offshore Baltic Sea bed exploration.

SHIPPING COMPANIES

- Challenges: dialogue between industry and EU policy makers; market segmentation; lack of capital and FDI.
- Opportunities: business development in line with global standards and attraction of direct investments to secure further growth and range of portfolio.

SUPPLIERS OF MARINE INDUSTRY

- Challenges: lack of R&D and innovation; lack of capital and FDI; migration; IT and after sales services.
- Opportunities: cost of workforce and top management; no language barriers with Russia and other CIS countries; geographical location; well-developed ports and local infrastructure; railway accessibility (1520mm); joint cooperation with other companies.

OTHER RELATED BUSINESS

- Challenges: regional railway capacity development (1520mm); further cost cutting.
- Opportunities: cross-cooperation and coordination with Russia, Ukraine and other CIS countries; FDI; R&D; RailBaltica; LNG terminal in Riga.

PORTS AND PORT OPERATORS

- Challenges: market segmentation; lack of well-developed container terminal or world known terminal operators; few ferry lines; talent flow to other EU countries; ageing of existing labour; railway capacity; Riga port capacity.
- Opportunities: master development plans in ports of Riga, Ventspils and Liepaja; efficiency of transit cargo capacity; terminal productivity; increase of total share in cargo turnover within fields of liquid cargo and cargo with value added services; non-military goods and military cargo for NATO purposes; direct investments in railway capacity and multimodal logistics parks; RailBaltica; TransChina–Riga–Hamburg railway shuttle train; R&D; development of high degree research institution with specific focus on transport and maritime topics.

6 THE SWEDISH MARITIME CLUSTER

By Jenni Junnelius and Annemari Andréén

6.1 OVERVIEW

Sweden is the only Nordic country that has closed down almost all shipyard activity, which has gradually lead to an overall decrease in the maritime industry. Sweden has gone from being a global player in the 1950's to controlling less than 1% of the world fleet. The decline took place in two phases; the first was from mid-1970 to mid-1980 and the second from late 1990 to today. In between there was a temporary recovery due to the favourable market conditions causing reconstruction of part of the business, but around the year 2000 many businesses were again lost or sold abroad. The decline is attributed to a poor market strategy; false interpretation of the market and bad timing, leading to overinvesting in the tanker segment, as well as poor policy by the government, causing Sweden to lose competitiveness against other nations (Poulsen et. al 2011).

6.2 SHIPBUILDING INDUSTRY

Swedish shipbuilding industry once belonged to the biggest in world. The industry grew significantly after the Second World War, reaching its peak in 1974–1975 when 39 000 people were employed in the industry (Wihlborg 2006). However, it faced its biggest crisis in the late 1970's as a consequence of the global oil crisis. Oil prices reached high levels, the international trade experienced a downturn, and the demand for shipping services decreased in combination with the fact that there was an overcapacity of especially heavy tankers which was the speciality of shipbuilders in Sweden. As a result, the shipping industry grew unprofitable and it led to a significant decrease of orders which hit Sweden exceptionally hard.

The action of the Swedish state in order to try to save the industry was to establish the company Svenska Varv AB in 1977. This company acquired the big shipyards, but they were soon thereafter forced to close down one by one. Due to the financial challenges, it turned into a governmental process of eliminating the Swedish shipbuilding industry. In 1981 the Öresundsvarvet was closed down and 1800 people lost their jobs. When the state support was stopped in 1985 also the well-known yard Uddevalla had to be closed down. At that point the shipyards had been subsidised for 34 billion SEK during 10 years. Sweden is the only Nordic country that has completely shut down the shipbuilding industry and today the Swedish shipbuilding is mostly a cultural and historical heritage. (SGU 2007)

The only still functioning bigger shipbuilding company is the ThyssenKrupp-owned Kockums. Kockums is focused on building submarines and naval surface ships, specialised in naval and stealth technology. (Kockums 2012) Another actor with a long history is the yard Götaverket Cityvarvet AB, where operations were restarted in 1993. Since then, the amount of 70 employees has doubled and in 2000 it was acquired by the Dutch company Damen Shipyards Group. With the specialisation in repair work and the location in Gothenburg, the biggest port in Scandinavia, the Götaverket Cityvarvet AB has reached a stable position on the market. (Damen Shiprepair Götaverken 2012) Damen Shipyard group acquired another Swedish company in May 2012, the repair and

maintenance yard Oskarshamnsvarvet, which has operated since 1863 (Damen 2012). Beside of these companies, a number of smaller shipyard companies are operating in Sweden, focusing mainly on repair work.

The association for Swedish yards has 25 members which in total employ 1200 people and have a total turnover of 1 300 million SEK (2010) (Föreningen Sveriges Varv 2012). There are, in other words, still some actors present and active, but they are single yard companies here and there. There is no longer a considerable shipbuilding industry in Sweden and no sign that this will change in the near future. The Swedish presence in the marine industry in terms of shipbuilding is not significant in a larger perspective.

6.3 SHIPPING COMPANIES

In the shipping industry there were approximately 1500 companies and 15 000 people employed in 2010 (Sjöfartsföretag 2012). The size of the Swedish commercial fleet has decreased during the past years and shipping companies are still moving abroad to countries nearby and in the Baltic Sea region, mainly due to taxation reasons. The taxation of Swedish shipping is not considered competitive compared to neighbouring countries and even though there have been discussions and pressure on Swedish authorities to switch to a yearly tonnage tax like in most EU countries, so far no changes have been made. During the past five years the tonnage has halved, from 240 ships to 120 and since 2008, 5000 jobs have been lost (SvD 2012a). Common segments of Swedish shipping operations include ro-ro, ferries and tankers.

The main Swedish shipping companies are the Stena-sphere, Walleniusrederierna and Rederi AB Transatlantic. The Stena-sphere group is the biggest family owned company in Sweden with operations globally in different market sectors. Within the marine sector, areas of operations are ferries, shipping and offshore drilling. The Stena Line Company consists of 19 ferry lines, 35 ships and 4 ports with operations mainly in Scandinavia. The ferries are commercial, passenger and combi-ferries with a total of 6000 people employed. The drilling operations are carried out all around the world seas and the company is one of the foremost, independent drilling companies in the world. Four drill ships belong to the fleet and the focus is mainly on construction and technical development. Also within the shipping area the operations are various and numerous, consisting of a fleet of tanker ships, ro-ro and ro-pax ships, ship management, shipbuilding, marine technology and LNG development. All the operations of the Stena group make it a serious and diversified actor on the global marine market. (Stena Sfären 2012)

The Wallenius shipping company owns and operates a fleet of 135 ships of which 35 are Wallenius-owned, and offers both international transport and logistics services. Other operations included in the Wallenius group are development of ships ensuring a modern fleet consisting of technically advanced and environmentally friendly ships. (Wallenius Lines & Wallenius Marine 2012)

Also the company Transatlantic is a considerable actor in the shipping industry in Sweden. Transatlantic is present in two main areas, with the companies Industrial shipping specialised in transportation and Viking Supply Ships with focus on offshore activities in harsh weather conditions and ice breaking. The company operates 50–60 ships, employs 850 people in total and had a turnover of some 3 000 million SEK in 2011. (TransAtlantic 2012)

6.4 SUPPLIERS OF MARINE INDUSTRY

The suppliers of the Swedish marine industry represent industrial, technology, engineering and design companies, as well as stevedoring and port operating companies. There is some specialisation within the offshore industry, since some of the bigger shipping companies, such as the already mentioned Stena Sphere and Viking Supply Ships, are present in this sector, as well as supplier companies operating with various aspects of the sector. In addition, the steel industry has an extensive history in Sweden and several companies established hundreds of years ago are still operating today.

Many of the offshore companies are big, international enterprises with operations in several countries around the globe, however, the location of their offices are mostly in the Nordic and Northern European countries. Also some smaller niche companies are found on the market. Operations of the offshore supplier companies include everything from transportation services to manufacturing of specific equipment, with a common factor of providing products or services especially developed and suitable for the demanding conditions in the offshore environment.

GVA is a design and engineering company focusing on projects within offshore in terms of producing semi-submersibles and other floating units. It has experience from over 100 projects in 20 different countries and has gathered the offshore and marine engineering expertise with the help over 100 engineers. The company provides both turnkey solutions for new buildings and phase specific services for parts of a project. (GVA 2012)

Svenska Petroleum Exploration AB is specialised in finding new oil and gas sources mostly in the Baltic Sea, Norway and West Africa. Their focus has been on offshore exploration but now also onshore exploration is developed in the company. (Svenska Petroleum Exploration AB 2012)

The Northern Offshore Services is specialised in applied vessel services in terms of transportation of people and equipment and stand by vessels for all kinds of offshore projects that are executed in different kinds of seas. Included in the fleet are 15 high-speed, multipurpose vessels to meet the requirements of the customers at all times. (Northern Offshore Services 2012)

Transatlantic's subsidiary Viking Supply Ship is also operating within the offshore and offshore ice breaking sector providing high quality vessels for harsh weather conditions. The 14 vessels included in the fleet are constructed to meet demanding arctic conditions. The headquarters is located in Denmark but one of their four other offices is located in Sweden. (Viking Supply Ships 2012)

Ramnäs is an example of a niche company with a long history, being established already in the 16th century, supplying high quality anchors and chains for offshore use. The chain production and development started already in 1876, modern production of chains started in Ramnäs in 1940s. (Ramnäs Bruk 2012)

Bassoe technology is an example of a newer company established in 2007 with a business focus on designing and supervising constructions of advanced floating offshore units and providing engineering services. However, its competence is based on the shipyard Götaverken Arenda which from the late 1970s mostly focused on the offshore industry, designing, constructing and delivering 14 semi-submersibles from its shipyard based in Gothenburg. (Bassoe Technology 2012)

Trelleborg is an engineering group with marine solutions as one of their product group, but the company is also a supplier for other sectors such as agriculture, automotive, aerospace and construction. The headquarters is located in Sweden and the company has over 15 000 employees in 40 countries. (Trelleborg 2012)

Moreover, there are some raw material producers and industrial manufacturers present on the Swedish market, both domestic and international companies exporting outside of Sweden and supplying the marine industry and shipping sector. Outokumpu has four production sites in Sweden, where stainless tubular products are produced. (Outokumpu 2012)

Another global actor present in Sweden is Wärtsilä providing various services and products for the marine industry including ship design, engines, generating sets, reduction gears, propulsion equipment, automation and power distribution systems, as well as sealing solutions and unique offshore applications. In 2011 also Wärtsilä acquired a Swedish company, Cedervall, which was a leading manufacturer of shaft seal and bearing systems for the marine industry. The company's headquarters is in Gothenburg and it has subsidiaries in Spain, China and Singapore, with manufacturing facilities in Sweden, China and Spain. (Wärtsilä Sweden 2012; Cedervall 2012)

Kohlswa Gjuteri is another company with an extensive history, operating in the steel sector since the 16th century and starting with steel casting in 1885. (Kohlswa Gjuteri 2012) Quite a few of the smaller Swedish suppliers have been acquired by bigger international companies entering the Swedish market and operating globally. Another example is Hägglunds devices specialised in direct drive system, which is part of the Bosch Rexroth since 2011. However, for now the brand has remained and the production stayed in Sweden in Mellansel. (Rexroth Bosch Group 2012)

SF Marina System AB is specialized in producing their own designed, floating concrete pontoon marina systems originating from the 1920's, as well as other kinds of floating pontoons for specific needs. (SF Marina System 2012) Cargotec facilitates cargo flows and port logistics as a supplier of cranes, lifting and transportation solutions to be used in the marine transportation sector, in ports and on vessels. (Cargotec Sweden 2012) Tillberg design is a company supplying the shipbuilding industry as it is focused on marine interior design and architecture. The company has operated for over 50 years and executed some 130 projects ranging from luxury ships to cruise vessels. Most of the customer companies are foreign but also some Swedish customers are on their reference list. (Tillberg Design 2012)

Nilsson Shipping is a main supplier in the shipping sector supplying a wide variety of products including everything from marine engines, shaft seals and ship cables to steel products, electronic switchgear and monitoring systems. The company is partly a distributor of products and partly has own production. The business also includes service operations. Their customers include a wide variety of companies in the marine industry such as shipping, shipbuilding and offshore companies. (Nilsson Shipping 2012)

Not only is Gothenburg the biggest port in the Nordic countries but the city is also a marine cluster providing a favourable environment for various shipping related companies to operate in. Even though the industrial shipping industry in Sweden is marginal, there are actors of a supplier character taking into account the whole marine industry, some of which are successfully doing

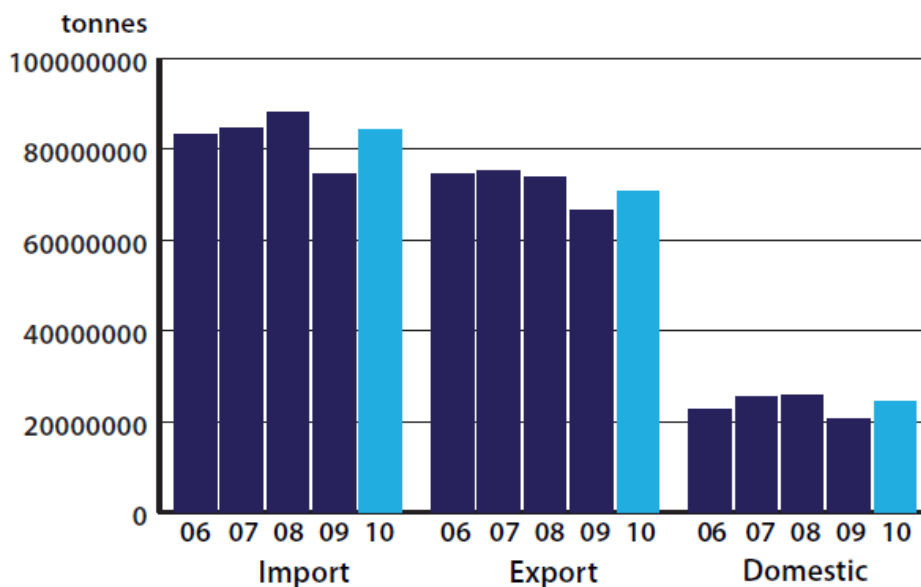
business not only in Sweden but worldwide. The offshore segment is in focus in the Swedish marine industry as both offshore operations performing companies and suppliers for these are represented. Many of the companies present on the Swedish market are big international actors that have acquired smaller Swedish companies. There are still some Swedish companies present on the marine supplier market, both old companies with an extensive history and newer ones.

6.5 PORTS

There are some 50 ports through which almost all the sea based goods traffic to and from Sweden is passing. They are mostly municipally owned but operated by port and stevedoring companies. (Sjöfartsverket 2012) The ports are competing with each other and foreign ports. According to statistics in 2010, there were 218 port companies operating in Sweden with a total of 1800 employees (Sjöfartsföretag (2012). Some problems within the port segment can be identified due to conflicting interests between employers and employees described more in detail in the next chapter. The Swedish port association has 60 member companies with a total of 4000 employees (Sveriges Hamnar 2012). Around 90% of the Swedish export and import is transported through the ports (Port of Gotenburgh 2012).

In 2010, a total of 180 million tons of cargo passed the Swedish ports out of which 84 million tons were international imports, 71 million tons international exports and 25 million tons domestic traffic (Holma et al. 2011). The total number of vessels entering Swedish ports was 85 700 in 2011. The five biggest ports, i.e Gothenburg, Brofjorden, Trelleborg, Helsingborg and Karlshamn, handled around half of the total amount of goods. Almost 27 million people passed Swedish ports when travelling on international ferry routes. (Statistiska Centralbyrån 2011)

Figure 10 Imports, exports and domestic traffic in the Swedish ports 2006–2010



Source: Holma et al. 2011, 150.

Figure 11 **The biggest ports according to the amount of goods handled in the port (in thousand tons)**



Source: Statistiska Centralbyrån 2011, 12.

Out of the goods passing the ports floating bulk was biggest in amount as 62 million tons were handled. The second biggest group of goods handled was dry bulk, 32 million tons. Containers counted for 14 million tons and ro-ro units (including trucks, trailers, semi-trailers and railway wagons) for 46 million tons. Other goods counted for 23 million tons. (Statistiska Centralbyrån 2011)

6.6 OTHER ACTORS AND COOPERATION IN THE SWEDISH MARINE INDUSTRY

There are a number of non-profit organisations and associations working to improve the marine industry and/or parts of it. These include worker associations, authorities, research institutes and environmental initiatives among others. Some of them are established already in the 19th century, whereas others have been initiated along with new challenges the industry is facing, such as environmental aspects or due to general structural changes in the industry. In Sweden, like in Finland, it is the Transportation Ministry that regulates the marine industry.

SWEBOAT, the Swedish Marine Industries Federation, is the trade organisation representing the Swedish marine industry and the overall organisation for a number of smaller associations guarding more specific sectors of the whole industry. It is a member of **The International Council of Marine Industry Associations – ICOMIA**, the international trade association representing the global marine industry since 1967. SWEBOAT has around 400 member companies. The members include associations such as Swedish Wholesalers and Importers, Swedish Marine Engine Manufacturers, Swedish Marina Equipment Manufacturers and Swedish Boating Industries. (ICOMIA 2012; Sweboat - Båtbranschens riksförbund 2012)

To improve the Swedish marine industry **The Institute of Shipping Analysis** was established in 1993 in order for shipping companies to outsource their in-house shipping analysis. It is a non-profit organization owned by its members from all parts of the shipping industry. The association produces statistics and analysis of different aspects in various parts of the industry. The research of the institute focuses on strategic issues, business environmental scanning and implementation of that in the various businesses. Market analysis reports, market indicators reports, forecast reports, reports on the new building market and early opportunities and warnings reports based on the situation in other industries are examples of materials produced. Only members of the institute have access to the reports and material produced by the institute. (The Institute of Shipping Analysis 2012)

The challenges regarding the upcoming emission restrictions are the same for Sweden as for all other SECA countries. Some single companies such as Wallenius have taken initiatives, made plans of their own and are already taking action in order to be prepared (Wallenius Lines & Wallenius Marine 2012). These solutions have been outlined in a cooperative project started in 2009. In order to prepare for the challenges imposed by the upcoming restrictions, **the Swedish Shipowners' Association** and **the Association for Swedish Ports** are cooperating in a project called "the Baltic Sea Position – Zero system co-operations!" The Swedish Shipowners Association (SSA) was the first in Europe to in 2009 support the EU vision of an emission free shipping industry, wanting to be a front figure regarding the environmental responsibility of the Baltic Sea. The result was **the Baltic Sea Position 1** (Östersjöpositionen 1) including the following three areas: contribution to a safer shipping, contribution to less water pollution and contribution to less air emissions. This was presented to politicians in 2009 and led to the insight that different actors in the marine industry need to come together to discuss in order to lead to long term and sustainable impact on the environment. (Sveriges Redareförening 2012)

The commitment of the SSA was to bring together different stakeholders including people from the ports, shipping customers, policymakers and ship owners. The project that developed from this had

the purpose of presenting existing solutions and underlining that co-operation is the only way, and the goal was to create a common understanding of a joint system approach in this matter. The result was the Zero Vision, a concrete model with facts on the different environmental issues and concrete existing solutions, found on a website launched in February 2010 (Baltic Sea Position 2012). Companies with existing solutions are clearly listed but the content of their environmentally friendly solutions is not in all cases very clear and concrete. The website is very illustrative and informative but it lacks the financial discussion of the existing solutions. It also lacks the engine alternatives, the fuel alternatives and the scrubber discussion. The next steps are stated but there is no information on how the process is proceeding. According to the Ports of Stockholm, a stakeholder in the project, the website is just a first step when looking at the zero goals in a larger perspective.

An attempt to bring together the still existing and potential new shipping actors is the association **Svenskt Marintekniskt Forum (SMTF)** established in 2007. Its main objective lies in the efforts to in various ways boost the maritime industry and function as a mediator between the industry and decision makers. The goal is to create a platform for the network of active actors, in order to strengthen the whole industry and together handle future challenges. Developing new and environmentally friendly marine products through cooperation with companies, universities and the state, and stimulating recruiting are examples of activities of the SMTF. The members mainly consist of actors within the sector of commercial shipping or private boating. (Svenskt Marintekniskt Forum 2012)

Regarding the port sector, there was a conflict in September 2012 between the Swedish ports' employers and employees, due to conflicting interests and differing views on the current situation on port work and workers (SvD 2012b). The result was a new contract the parties agreed on. **The Swedish ports (Sveriges hamnar)** is an association for the employees in the port sector guarding their interests. The association has around 60 member companies with totally 4000 employees. It also provides support for member companies within the overall transport sector. (Sveriges Hamnar 2012) The employer side has two different corresponding associations guarding their interests towards the employee side. **The Portworkers' Association (Svenska Hamnarbetarförbundet)** is one of the associations (Svenska Hamnarbetarförbundet 2012). The other one is the **Transportation Workers Association (Transportarbetareförbundet)** which nowadays includes all kinds of transportation branches but which originally was established specifically for port workers in 1897. Nearly all port workers in Sweden are members of the associations. (Transportarbetarförbundet 2012)

Operating in a totally different way in favor of the industry is **the Swedish Club**, established in 1872. This is also a non-profit organization, more specifically a mutual insurer whose members are international shipowners. The headquarters are located in Gothenburg but they also have offices in some other important ports in the world. (The Swedish Club 2012)

SUMMARY: THE PROSPECTS OF THE SWEDISH MARITIME CLUSTER

SHIPBUILDING INDUSTRY

- After the crisis in the 1970's the industry was gradually eliminated as it no longer was competitive on the global market.

OFFSHORE INDUSTRY

- Challenges: for the bigger companies, to maintain and strengthen their position on the international market; for the smaller companies or niche companies, to gain market share and become stronger players.
- Opportunities: the variety of businesses, from engineering and drilling to transport and design services; several companies specialized specifically in offshore operations or services and competitive also on the international market.

SHIPPING COMPANIES

- Challenges: unfavourable taxation compared to neighboring countries which has led to the decrease of the commercial fleet; the market mainly consists of a few main actors, big international companies present in a wide variety of marine operations.
- Opportunities: for the big international companies there are opportunities on the global shipping market; smaller actors need more beneficial taxation in order to be able to compete with foreign actors.

SUPPLIERS OF MARINE INDUSTRY

- Challenges: international companies entering the market and acquiring smaller Swedish companies that are not globally competitive themselves.
- Opportunities: many offshore suppliers on the market due to the viability of the offshore segment; several smaller specialized, niche companies.

PORTS AND PORT OPERATORS

- Challenges: out of 50 ports 5 ports handle half of all the goods passing through the ports; competition between small ports and port operating companies; recent conflicts between port workers and their employers.
- Opportunities: large material flows as around 90% of Swedish trade is passing through the ports; the central Sweden is a major port cluster with Gothenburg as the biggest port.

7 SYNTHESIS AND CONCLUSIONS ON THE MARITIME CLUSTERS' OUTLOOK IN THE CENTRAL BALTIC REGION

7.1 KEY COMPETENCES OF EACH CLUSTER

The Central Baltic region maritime clusters have several factors in common but there are also country-specific strengths. Regarding Estonia, tourism, transport and logistics are important elements of the maritime cluster as the majority of foreign trade as well as international traveling are seaborne. The Tallink Group dominates the shipping business, particularly regarding passenger traffic but provides also ro-ro cargo services. Transit trade, particularly from and to Russia, is important for Estonia and its ports. The majority of goods handled in Estonian ports are petroleum products which are transported from East to West through Estonia. In the shipbuilding sector ship repair and maintenance is well developed and the Baltic Ship Repair Company (BLRT) dominates the industry even throughout the Baltic States. Fishing industry is also well-developed in Estonia.

In Finland, the shipbuilding competence is extensive and shipbuilding is one of the most important sectors of the country's maritime cluster. Shipbuilding, together with a wide network of related and supporting industries specialized particularly in the needs of the Finnish maritime industry, can be said to form a cluster of its own. Finland is also an important player in the offshore sector – there is a demand for excellent quality as well as special niche know-how and technology, for instance related to the Arctic conditions. As around 85 per cent of the Finnish foreign trade is seaborne, shipping industry and ports are an important part of the Finnish maritime cluster. In addition, Russian transshipments are of great significance for Finnish ports, of which they are also competing with ports in the Baltic States.

In Latvia, transports and logistics play an important role in national economy and ports are an important element of the country's logistic cluster, as well as the maritime cluster. The competitiveness of ports is largely affected by railway and road accessibility, port infrastructure and various services offered in the vicinity of the ports. Transshipments from Russia and other CIS countries constitute the majority of the cargo transported through Latvian ports. Latvia's shipbuilding industry is mainly specialized in ship repair activities. There is also a wide and competitive network of suppliers of marine industry, whose products range from ship hulls and machinery to ship design, interior and various electronic devices.

Swedish shipbuilding sector went through a structural change some decades ago. As a consequence, all large shipyards were shut down and currently there are only a number of small shipyards operating in Sweden, specializing mainly on repair work. However, there is still a wide and competitive network of various suppliers of marine industry which represent industrial, technology, engineering and design companies with a particular specialization in offshore and steel industries. In addition, building of pleasure boats has developed into an important field of operations of the Swedish maritime cluster.

7.2 MAIN CHALLENGES AND OPPORTUNITIES FOR THE DEVELOPMENT OF THE CENTRAL BALTIC REGION MARITIME CLUSTERS

Maritime clusters of the Central Baltic region are still separate and often compete with each other. However, in the future they should find ways to combine their strengths in order to increase the competitiveness of the region's maritime sector. The clusters are still small in a global scale and are facing common challenges which could be better answered with coordinated solutions. The maritime clusters are connected with the common sea which sets a special business environment for them. Ships and shipping companies operating in the area have to take into account the special requirements set by the sensitivity of the shallow but densely run Baltic Sea. The risk of accidents, such as oil catastrophes, concerns all coastal states, and boosts the investments in technologies and processes aimed at increasing the safety of navigation. The legal framework for vessel traffic in the Baltic Sea is also tightening, the sulphur emission regulations giving the most recent example. The maritime clusters in the Central Baltic region have to make remarkable investments in finding and implementing new solutions to meet the regulations. Although challenging, the tightening environmental regulations could turn into an opportunity as well, making CBR countries forerunners in environmental-friendly technologies.

The clusters are facing other common challenges as well. The rising cost levels threaten the profitability of the maritime industry and the global competition is tightening as particularly Asian clusters are competing with lower production costs. Availability of qualified workforce is also a common problem in the maritime sector, both due to aging population and shifting of experts to other industries. This challenge has to be met by guaranteeing the sufficiency and quality of education and creating an appealing image for the maritime sector. Common branding and communication activities could improve the image of the maritime sector and increase awareness of its importance for the CBR countries.

Instead of prices, the Central Baltic region maritime clusters could compete with quality and specialization. The main opportunity lies in investing in R&D and innovation activities related, for instance, to cleantech, other advanced technological solutions and functionality. The CBR countries have special expertise concerning for instance IT solutions, design and engineering which could be taken into advantage in the maritime sector even more. However, keeping up with the pace of technological development requires maintaining the sufficient financial and scientific resources for innovation activities.

Although CBR maritime companies clearly form national clusters in which various actors are integrated and mutually dependent, the existence of the cluster is not always taken sufficiently advantage of even at a national level. Thus, to speak about a common cluster for the Central Baltic region is slightly misleading, as there is still room to increase the cooperation between the clusters in the different countries and even between the various actors within each cluster. The main common feature of the Central Baltic clusters is the proximity to Russia and as a consequence, the high degree of exports and imports and transit traffic is taking place to and from Russia. As the material flows to and from Russia show a steady increase, this will benefit the whole cluster. However, Russia is investing heavily in developing its own port and land infrastructure with the aim of taking larger control over the transports. The consequences of this have already been witnessed

in terms of reduced amount of transit cargo for some material flows. On the other hand, investments in port infrastructures and the overall increase in material flows is hoped to secure the future traffic through the Baltic ports as well.

7.3 WHAT KIND OF ACTIONS SHOULD BE TAKEN?

The situation at hand is challenging, in that profitability is low for many companies, the market is scattered and there is fierce competition from other countries both near and far. Therefore the current trend is managing costs, not revenues. The environmental regulations that have been brought up in this report push for a change, but few actors have done anything about it yet. The only way to stay competitive in the long term is to invest in innovative solutions that bring added value to the end customer. This goes for shipyards, shipowners, ports and suppliers. Developing the optimal logistical solutions demands a higher degree of cooperation between the actors in the respective clusters as the whole value chain is needed to formulate them. Today many industrial companies are doing this work themselves as they have not found a service provider who can offer a competitive enough solution to them.

The shipowners and their customers need to increase their collaboration and start planning joint logistics solutions in order to optimize the usage of the harbours and vessels. This may lead to a concentration of certain material flows to certain harbours even to a higher degree than today, and as a consequence, the number of harbours may well be reduced in the future. Moreover, shipowners need to review their offering to their customers in order to secure that they are more attractive than competitors. Current fleets need to be reviewed and renewed, which means getting rid of old tonnage and making sure that the rest meets the new demands regarding environment and fuel efficiency. This means retrofits, conversions and newbuildings which again provide business opportunities for the shipyards in the region, such as the BLRT group. The shipyards and suppliers need to consider the life-cycle aspects more already at the design stage and offer these services as part of their portfolio.

In order to create new ship designs that ensure competitiveness in the future, joint R&D is needed which could bring shipowners, end customers, shipyards and designers to the same table. As the Baltic Sea belongs to the so called SECA, we are the first to implement the lower sulphur requirements. This provides us with the opportunity to come up with a good solution which can then be exported to other regions that follow the requirements five years later. Innovative fuel solutions, taking into account the ecosystem, need to be developed. In addition to fuel efficiency, ship designs optimizing the usage of space and cargo handling solutions, which minimize damages and the time needed for loading and discharging, should be developed.

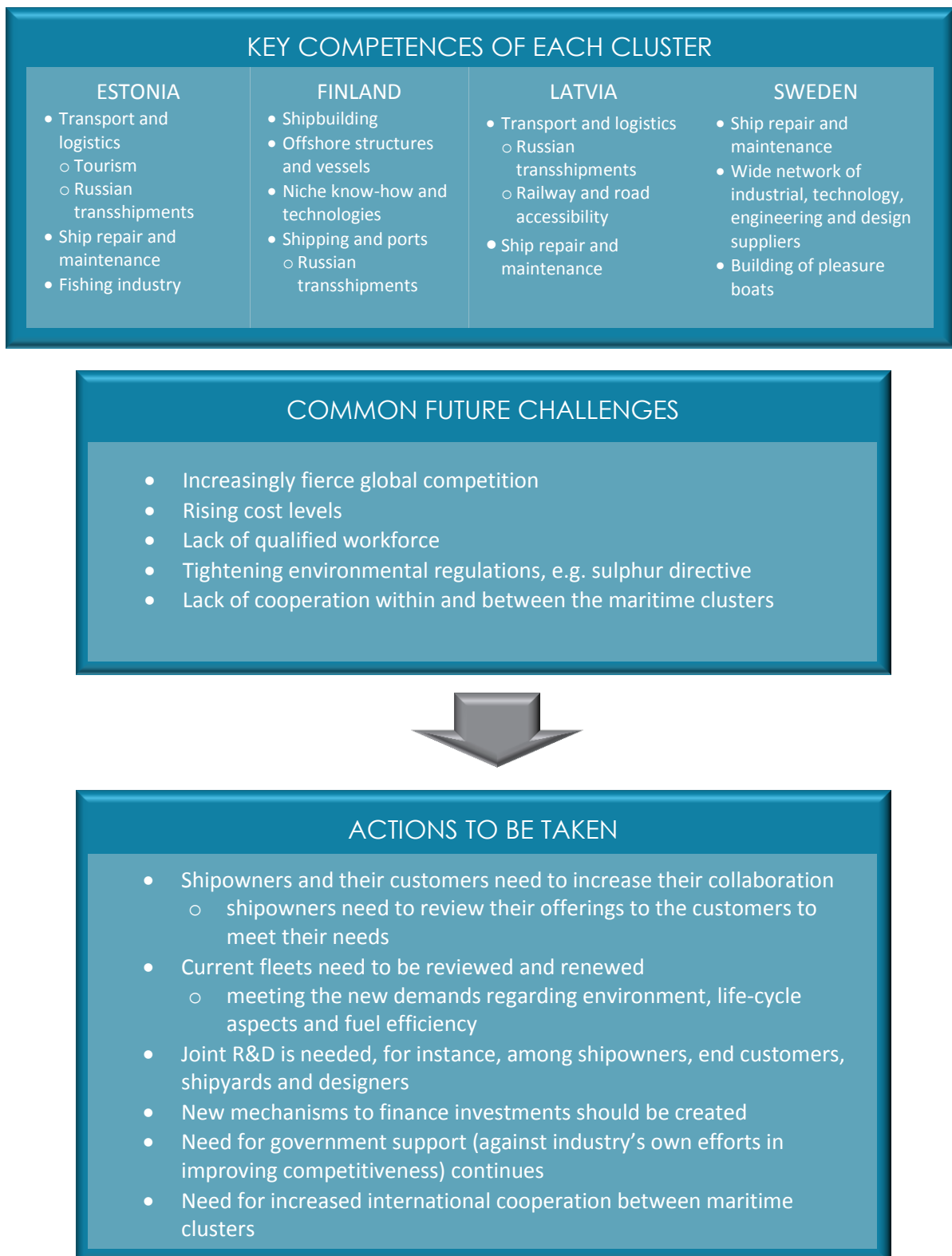
In order to secure financing for the needed investments, new funding mechanisms should be created. Traditional bank financing is harder to come by than before because some major ship financing banks have pulled out of the business due to poor profitability. In addition to banks, shipping funds are needed, and the right models for them have to be created.

The role of the governments should not be forgotten. The shipbuilding and shipping industries have been supported by the local governments in different ways, such as subsidies in the form of tax exemptions or receiving so called innovation support. In the future as well, the maritime cluster will

need the support of the government, but this support should not be provided automatically. Rather it should be connected to the industry's own efforts in improving its competitiveness and demonstrating initiative to develop innovative solutions to the benefit of the entire cluster and region or country.

Indeed, a higher degree of collaboration is needed both within as well as between the clusters. Facilitating the networking among companies and combining their resources could increase their competitiveness and improve their chances to penetrate international markets – for instance Russia in the close neighbourhood could offer business opportunities for the CBR maritime companies. Furthermore, free flow of ideas within the clusters can support the innovation development and common challenges often require coordinated solutions. Viewing each other less as competitors and more as cooperative partners could benefit the maritime clusters and joining their forces could bring competitive advantages for the whole Central Baltic region.

Figure 12 **Synthesis and conclusions on the Central Baltic region maritime clusters**



8 REFERENCES

- Aker Arctic Technology (2012a) Aker Arctic to participate in the Design of the Canadian Coast Guard's new Polar Icebreaker. Aker Arctic Technology Inc, press release 5.2.2012.
- Aker Arctic Technology (2012b) Aker Arctic to Design the First Chinese Polar Research Icebreaker. Aker Arctic Technology Inc, press release 31.7.2012.
- AKT (2012) Auto- ja Kuljetusalan Työntekijäliitto AKT ry. <www.akt.fi>, retrieved 20.9.2012.
- Álvarez, I. – Marin, R. – Fonría, A. (2009) The role of networking in the competitiveness of firms. *Technological Forecasting & Social Change*, 79, 410–421.
- Andrésen et al. (2009) Paketti kuntoon ja maailmalle. Varsinais-Suomen meriteollisuusyritysten kansainvälistyminen. Meriklusteriohjelman selvitys 2009.
- Andrésen, A. – Koshelev, A. (2012) Present state analysis. Phase 1 report in research project "Future of shipping in Finland 2015 and beyond", financed by Varustamosäätö (Finnish Shipping fund) 2012.
- Arctech (2011) Arctech Helsinki Shipyardille jäätämurtavan innovatiivisen monitoimipelastusaluksen tilaus Venäjän liikenneministeriöltä. Arctech Helsinki Shipyard, press release 8.12.2011.
- Arctech (2012) Arctech Helsinki Shipyard luovuttaa arktisen offshore-aluksen neljä kuukautta etuajassa. Arctech Helsinki Shipyard, press release 15.8.2012.
- AS BLRT Grupp (2012) <<http://www.bsr.ee>>, retrieved on 29.10.2012.
- AS Tallink Grupp (2012) AS Tallink Grupp Yearbook 2010/2011. <<http://www.tallink.com>>, retrived on 30.10.2012.
- AS Tallinna Sadam (2012) Consolidated Annual Report for the Year Ended on 31 December 2011. <<http://www.portoftallinn.com/annual-rpeorts.pdf>>, retrieved on 30.10.2012.
- Aswega AS (2012) <<http://www.aswega.ee>>, retrieved on 30.10.2012.
- Backman-Trummer (2012) <http://www.backman-trummer.fi/In_English/Home>, retrieved on 20.9.2012.
- Baltic Sea Position (2012) <<http://balticseaposition.com/main.swf>>, retrieved 8.11.2012.
- Baltic Workboats AS (2012) <<http://www.balticworkboats.ee>>, retrieved on 30.10.2012.
- Bassoe Technology (2012) <<http://www.basstech.se/web/>>, retrieved 5.11.2012.
- Bathelt, H. – Malmberg, A. – Maskell, P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography*. Vol. 28, Issue 1, 31–56.
- Bathelt, H. (2008) Knowledge-based clusters: regional multiplier models and the role of 'buzz' and 'pipelines'. In: Handbook of Research on Cluster Theory, 78–92. Ed. by Charlie Karlsson. Edward Elgar Publishing Limited: Cheltenham.
- BATL (21012) <<http://www.batl.eu/>>, retrieved 10.12.1012.
- Benito, G. R. G. – Berger, E. – de la Forest, M. – Shum, J. (2003) *International Journal of Transport Management*, 1, 203–215.
- BPO (2012) Baltic Ports Organisation. <<http://www.bpoports.com>>, retrieved 20.9.2012.
- Cargotec Sweden (2012) <http://www.forkliftaction.com/cards/cargotec_274/default.aspx>, retrieved 7.11.2012.
- Cedervall (2012) <<http://www.cedervall.com/>>, retrieved 6.11.2012.
- Chiaroni, D. – Chiesa, V. (2006) Forms of creation of industrial clusters in biotechnology. *Technovation*, 26, 1064–1076.
- CMI (2012) Comité Maritime International. <www.comitemaritime.org>, retrieved 17.9.2012.

- Damen (2012) Damen Shipyard Acquires Swedish Shiprepair Yard Oskarshamnsvarvet. *Damen News*, 25.5.2012. <<http://www.damen.nl/en/news/2012/05/oskarshamnsvarvet>>, retrieved 1.11.2012.
- Damen Shiprepair Götaverken (2012) <<http://www.damen.nl/companies/damen-shiprepair-gotaverken>>, retrieved 1.11.2012.
- Dekoil AS (2012) <<http://www.dekoil.ee>>, retrieved on 30.10.2012.
- Dicro Eesti OÜ (2012) <<http://www.dicro.fi>>, retrieved on 30.10.2012.
- Doloreux, D. – Shearmur, R. (2009) Maritime clusters in diverse regional contexts: The case of Canada. *Marine Policy*, 33, 520–527.
- Eesti Laevajuhtide Liit (2012) Association of Estonian Deck Officers. <<http://www.laevajuhid.ee>>, retrieved on 10.10.2012.
- Eesti Laevamehaanikute Liit (2012) Association of Estonian Ship Engineers. <<http://www.elml.ee>>, retrieved on 10.10.2012.
- Eesti Logistika ja Ekspedeerimise Assotsiatsioon (2012) Estonian Logistics and Freight Forwarding Association, ELFA. <<http://www.elea.ee>>, retrieved on 10.10.2012.
- Eesti Meremeeste Sõltumatu Ametiühing (2012) Independent Trade Union for Estonian Seamen. <<http://www.emsa.ee>>, retrieved on 10.10.2012.
- Eesti Sadamate Liit (2012) Estonian Ports Associations <<http://www.estonianports.com>>, retrieved on 10.10.2012.
- EK (2012a) Rikkidirektiivistä kohtuuttomat kustannukset Suomelle – haittoja lievennettävä kaikin keinoin. <http://www.ek.fi/ek/fi/ajankohtaista/rikkidirektiivista_kohtuuttomat_kustannukset_suomelle_haittoja_lievennettava_kaikin_keinoin-9251>, retrieved 20.9.2012.
- EK (2012b) Toimitusjohtaja Mikko Pukkinen: Rikkidirektiivi on Suomelle täysin mahdoton. <http://www.ek.fi/ek/fi/ajankohtaista/toimitusjohtaja_mikko_pukkinen_rikkidirektiivi_on_suomelle_taysin_mahdoton-9254>, retrieved 20.9.2012.
- Enerpoint Saare OÜ (2012) <<http://www.enerpoint.fi/yhteustiedot.html>>, retrieved on 30.10.2012.
- Enterprise Estonia (2012) <<http://www.eas.ee/en/for-the-entrepreneur/cluster-development-programme.aspx>>, retrieved on 15.11.2012.
- Fagerström, H. (2012) The traffic within the Baltics is developing rapidly. Can the current fleet manage the challenges or is there a need for structural change? Presentation at Baltic Ports Conference, 6.9.2012, Turku, Finland.
- FEPORT (2012) The Federation of European Private Port Operators. <www.feport.be>, retrieved 17.9.2012.
- FINLEX (2011) Laki uusiutuvilla energialähteillä tuotetun sähkön tuotantotuesta. <<http://www.finlex.fi/fi/laki/ajantasa/2010/20101396>>, retrieved 19.9.2012.
- Finnish Transport Agency (2012) Satamien ulkomaan tavaraliikenne, 2009–2011. <http://portal.liikennevirasto.fi/portal/page/portal/f/liikennevirasto/tilastot/liikennemaarat/ulkomaan_meriliikenne/mlt_ta_satamittain.htm>, retrieved on 20.9.2012.
- Fonecta (2012) Kohdistamiskone B2B. Fonecta Oy.
- Freeport of Riga (2012) <www.rop.lv/en>, retrieved 10.12.2012.
- Freeport of Riga Law (2012) <www.likumi.lv/doc.php?id=3435>, retrieved 10.12.2012.
- Freeport of Riga Regulations (2006) Valid from April 6, 2006. Republic of Latvia, Riga City Council, Binding Regulations, No. 42 of 07.03.2006.
- Freeport of Ventspils (2012) <<http://www.portofventspils.lv/en/>>, retrieved 10.12.2012.
- Freeport of Ventspils Law (2012) <www.likumi.lv/doc.php?id=41737>, retrieved 10.12.2012.

- FSA (2012) The Finnish Shipbrokers' Association. <www.shipbrokers.fi>, retrieved on 20.9.2012.
- Föreningen Sveriges Varv (2012) <<http://www.sverigesvarv.se/>>, retrieved 10.12.2012.
- Gorschelnik, C. (2012) A recorded interview at the Pan-European Institute, Turku School of Economics at the University of Turku on the 27th of August in 2012.
- GVA (2012) <<http://www.gvac.se/>>, retrieved 5.11.2012.
- HELCOM (2012) Helsinki Commission. <www.helcom.fi>, retrieved 20.9.2012.
- Helsingin Sanomat (2010) Ahtaajien lakko hiljensi useita satamia. *Helsingin Sanomat*, 2.2.2010. <<http://www.hs.fi/politiikka/artikkeli/Ahtaajien+lakko+hiljensi+useita+satamia/1135252564276>>, retrieved 17.9.2012.
- Helsingin Sanomat (2012) Cargotec vie Marinen Singaporen pörssiin. *Helsingin Sanomat*, 18.9.2012. <<http://www.hs.fi/paivanlehti/#talous/Cargotec+vie+Marinen+Singaporen+p%C3%B6rssiin/a1347852537754>>, retrieved 19.9.2012.
- Hernesniemi, H. (2012) Mernekulun tomintaedellytykset, kilpailukyky ja julkisen talouden sopeuttamistoimet. Taustaselvitys valtionvarainministeriölle. Elinkeinoelämän tutkimuslaitos, Discussion paper No 1270.
- Holma, E. – Heikkilä, A. – Helminen, R. – Kajander, S. (2011) Baltic Port list 2011. University of Turku, Centre for Maritime Studies, available at <<http://www.balticportlist.com/>>.
- ICOMIA (2012) International Council of Marine Industry Associations. <<http://www.icomia.com/members/Default.aspx?CountryId=SE>>, retrieved 7.11.2012.
- IFCO (2012) IFCO – suomalaisen offshore-teollisuuden kehittämishanke. Offshore Technology Center. <<http://www.offshoretc.fi/ifco.htm>>, retrieved 19.9.2012.
- IMO (2004) International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM). <<http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-%28BWM%29.aspx>>, retrieved on 20.9.2012.
- IMO (2008) MARPOL 73/78 Convention, Revised Annex VI. <<http://www.imo.org/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Air%20pollution/Resolution%20MEPC.176%2858%29%20Revised%20MARPOL%20Annex%20VI.pdf>>, retrieved on 20.9.2012.
- IMO (2012) International Maritime Organisation. <www.imo.fi>, retrieved 17.9.2012.
- JSC (2012) JSC Latvian Shipping Company corporate profile. <<http://www.lk.lv/en/>>, retrieved 1.12.2012.
- Karvonen, T. – Vaiste, J. – Hernesniemi, H. (2008) Suomen meriklusteri 2008. Tekesin katsaus 226/2008. Helsinki: Libris Oy.
- Karvonen, T. (2012) A recorded interview at the Centre for Maritime Studies at the University of Turku on the 12th of September in 2012.
- Ketels, C. (2012) The impact of clusters and networks of firms on EU competitiveness. Final Report: Firm networks (May 2012), Studies in the Area of Competitiveness, WIFO. Specific Contract No 605748.
- Kockums(2012) <<http://www.kockums.se/en/>>, retrieved 2.11.2012.
- Kohlsua Gjuteri (2012) <<http://www.kohlsuagjuteri.se/>>, retrieved 6.11.2012.
- KOJA (2012) <www.koja.fi>, retrieved 10.12.2012.
- Känkänen, J. (2012) A recorded interview at the Ministry of Employment and the Economy in Helsinki on the 4th of October in 2012.
- LAFF (2012) <<http://www.laff.lv/>>, retrieved 10.12.2012.

- Lakhal, S. – Martel, A. – Oral, M. – Montreuil, B. (1999) Network companies and competitiveness: A framework analysis. *European Journal of Operational Research*, 118, 278–294.
- Lamminsivu, S. (2012) Suomen satamat muutosten kourissa. The Finnish Seamen's Union. <<http://www.smu.fi/viestinta/nettijutut/suomen-satamat-muutosten-kouriss/>>, retrieved 5.12.2012.
- LATAIA (2012) <<http://www.lataia.lv/lv/>>, retrieved 10.12.2012.
- LATDEA (2012) <<http://www.latdea.lv/members/20/>>, retrieved 10.12.2012.
- Latvian Railway (2012) Latvian Railway (LDz), Annual reports. <http://www.ldz.lv/?object_id=1926>, retrieved 10.12.2012.
- LAUTO (2012) <<http://www.lauto.lv/>>, retrieved 10.12.2012.
- LBAS (2012) <http://www.lbas.lv/members/water_transport_unions_federation>, retrieved 10.12.2012.
- Lend, E. – Eidast, A. – Segercrantz, W. – Uustalu, A-M. – Uriko, M. (2007, 2008) Eesti transiit ja logistika: tänapäeva ja tulevik, I, II, Tallinn.
- Liepaja Special Economic Zone (2012b) <<http://www.lsez.lv/>>, retrieved 10.12.2012.
- Liepaja Special Economic Zone (2012a) <<http://www.liepaja-sez.lv/>>, retrieved 10.12.2012.
- LLA (2012) <<http://www.lla.lv/>>, retrieved 10.12.2012.
- Logistika ja Transiidi Assotsiatsioon (2012) Estonian Logistics and Transit Association. <<http://www.transit.ee>>, retrieved on 10.10.2012.
- LOGY (2012) Suomen Osto- ja Logistiikkayhdistys LOGY ry. <www.logy.fi>, retrieved 17.9.2012.
- Lähteenmäki, P. (2012) Tässä on rikkidirektiivin häpeällinen tausta. *Talouselämä*, 9.11.2012. <<http://www.talouselama.fi/uutiset/tassa-on+rikkidirektiivin+hapeallinen+tausta/a2154556>>, retrieved 10.12.2012.
- Martin, R. – Sunley, P. (2003) Deconstructing clusters: chaotic concept or policy panacea? *Journal of Economic Geography*, 3, 5–35.
- McCann, P. (2008) Agglomeration economics. In: Handbook of Research on Cluster Theory, 23–38. Ed. by Charlie Karlsson. Edward Elgar Publishing Limited: Cheltenham.
- Meriäura (2012) <www.meriaura.fi>, retrieved 10.12.2012.
- Meriliitto (2012) <www.meriliitto.fi>, retrieved 17.9.2012.
- Merima (2012) Merima carried out interior outfitting of four top modern movie digital theaters at new Porvoo Art Factory. <<http://www.merima.fi/uutiset/merima-has-completed-interior-outfitting-project-porvoo-art-factory>>, retrieved 10.12.2012.
- Metsäteollisuus (2010) Ahtaajien lakko tekee tyhjäksi sahojen vuosien työn asiakassuhteiden luomiseksi. <<http://www.metsateollisuus.fi/Infokortit/lakkohaastattelu/Sivut/default.aspx>>, retrieved 17.9.2012.
- Ministry of Employment and the Economy (2012) Abrupt structural change areas and areas supported due to closure of garrisons. <<https://www.tem.fi/index.phtml?l=en&s=2158>>, retrieved on 29.11.2012.
- Mäntylä, J.-M. (2010a) Satamajätka haluaa herran diilin. *Talouselämä*, 4.3.2010. <<http://www.talouselama.fi/uutiset/satamajatka+haluaa+herran+diilin/a2080761>>, retrieved 17.9.2012.
- Mäntylä, J.-M. (2010b) Ahtaajat ovat unelmavastus. *Talouselämä*, 5.3.2010. <<http://www.talouselama.fi/uutiset/ahtaajat+ovat+unelmavastus/a2076675>>, retrieved 17.9.2012.

- National Board of Customs (2012a) Ulkomaankaupan kuljetukset 2011.
 <http://www.tulli.fi/fi/tiedotteet/ulkomaankauppatilastot/tilastot/kuljetukset/kuljetukset11/liitteet/2012_M07.pdf>, retrieved on 20.9.2012.
- National Board of Customs (2012b) Kuvioita ulkomaankaupasta v. 2011.
 <http://www.tulli.fi/fi/suomen_tulli/ulkomaankauppatilastot/grafiikkaa/liitteet/Kuviot_2011FI.pdf>, retrieved on 20.9.2012.
- National statistics centre of Latvia (2011.y., 2012.y.) <www.csp.gov.lv>, retrieved 10.12.2012.
- Nilsson Shipping (2012) <http://www.nilssonshipping.se/default.aspx?__cmLeftMenu=168>, retrieved 7.11.2012.
- Northern Offshore Services (2012) <<http://www.n-o-s.se/>>, retrieved 5.11.2012.
- Outokumpu (2012) <http://www.outokumpu.com/en/Products/tubular-products/production_sites/Pages/default.aspx>, retrieved 6.11.2012.
- Padmore, T. – Gibson, H. (1998) Modelling systems of innovation: II. A framework for industrial cluster analysis in regions. *Research Policy*, 26, 625–541.
- Porter, M. E. (1990) The Competitive Advantage of Nations. The Macmillan Press Ltd: London.
- Porter, M. E. (2000a) Locations, Clusters, and Company Strategy. In: The Oxford Handbook of Economic Geography, 253–274. Eds: G. L. Clark, M. P. Feldman and M. S. Gertler. Oxford University Press Inc: New York.
- Porter, M. E. (2000b) Location, Competition, and Economic Development: Local Clusters in a Global Economy. *Economic Development Quarterly*, Vol. 14, No. 1, 15–34.
- Porter, M. E. – Ketels, C. – Delgado, M. (2008) The Microeconomic Foundations of Prosperity: Findings from the Business Competitiveness Index. In: The Global Competitiveness Report 2007–2008, 51–81. World Economic Forum: Geneva.
- Port of Gotenburgh (2012) <<http://www.portofgothenburg.com/About-the-port/Volumes-and-freight-flow-/>>, retrieved 7.11.2012.
- Port of Liepaja (2012) <<http://www.portofliepaja.lv/lv/doc.php?id=243>>, RETRIEVED 10.12.2012.
- Port of Sillamäe (2011) <www.silport.ee>, retrieved 10.12.2012.
- Portsmouth, R. – Hunt, T. – Terk, E. – Nömmela, K. – Hartikainen, A. (2012) Estonian Maritime Cluster. Proceedings of Estonian Maritime Academy, No. 13.
- Poukka, L. (2010) Osaamisen ennakointi meriteollisuudessa. Ennakointipaja II 14.10.2010, Forum Marinum Turku. <<http://www.osaameri.fi/cms/images/stories/dokut/lp.pdf>>, retrieved 10.12.2012.
- Poulsen, R. – Sjögren, H. – Lennerfors, T. (2011) The Two Declines of Swedish Shipping. In: Global Shipping in Small Nations: Nordic Experiences after 1960. Eds: S. Tenold, M. Iversen, and E. Lange. Palgrave Macmillan.
- Prime Minister's Office (2012) 60 years after the war reparations.
 <http://vnk.fi/tiedostot/julkinen/pdf/2012/Sotakorvaus_EN.pdf>, retrieved on 29.11.2012.
- Purju, A. – Dedegkajeva, I. – Soosaar, R. (2003). The role and share of transit in Estonian economy. Studies in Industrial Engineering and Management, Lappeenranta University of Technology, 285–293.
- Rahvusvahelise Mereõiguse Eesti Assotsiatsioon (2012) Estonian International Maritime Law Association. <<http://www.imla.ee>>, retrieved on 10.10.2012.
- Ramnäs Bruk (2012) <<http://www.ramnas.com/>>, retrieved 5.11.2012.
- Raumainterior (2012) <www.raumainterior.fi/eng/ajankohtaista.html>, retrieved 10.12.2012.
- Rexroth Bosch Group (2012) <http://www.boschrexroth.com/business_units/dc_ia/subwebsites/haeggelunds/en/index.jsp>, retrieved 6.11.2012.

- Riiklik Arengukava (2009) Eesti merenduspoliitika 2011–2020 (Estonian Maritime Policy 2011–2020). Majandus- ja kommunikatsiooniministeerium, Tallinn.
- Rönty, J. – Nokkala, M. – Finnälä, K. (2011) Port ownership and governance models in Finland. Development needs & future challenges. VTT Working Papers 164.
<<http://www.vtt.fi/inf/pdf/workingpapers/2011/W164.pdf>>, retrieved on 20.9.2012.
- Satamaoperaattorit (2012) <www.satamaoperaattorit.fi>, retrieved 17.9.2012.
- Schröder Bech, M. (2012) Panel session “When will LNG be available as a fuel in the ports? – motivations and bottlenecks”. Baltic Ports Conference, 6.9.2012, Turku, Finland.
- SEAEurope (2012) Ships & Maritime Equipment Association. <www.seaeurope.eu>, retrieved 17.9.2012.
- SF Marina System (2012) <<http://www.sfmarina.com/>>, retrieved 7.11.2012.
- SGU (2007) Information från programmet Statligt förorenade områden. *Sveriges Geologiska Undersökning*, 13.4.2007. <http://www.sgu.se/dokument/miljo_fororenat/om-svensk-varvsindustri.pdf>, retrieved 9.11.2012.
- SHL (2012) Suomen Huolintaliikkeiden Liitto. <www.huolintaliitto.fi>, retrieved 17.9.2012.
- Sjöfartsföretag (2012) Trafikanalys. <<http://www.trafa.se/sv/Statistik/Sjofart/Sjofartsforetag/>>, retrieved 7.11.2012.
- Sjöfartsverket (2012) <<http://www.sjofartsverket.se/sv/Sjofartssektorn/Sjofart-hamnar/>>, retrieved 8.11.2012.
- SMU (2012) Suomen Merimies-Unioni SMU ry. <www.smu.fi>, retrieved 17.9.2012.
- SOT (2012) Suomen offshore-toimiala 2012. Prizztech Oy.
<<http://www.prizz.fi/asiakaskuvat/Meri/Finnish%20offshore%20industry%202012.pdf>>, retrieved 10.9.2012.
- Statistics Estonia (2012) <<http://www.stat.ee/en>>, retrieved 10.12.2012.
- Statistiska Centralbyrån (2011) Sjötrafik 2011. Trafikanalys 16.5.2011.
<http://trafa.se/PageDocuments/Sjoetrafik_2011.pdf>, retrieved 7.11.2012.
- Stena Sjöfart (2012) <<http://www.stena.com/sv/Sidor/default.aspx>>, retrieved 1.11.2012.
- Steveco (2012) <<http://www.steveco.fi/fi/>>, retrieved on 20.9.2012.
- STX Europe (2012) <www.stxeurope.com>, retrieved 10.12.2012.
- STX Finland Oy (2011) STX Finlandille merkittävä offshore alihankintatyö. STX Finland Oy, press release 12.10.2011.
- Suomen Satamaliitto (2012) <www.finnports.com>, retrieved 17.9.2012.
- Suomen Varustamot (2012) <www.shipowners.fi>, retrieved 17.9.2012.
- SvD (2012a) Handelsflottan halverad när rederierna flyr skattetrycket. *Svenska Dagbladet Näringsliv*, 13.9.2012. <http://www.svd.se/naringsliv/sveriges-handelsflotta-halverad_7495822.svd>, retrieved 1.11.2012.
- SvD (2012b) Konflikt på gång i Sveriges hamnar. *Svenska Dagbladet Näringsliv*, 25.9.2012.
<http://www.svd.se/naringsliv/konflikt-pa-gang-i-sveriges-hamnar_7527666.svd>, retrieved 8.11.2012.
- Sweboat - Båtbranschens riksförbund (2012) <<http://www.sweboat.se/>>, retrieved 8.11.2012.
- Svenska Hamnarbetarförbundet (2012) <<http://www.hamn.nu/>>, retrieved 8.11.2012.
- Svenska Petroleum Exploration AB (2012) <<http://www.spe.se/ds/export/spe/>>, retrieved 5.11.2012.
- Svenskt Marintekniskt Forum (2012) <<http://www.smtf.se/start.html>>, retrieved 2.11.2012.

- Sveriges Hamnar (2012) <<http://www.transportgruppen.se/ForbundContainer/Svenska-hamnar/Om-Sv-Hamnar/>>, retrieved 8.11.2012.
- Sveriges Redareförening (2012) <<http://www.sweship.se/>> , retrieved 8.11.2012.
- Taina, J. (2012) A recorded interview at the Pan-European Institute, Turku School of Economics at the University of Turku on the 12th of September in 2012.
- Technip (2012) <www.technip.com>, retrieved 10.12.2012.
- TEM (2012a) Ministry of Employment and the Economy in Finland. <www.tem.fi>, retrieved 10.12.2012.
- TEM (2012b) Uusiutuvan energian syöttötariffi. <<http://www.tem.fi/index.phtml?s=3256>>, retrieved 19.9.2012.
- The Institute of Shipping Analysis (2012) <<http://www.sai.se/>>, retrieved 8.11.2012.
- The Swedish Club (2012) <<http://www.swedishclub.com/>>, retrieved 8.11.2012.
- Tillberg Design (2012) <<http://www.tillbergdesign.com/>>, retrieved 7.11.2012.
- TransAtlantic (2012) <<http://www.rabt.se/en/>>, retrieved 1.11.2012.
- Transportarbetarförbundet (2012) <<http://www.transport.se/>>, retrieved 8.11.2012.
- Trelleborg (2012) <<http://www.trelleborg.com/en/>>, retrieved 6.11.2012.
- Tulli (2012) <www.tulli.fi>, retrieved 10.12.2012.
- Turku Repair Yard (2012) <www.turunkorjaustelakka.com>, retrieved 10.12.2012.
- Wallenius Lines & Wallenius Marine (2012) <<http://www.walleniuslines.com/>>, retrieved 1.11.2012.
- Vanaale, E. (2012) Trade and shipping in global scale – impact on the Baltic. Presentation at Baltic Ports Conference, 6.9.2012, Turku, Finland.
- Wihlborg, M. (2006) Employment trends in all sectors related to the sea or using sea resources: Country report – Sweden. *European Commission DG Fisheries and Maritime Affairs*, August 2006. ECOTEC Research & Consulting.
<http://ec.europa.eu/maritimeaffairs/documentation/studies/documents/sweden_employment_trends_en.pdf>, retrieved 5.11.2012.
- Wijnolst, N. – Jenssen, J.I. – Sodal, S. (2008) European maritime clusters. Agder University College, Faculty of Economics and Social Science and DUP Satellite, Delft University Press.
- Viking Supply Ships (2012) <<http://www.vikingsupply.com/>>, retrieved 5.11.2012.
- Wärtsilä (2012) <http://www.wartsila.com/en_EE/Home>, retrieved on 30.10.2012.
- Wärtsilä Sweden (2012) <http://www.wartsila.com/en_SE/Home>, retrieved 6.11.2012.
- YLE (2010) Ahtaajat marssivat ulos satamista – työnantajapuoli tyrmistyi. Yle Uutiset, 25.3.2010.
<http://yle.fi/uutiset/ahtaajat_marssivat_ulos_satamista_-_tyonantajapuoli_tyrmistyi/5690765>, retrieved 17.9.2012.
- YLE (2012) Viiden varustamon lastinkäsittely pysähtyi pariaksi tunniksi. Yle Uutiset, 4.9.2012.
<http://yle.fi/uutiset/viiden_varustamon_lastinkasittely_pysahdyi_pariaksi_tunniksi/6281531>, retrieved 17.9.2012.
- Yle Uutiset (2012) 23.9.2012 at 20:30, Yle TV1.



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