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ESTONIAN MARITIME CLUSTER

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1 Definition and Significance of Maritime Clusters

Economic clusters, their nature, and use are becoming a topical issue both at the state and local levels. Recently, the matters of interstate or the so-called cross-border clusters have become of interest. The effort to bring up and analyze a cluster or clusters related to maritime affairs is the logical expression of this trend. The attempt to describe Estonian maritime cluster in the current thesis is not the first in this field; the matter of maritime cluster has been dealt with also in Finland, Norway, the Netherlands, and at the European level. But the one and dominant theoretical approach to economic clusters has not been developed yet. There is quite a wide variety of approaches in cluster concepts and cluster analysis methods.

At the most general level, an economic cluster can be defined as a group of companies where the internal connections are stronger than the connections of this group with the external environment. At the same time, there is nothing much to be done with such an abstract definition. First of all, approaching clusters as geographically concentrated economic interrelated activities, we have to establish first which concentration level or territorial proximity we keep in mind. Here we can see some discrepancies between the publications concerning clusters at the state level and the publications dealing with regional development. Secondly, it is important to know what kind of connections we keep in mind – only technological (technological basis for the value chain development) and economic, or we also consider social relations, information exchange, etc. The possibilities to further develop the cluster depend on the nature of the connections, as different connections can be influenced by different measures, and this prospect to have an influence on connections is the main justification to the cluster-based approach to economy.

As companies and clusters in an economic area are interconnected, each and every positive development or investment in one sector may have an impact on many others, but this impact is not always necessarily a positive one. Therefore, it is important to establish the economic sectors and connections, the development of which has the most positive impact on the whole economic area. Cluster development is a means of bringing new investments into the region, creating new jobs, and increasing export volume. Apart from companies, also regions start competing with each other providing high-quality living and business environment. So, implementing detailed cluster politics helps to improve the competitive strength of the area and this, in its turn, has a positive impact on the cluster development.

Economic cluster is, therefore, not only a category to study the reality but also a means to change it. A cluster can be viewed as an economic political category, as an instrument of economic policy, the aim of which is to develop or promote connections between companies and secure some extra effects. The question is not only what the cluster is like but what it could be like. But everybody seems to agree that it is extremely difficult to create a well-functioning cluster merely through the efforts of the public sector. It is more likely to contribute to the developing and improving the cluster in different ways. Cluster development in itself is mostly self-regulative.

Therefore, it is also not very easy to raise a question about the input-analyses of the cluster policies, their content, sequence, amount, etc. The question is whether cluster analysis is necessary in order to establish the clusters and figure out if they exist in the objective reality or not - or we should presume that the clusters are created as a result of intentional actions

between people aimed at realizing certain ambitions. But perhaps the analysis should illustrate if it is possible to realize those ambitions and what are the better ways of doing it – which connections to research in the first case, which ones in the second, which methods work better in one case or another, etc.

2 Theoretical Cluster Approach

As mentioned above, most cluster concepts emphasize the geographical concentration of economic activities as an important feature of clusters, but concerning other cluster characteristics, especially dealing with in-cluster and inter-cluster connections, no common attitude has been developed.

To leave the space open for different approaches and aspects, the current research is based on the definition as general as possible: the clusters are viewed as geographically concentrated economic interconnected activities while the types of connections are not defined.

Gordon and McCann (2000) distinguish three conceptually different cluster models:

- **Classical agglomeration model** that is based on the presence of the local resource, demand, or other advantage present in the local business environment;
- **Neoclassical value chain model** based on the direct economic connections between the companies;
- **Post-industrial social network or the club model** based on social relations and the trust between the cluster members.

Acknowledged cluster theorists Porter and Ketels (2004) are also of the opinion that in order to make clusters succeed, agglomeration and linkage factors are of great importance: (i) proximity and critical mass that help to share common resources and (ii) interactions and linkages that promote cluster growth and allow setting the common cluster development goals.

In their cluster classification, Hofe and Chen (2006) also present an independent cluster model based on the competition terms and conditions. This model is mostly supported by the works of Michael Porter and it points out four factors influencing clusters' competitiveness: (i) factor conditions or the environmental resource advantages; (ii) demand conditions; (iii) related and support industry; (iv) the strategy, structure, and competitiveness of the companies. As Porter's approach based on the competition terms and conditions covers the aspects of agglomeration and value chain as well those of the network, in the current thesis we have decided to use Gordon and McCann cluster division as this outlines the so-called "pure" cluster concepts that - in one way or another - are considered and synthesized by the Porter's approach as well.

Hofe and Chen (2006) as well as Gordon and McCann (2000) agree that in reality we do not often see pure cluster models since local demand, local business relations and climate, and social relations are integrated in different ways and to a different extent. The reasons for cluster development, history and environments are different and in case of every single cluster the logic of in-cluster connections is unique. Thus, even in case it is possible to define a cluster using analytical methods, it is extremely difficult to define, analyze, consider, and influence all the cluster aspects, because evaluating social relations, the nature and strength of trust is complicated (Karlsson, 2007).

On the other hand, the detailed and precise cluster analysis is necessary for effective implementation of cluster policies, because the better we understand in-cluster connections the better we can influence those connections and the cluster development.

3 Cluster Identification Problems

At the general level, cluster analysis helps to divide data into different groups that have a meaning or that are important for achieving the objective of the analysis. The choice and analysis of the cluster is thus determined by the goal of the research – in order to achieve the goal, the model has to be as meaningful and optimal as possible.

The first challenge in cluster analysis is cluster identification and formulating its basic structure that could be used as the work hypothesis of the cluster analysis. The abundance of different cluster concepts and identification methods makes it difficult for cluster analysts to decide which concepts and methods to employ. As the result of the analysis, to some extent, also depends on the model and method of the analysis, the absence of one universal method and concept brings along certain scepticism towards implementing cluster policies in general (Hofe and Chen, 2006).

We can distinguish three types of identifiers indicating the existence of a cluster in an economic area:

- **Volume indicator** – high representation of one economic sector in one area indicates the existence of the agglomeration-type cluster.
- **Cooperation indicator** – the presence of professional associations and cluster initiatives in the area indicates the existence of the network-type cluster.
- **Resource indicator** – the presence of a common denominator in the area - e.g., natural resources, infrastructure, geographical location, or research and development activities in a certain area - indicates the existence of the value chain cluster developed around this resource.

We have to keep in mind that there are no indicators providing direct information about the main possible cluster characteristic – the intensity of business activities between the cluster companies. Therefore, we can use these indicators only as the basis of the analysis, as the starting point for cluster identification.

So, the choice of indicators to be used in search for clusters mainly depends on the objective of identifying the clusters. In case the objective is to perform economic analysis, it would be wise to sample cluster companies based on the volume indicator. But then again, although the cluster model constructed using the volume-indicator brings forth the agglomeration and makes it possible to establish the intensity of business activities between cluster companies, it does not necessarily give any information about cluster characteristics concerning cooperation, network functioning, and cause-and-effect relationships. Volume indication does not suit for establishing those clusters that are either in the process of emerging (new industries) or in the process of coming out of the decline and refocusing (old industries).

Cooperation indicator refers to the existing intercompany relations that are important in case the objective is to influence the economic environment through cluster development. Cooperation indicator may refer to the existence of such significant (including not necessarily strongly agglomerated and large-scale) economic clusters based on social relations that have development potential and that cannot be identified through statistical analysis. The draw-

back of clusters being revealed by cluster initiatives as compared to the clusters revealed by volume indicator is the dependence of cluster focus or the core on the interests of cluster companies that are not necessarily optimal on a wider scale. At the same time, the interests of companies are considered to be one of the critical factors in cluster development (Ketels 2004), because this enables more accurate investment planning for cluster development. As the absence of cluster initiatives and/or the absence of professional unions does not necessarily mean that there is no developing or existing cluster, the economic political argumentation and implementing policies supporting the development of cluster initiatives, is often the only way to identify clusters.

The resource-based approach which is used as the third indicator is the ordinary basis for economic political argumentations – the effective, value-adding, and sustainable use of natural and other environmental resources helps to improve the competitiveness of the regions and is therefore the focus of economic political measures. Resource-based indicator is used as the basis of the maritime cluster analysis in the current thesis as well – Estonian coastal location allows us to presume the existence of a maritime cluster in our economic space.

4 Cluster Analysis Methods

Not depending on whether the volume or cooperation indicators have been used in search for clusters, there is quite a wide arsenal of methods for more detailed analysis and specification of clusters. Generalizing, based on the publications on cluster analysis, it is possible to list the following more common methodological approaches to cluster analysis:

Statistical analyses help to assess cluster agglomerations and critical mass. The quality of the result can be influenced by data availability – as mentioned above, statistical data is often available assembled in the economic sectors and this does not enable detailed analysis. On the other hand, the absence of data can give us important information for cluster development, for example in case the main obstacle to sector development is the absence or weakness of a certain sub-cluster. This is why the statistical approach may not be enough for giving an idea of the necessary connections and development obstacles in cluster development and for listing the weakly agglomerated but important sub-clusters.

Economic transaction analyses enable to define value chains of the clusters and the formal economic relations and dependencies between sub-clusters. Input-output analysis can be used to assess if there is a need to substructure certain clusters – the narrower the definition of cluster and its sub-clusters is, the more accurate can the employed cluster policy be. The analyses of economic transactions do not allow the analyses of social relations or cause-and-effect analyses, but strong financial input-output connections between certain groups of companies can refer to strong inter-company relations that characterize the social network or club-type cluster.

Methodology of organizational diagnosis can be used to establish the informal connections and social relations of the clusters, to write development scenarios etc, and it can also be used in other cases where understanding the cause-and-effect connections is important for the research objective. Implementing methodology of organizational diagnostics is complicated by the fact that it requires social network mapping on the person-level. The drawback of qualitative research methods is also that they are time-consuming, and this is problematic especially in case of voluminous clusters. And finally, the absence of social network does not

necessarily mean the non-existence of a cluster or that there is no point in cluster development - for example in case of geographically agglomerated companies which do not have any contacts with each other but where the intercompany relations could give a remarkable competitive advantage.

We can also point out methods concentrating on **competition analysis** based on Porter's approach, including Porter's Diamond. These methods require employing all the above-mentioned analytical methods to a smaller or greater extent, and they also consider competition conditions and other environmental factors having a positive or negative impact on the cluster development. The competition analysis is effectively used in working out development strategies that can be implemented through social cluster networks and using political development methods.

5 Correlations between Cluster Modelling and Analysis

In the existing publications on clusters, we can find several attempts to identify methodology suitable for analyzing clusters of different types. American cluster researchers Hofe and Chen (2006) have associated methods of cluster analysis with cluster typology, but they do admit that since there are no universal clusters, there cannot be a universal analytical method, and they recommend using a combination of different methods. Their approach does not include social network model that the other cluster analysts Gordon and McCann (2000) have dealt with but they have not found an efficient method for analyzing social network clusters either. The area of behavioural sciences and organisational diagnostics provides several ways to analyze in-cluster relations, but their use in economic cluster analysis has not been very common so far (Ter Wal, Boschama, 2008).

Based on the above-mentioned conceptual approaches, the methods suitable for analyzing different cluster models are presented in Table 1.

Table 1. Suitability of methods for analyzing different types of clusters.

Cluster model	Agglomeration*	Value chain*	Social Network**
Main characteristic	Proximity Critical mass	Cooperation Economic transactions	Coherence Informal relations
Indicators	Volume indicator	Resource indicator	Cooperation indicator
Analytical approaches	Statistical agglomeration and specialization analyses	Input-output analyses of economic transactions	Network analyses and organisational diagnostics
Competitive strength	Scale effect, specializing	Economic involvement, environmental conditions	Intersectoral cooperation

Sources: * Hofe and Chen (2006)
** McCann and Shefer (2004)

Irrespective of the basis for establishing the initial cluster model, it is important to consider all the characteristic aspects and features of all three cluster types. For example, social network cluster does not necessarily have to possess strong cluster characteristics like economic involvement or sufficient critical mass and, on the contrary, the statistics may indicate strong sectoral agglomerations, but it does not necessarily refer to the existence of a large number of interrelated companies in the area.

6 Estonian Maritime Cluster Model

Developing maritime clusters and implementing integrated maritime politics is of the interests of the European Union mainly because of the important role of maritime transport and *offshore* services in the European economy, including Estonian economy. European Commission has defined the structure of European maritime cluster in its working document "Maritime Cluster" which establishes the basis for Estonian national maritime development plan and is also used in the current thesis.

Maritime cluster analysis is limited by data availability – in many areas (e.g., transport and logistics, maritime tourism, research development, and port building) it is impossible to separate the share of activities related to maritime affairs. Also, there is no maritime cluster initiative developed in Estonia that could establish the basis for maritime cluster analysis. Therefore, in this thesis we have used political interest as the basis of establishing the initial model of the maritime cluster: Estonian maritime cluster model presented in the Estonian maritime development plan has been used as the basis of constructing the model. Connections between sub-clusters are described as logical economic connections, and to characterize sub-clusters the economic indicators of bigger companies were used as a volume-indicator.

Due to the research objective, only areas directly related to maritime affairs that have enough volume in the Estonian context are used to construct Estonian maritime cluster model. Maritime cluster model does not include areas that are indirectly related to maritime affairs but are potentially critical from the point of view of maritime development like connecting roads with ports, etc.

The structure of the Estonian maritime cluster is explained by the following logical connections between maritime sub-clusters:

Shipping has been called the backbone of the European maritime affairs, as it has a direct influence on the trade movement and is, therefore, related to economic competitiveness at a more general level. The growing demand for shipping services has a positive influence on shipbuilding and the manufacturers of maritime supplies and components related to that. As the volume of outsourcing network in the Estonian shipbuilding is considerably small, the manufacturers of maritime supplies are viewed as a part of shipbuilding and repair sub-cluster.

At the European level, the development of **shipbuilding** sector is viewed as critically important for the manufacturers of maritime supplies, because although maritime supplies are also exported from Europe to Asian shipbuilding countries, the survival of basic domestic market demand is important in order to maintain the sector's competitive strength. In other words, the ongoing migration of shipbuilding from Europe to Asia does not only bring along the loss

of the direct surplus value of shipbuilding, but also has a more extensive impact through disappearance of related sectors. At the same time, the disappearance of European shipbuilding has brought along the development of manufacturing special purpose and recreational ships as the knowhow left over from the shipbuilding sector can be exploited here. Shipbuilding also influences the sector of maritime affairs – in order to function effectively, shipbuilding needs the availability of the knowledge-based services related to product development and access to sea provided by the ports.

Maritime service is, in addition to shipbuilding, directly related to the development of shipping, but not necessarily to that of national shipping. There is still reason to believe that if possible and in case the price of the service is the same, maritime shipping prefers to use domestic ports and services. Anyway, the demand for port services is important for port development; shipping, transport, and logistics play a traditionally significant part in the demand for port services. Providing port and other maritime services also increases the demand for shipbuilding because many maritime services require the use of special purpose ships.

Maritime research and educational activities can partially be considered to be a sub-cluster of maritime service cluster as research institutions provide the companies with the services connected with product and employee development. In the current thesis, the maritime research and educational activities are viewed as a separate sub-cluster offering services related to employee development, product development, and infrastructure to all maritime sub-clusters. According to several studies, research and educational activities are of critical importance from the point of view of cluster development, and therefore it certainly needs a more thorough analysis in the context of Estonian maritime cluster.

Port development is the key factor in the whole maritime sector because ports constitute an infrastructure, but for port development there is a need for port services that shipping has a significant role in. Port development can be measured in tons – the bigger the volume of trade movement, the better the potential of the port development. On the other hand, we cannot ignore the significance of ports for yachting and recreation sector as well as for fishing and aquaculture – the role of ports in the maritime sector is extremely varied.

The building and repair of fairways and marine facilities is directly dependant on the developmental needs of ports. The low level of hydraulic engineering or the total lack of it can turn out to be a substantial obstacle in the maritime cluster development. Fairways, their mapping, and marking are also important for the development of yachting shipping and recreation sector, including maritime tourism.

Yachting and recreation are in some ways more loosely connected with the maritime cluster but it is still an important sub-cluster as it creates the demand for small harbour development and manufacturing recreational ships and maritime equipment. Yachting also contributes to popularization and development of maritime culture and maritime hobbies which is an important factor for cluster development as it helps to improve the employee base and the region's reputation.

Fishing and aquaculture are important sub-clusters from the point of view of the demand for port services, the development of shipping and maritime culture. Fishing is unevenly agglomerated in different Estonian regions due to environmental conditions and fish resources. The existence of strong fishing sector both on the level of industrial and hobby fishing is more important for the development of maritime sectors than it may seem at first. Fishing gives a direct reason to go out to the sea promoting the development of maritime culture as a whole. Like the yachting sub-cluster, also fishing and aquaculture have a positive impact on the small harbour development; it creates an additional demand for recreational craft building, repair, and maintenance service and also for such land-logistics services that in the context of the current thesis do not belong to the model of maritime cluster approach.

As in case of maritime clusters, the scales and structures of different economic associations greatly depend on the vicinity of natural resources and infrastructure, or in other words, the closeness of water bodies and the presence of ports, there is probably a reason to take the analysis of Estonian maritime cluster to the regional level – it is obvious that the activities agglomerated around cargo ports, yacht harbours, and fishing ports have a very different character and scale and, therefore, they need different development approaches.

For end-use analysis of the Estonian maritime cluster, it is probably also necessary to view the connections relating maritime areas to land: logistics, transport, access to ports, international fairways, but also tourism and other clusters that have a common element with the maritime cluster.

The model proposed in the research presents a platform for a closer analysis of the connections between maritime sub-clusters, which makes it possible to identify the wider influence range and the development obstacles coming from the areas related to maritime affairs. The data of bigger sub-cluster companies used in the analysis can also be used as the sample of the analysis. That can be done to analyze the in-cluster relations and also for taking the maritime cluster analysis to the regional level which makes it possible to give a specific input to developing Estonian maritime cluster on the state and local levels as well as on the cross-border level.

7 Source Materials and Methods for Maritime Cluster Research

Estonian maritime cluster research is a part of the Spinnaker project and its objective is to research the existence of Estonian maritime cluster and its perspectives. The Estonian maritime cluster research is the continuation of the research compiled by Estonian Maritime Academy in 2006. In the current research, the main information source used was the system of the Commercial Register which provided all necessary data about the companies under research. Äripäev TOP 500 data has also been used to establish the companies with the biggest turnover during the period 2004-2008. In addition to that, the annual reports of the companies, electronic database of the Statistical Office, electronic land register, companies' web pages, newspaper articles, and other supplementary materials have been used.

Data collection for the current research started with using the e-Commercial Register. E-Commercial Register of the Centre of Registers and Information Systems is the collective name for the services including electronic data related to different legal entities. Commercial Register's data is held and confirmed by County Court Registry Departments (Centre of Registers and Information Systems, 2011). Depending on the field of activity registered in the Commercial Register, it was possible to outline Estonian maritime companies. There were approximately 400 maritime companies and their main areas were maritime transport organization, cargo handling, and activities related to port operations. In order to compare the maritime cluster sectors, turnover figures and average number of employees stated in the annual reports of the companies were presented. A five-year period 2004-2008 was chosen as the basis for comparing turnovers and average numbers of employees. Registration locations and the dates of initial entry into the Commercial Register were considered as well.

The research and comparison of the sub-clusters of the maritime cluster constitutes a prominent part of the current thesis. In order to perform this research, the companies picked out from the Commercial Register were divided into sub-clusters depending on the field of activity.

The goal of analyzing each sub-cluster was to study different situations in the Estonian maritime affairs. For adequate results, different tables and diagrams were compiled for each sub-cluster. As the sales revenues of ten companies with the biggest turnover constitute a significant part of each sub-cluster, only those companies were included in the tables and diagrams to ensure a better overview. The analyses and the results of comparing the sub-clusters are also presented in the current research.

In order to compare the data of the companies divided into sub-clusters, the companies with consolidated annual reports are tagged. For that purpose, the business name of the company is followed by superscript number one*, meaning that the annual report of the company was consolidated. Apart from that, the financial year of some companies does not coincide with the calendar year. The business names of those companies are followed by superscript number two* to mark the difference. Sales revenues presented in the tables and diagrams are mostly presented in thousands of kroons.

Estonian maritime cluster includes companies involved with maritime activities both directly and indirectly and therefore, in order to guarantee a better overview, each sub-cluster has been approached individually. In most sub-clusters like shipping, ports, port operators, maritime service and intermediate commercial transactions, shipbuilding and repair, yachting and recreation, fishing and processing and aquaculture, the maritime sector in the companies' turnover constitutes over 80% (Estonian Maritime Academy, 2006). For that reason and also due to the absence of the more precise turnover figures in the maritime sector, total turnovers of the companies have been used when describing those sub-clusters.

Unlike in case of the above-mentioned sub-clusters, the results of the cluster research performed by Estonian Maritime Academy in 2006 have been used to describe the sub-cluster of construction and maintenance of fairways and marine facilities. According to this research, the maritime sector in the sub-cluster of construction and maintenance of fairways and marine facilities constituted 15% of the companies' turnovers in 2004, during the previous years it had been 20%. Considering that the research period of the current thesis is five years and the companies' annual reports have stated that the share of construction and maintenance of water and port facilities has increased, in this cluster research it has been shown that the turnover of the companies of the sub-cluster of construction and maintenance of fairways and marine facilities constitute 20% in the Estonian maritime cluster. The total turnover of companies has been presented in the graphical descriptions of this sub-cluster, but in the consolidated data of maritime clusters, the percentage of this sub-cluster is calculated 20%.

Special attention has been paid to the sub-cluster of public sector and that of science and education. Public sector forms a significant part of the essence of Estonian maritime cluster but unfortunately it was complicated to estimate the importance of different institutions in the maritime activities. Therefore, we have used the descriptions of different public sector enterprises to interpret the essence of this sub-cluster. Due to the lack of accurate data, we are missing the information about the number of employees involved with maritime activities in these companies and also the exact turnovers.

In order to get a better overview of Estonian maritime cluster and the companies included, different supplementary and additional materials were used in the research. The ship register enabled to explore the ships sailing under Estonian flag and to draw adequate conclusions concerning the essence of the maritime cluster. Statistical Office database enabled to present

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* Consequently:

[1] consolidated annual report.

[2] financial year does not coincide with the calendar year.

the current situation of product flows and investigate the fishing conditions in the Estonian coastal and inland water areas. Descriptive information about the companies studied was also retrieved from web pages and newspaper articles.

8 Estonian Maritime Cluster

Current maritime cluster research covers approximately 400 maritime companies with the registered turnover during 2004-2008. To establish the companies with the biggest turnover, Äripäev TOP 500 information has primarily been used (Äripäev 2009; Äripäev 2005). Turnovers during the period 2004-2008 and average numbers of employees 2004-2008 are established based on the Commercial Register data.

Estonian maritime cluster has been divided into nine sub-clusters:

1. Shipping
2. Ports
3. Port operators
4. Maritime service and intermediate commercial transactions
5. Shipbuilding and repair
6. Public sector. Science and education
7. Yachting and recreation
8. Construction and maintenance of fairways and marine facilities
9. Fishing and processing. Aquaculture

Sub-clusters of the Estonian maritime cluster are selected in accordance with the prevalent maritime cluster division and considering Estonian individuality. The principles of Estonian maritime cluster are established by the public sector. The resolutions and regulations adopted by the public sector influence economy and business in general and therefore, it also determines the feasibility and essence of the Estonian maritime cluster. High-quality maritime education also promotes the development of the maritime cluster by providing companies with specialized employees. Sub-clusters directly related to maritime activities are shipping, ports, port operators, maritime service and intermediate commercial transactions, and shipbuilding and repair. The activities of the companies in these areas have the biggest influence on the development and sustainability of the Estonian maritime cluster. In addition to the above-mentioned, there are also areas in the Estonian maritime cluster that are related to maritime companies or provide them with support services. This includes research and development activities, construction, yachting, and classification and certification services. Fishing and processing as well as aquaculture are of importance for Estonian maritime activities as well.

The analysis of the Estonian maritime cluster commenced with the study of sub-clusters. To compare the sub-clusters, the data of 10 companies with the biggest sales revenue in each sub-cluster was used. The companies' turnovers are registered during the years 2004-2008, the basis for sequence being the data from 2008. The same procedure was followed when comparing the average number of employees.

The estimated total turnover of the Estonian maritime cluster in 2004 was 32 billion kroons. When calculating the total turnover, the estimated share of the maritime sector in the total

turnover of the companies in the sub-cluster of construction and maintenance of fairways and marine facilities is 20%. In 2004, the sub-cluster of maritime service and intermediate commercial transactions with the estimated turnover of 14 billion kroons constituted approximately 44% of the total turnover of the Estonian maritime cluster. In 2008, the estimated total turnover of the Estonian maritime cluster was 53 billion kroons and again the dominant sub-cluster was that of the maritime service and intermediate commercial transactions constituting 33% of the total turnover.

As this cluster research is based on the data from 2004-2008, the situation may have been changed in some aspects during the recent years. In order to get a better overview, also those companies have been researched which have meanwhile been deleted from the Commercial Register, are in the process of liquidation at the moment, or have declared bankruptcy. As at May 2011, 42 maritime companies studied in this research have been deleted from the Commercial Register during the years 2004-2011. As at the same date, 8 companies have declared bankruptcy and another 8 are being liquidated at the moment.

Estonian Commercial Register together with the Commercial Code became effective September 1, 1995 (Commercial Code). Therefore, all the companies connected with maritime clusters chosen for this research have been registered in the Commercial Register during the years 1995-2008. The biggest numbers of companies were registered in 1996 and 1997 (75 and 77 accordingly), and since 1999 the number of maritime companies registered started to decrease until it came down to only 1 in 2006.

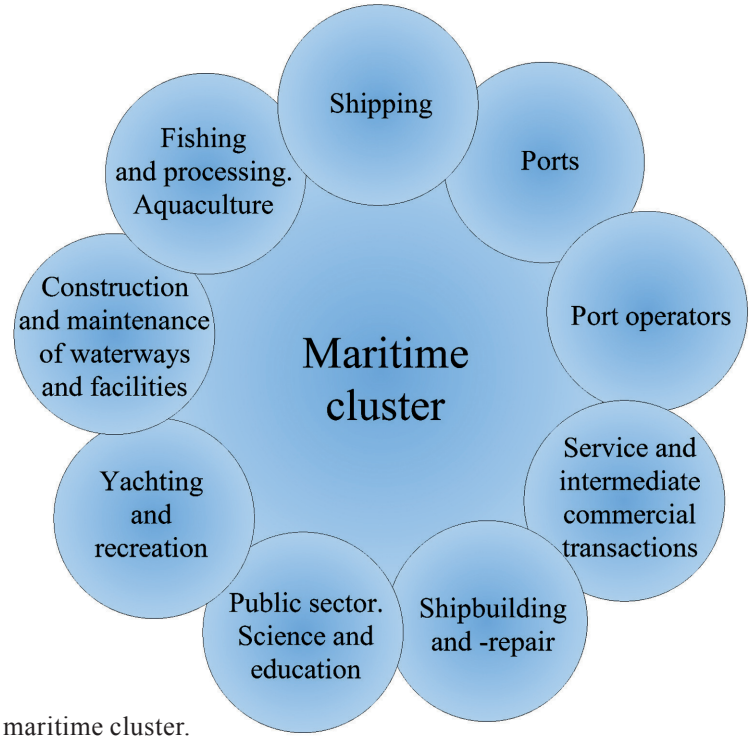

Diagram 1. Estonian maritime cluster.

Depending on the field of activity stated in the Commercial Register, the companies being researched are divided into sub-clusters. The number of companies in each sub-cluster is presented in the table below (see Table 2). The cluster with the biggest number of companies is the one of maritime service and intermediate commercial transactions, where there are 152 companies under research. The companies in this sub-cluster are mostly in the business of providing transport and logistics services. Fishing in the coastal and internal waters has traditionally been important for Estonia as a coastal country, and there are 74 fishing companies involved in this research.

Table 2. Sub-clusters and the number of companies they include

Sub-cluster	Number of companies
1. Shipping	23
2. Ports	11
3. Port operators	28
4. Maritime service and intermediate commercial transactions	152
5. Shipbuilding and repair	45
6. Public sector. Science and education	?
7. Yachting and recreation	13
8. Construction and maintenance of fairways and marine facilities	23
9. Fishing and processing. Aquaculture	74

Annual turnovers of the companies belonging to the Estonian maritime cluster are very different. To provide a better understanding, the annual turnovers of the companies are added up and the consolidated data that was determined on the basis of the database used in this research is presented in the table below (see Table 3). Based on this table, we can say that the total turnovers of the companies belonging to the Estonian maritime cluster have been increasing throughout the five-year period.

Table 3. Total turnovers of the companies during the period2004-2008 in thousands of kroons.

Year	2004	2005	2006	2007	2008
Total turnover (thousands of kroons)	32 040 154	37 499 100	44 214 427	52 853 014	53 251 176

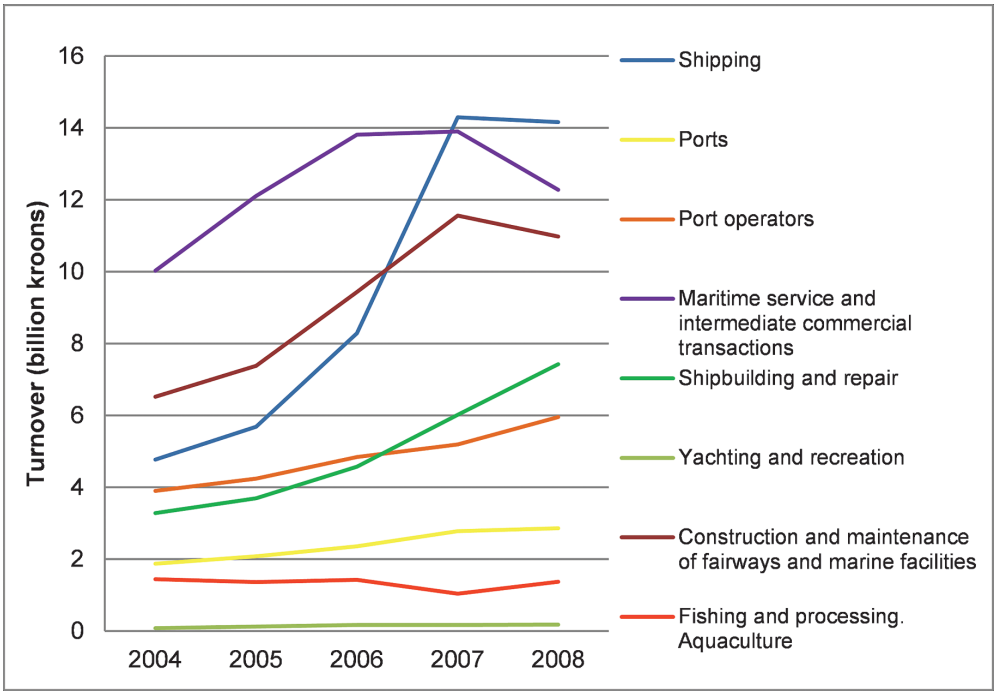

Diagram 2. Comparison of consolidated data of the 10 companies with the biggest turnover during the period 2004-2008. (Note: the estimated share of the maritime sector in the turnovers of the companies in the sub-cluster of construction and maintenance of fairways and marine facilities is 20 %)

For data comparison, ten companies with the biggest turnover in each cluster are used. The comparison of the consolidated data of the 10 companies with the biggest turnover in sub-clusters during the period 2004-2008 is presented in the diagram below (see Diagram 2 on page 17). This diagram illustrates that the companies with the biggest turnover belong to the sub-cluster of maritime service and intermediate commercial interactions. During the five years, the biggest riser has been the shipping sub-cluster that has gained number one position in the turnover comparison since 2007.

Throughout the five years, the increase in the sub-cluster of port operators and in that of shipbuilding and repair has been slow but stable. Diagram 2 lacks the sub-cluster of public sector as well as that of science and education as it was difficult to line up the ten companies with the biggest turnover as there are no adequate turnover figures for maritime sector available.

To provide a better understanding of the Estonian maritime cluster, the number of people employed in the maritime sector has been studied as well. Maritime activities have always created various jobs, especially in coastal areas. The number of employees in different sub-clusters varies greatly. To compare the average total number of employees in the maritime areas during the period 2004-2008, a table of average total number of employees has been compiled (see Table 4). The average total number of employees was increasing until 2006 and after that it started to decrease. In 2008, 24 986 people were employed in the companies included in the Estonian maritime cluster research. 8020 people or 32% of them were working in the shipping sub-cluster. Like in case of comparing turnovers, the biggest increase in the number of employees during the period 2004-2008 has been in the shipping sub-cluster. The other big employer is the shipbuilding and repair sub-cluster where there were 5139 people employed in 2008.

In Diagram 3, the average number of people employed in different sub-clusters is shown in the division of total turnovers and the number of companies in 2008. The diagram legend displays the list of sub-clusters and the average numbers of employees in 2008 are added in the brackets. The diagram lacks the sub-cluster of public sector and that of science and education as the adequate data about the average number of employees and turnovers in the maritime sector is missing.

Table 4. Average total numbers of employees during the period 2004-2008.

Year	2004	2005	2006	2007	2008
Total number of employees	20 636	22 002	25 198	25 228	24 986

Approximately 400 companies are included in the Estonian maritime cluster research. Commercial Register's database enables us to find out where these companies are registered. Studying the registrations of the companies in different counties, it appeared that there are maritime companies registered in 12 counties out of 15. According to Commercial Register's database, the biggest number of companies was registered in Harju county. Many companies have probably registered themselves near the capital because the head offices of most companies are located in Tallinn. 255 companies or 77% of all the studied companies were registered in Harju county; the estimated total turnover of those companies in 2004 was 30 billion kroons. The biggest field of activity in Harju county is the sub-cluster of maritime service and intermediate commercials transactions that constitutes ca 47% of the registered companies. The turnover of the companies registered in Harju county constitutes ca 93% of the turnover of the whole maritime cluster in 2004. The second county with the biggest number of compa-

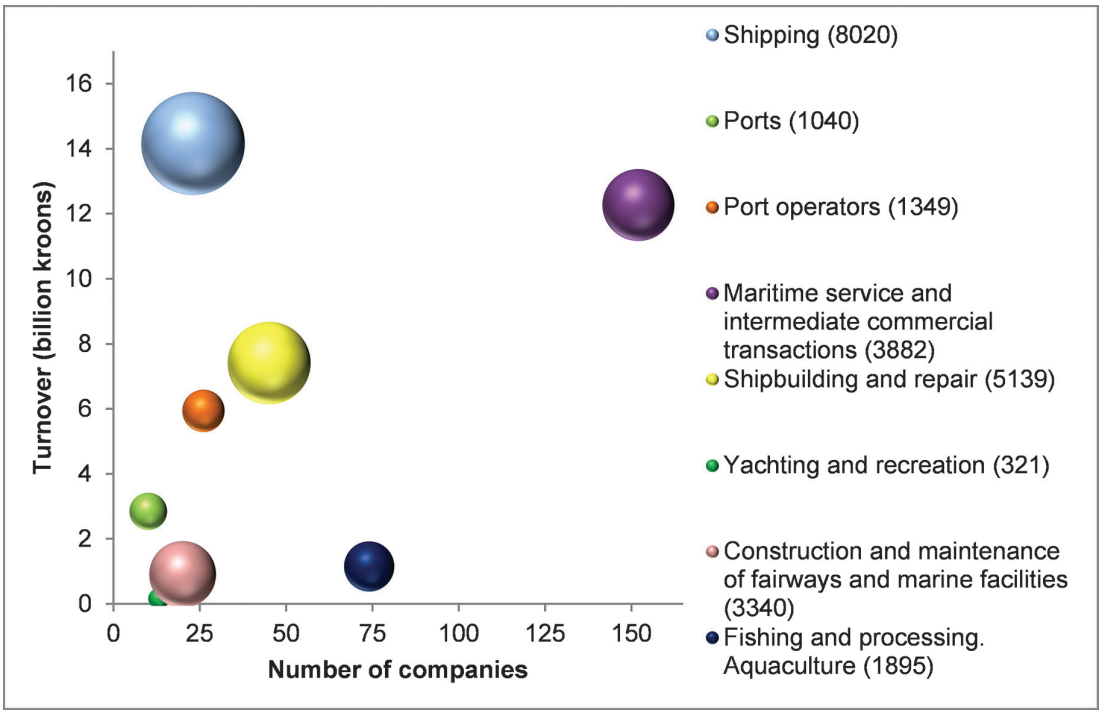

Diagram 3. The average number of people employed in sub-clusters in the division of total turnovers and the number of companies in 2008.

nies is Pärnu county. The estimated total turnover of the companies in Pärnu county in 2004 was 530 million kroons and most of it came from the sub-cluster of fishing and processing and aquaculture (52%). The third biggest county in terms of the number of companies is Saare county. Many companies dealing with fishing and yachting have been registered in Saare county; the estimated total turnover in 2004 was 475 million kroons. In three Estonian counties- Rapla, Põlva, and Võru county - there are no companies registered that were included in the current research. The reason might be the fact that those counties are located far from the coastal areas.

The map (see Diagram 4 on page 18) illustrates that most of the companies related to the maritime cluster are located in coastal areas and around Lake Peipsi. Fewer companies included in the research are also registered in Central and Southern Estonia.

Table 5. Number of companies related to the maritime cluster.

County	Number of companies related to the maritime cluster	County	Number of companies related to the maritime cluster
Harju county	255	Pärnu county	21
Hiiu county	5	Rapla county	0
Ida-Viru county	8	Saare county	20
Jõgeva county	3	Tartu county	8
Järva county	1	Valga county	1
Lääne county	4	Viljandi county	1
Lääne-Viru county	4	Võru county	0
Põlva county	0		

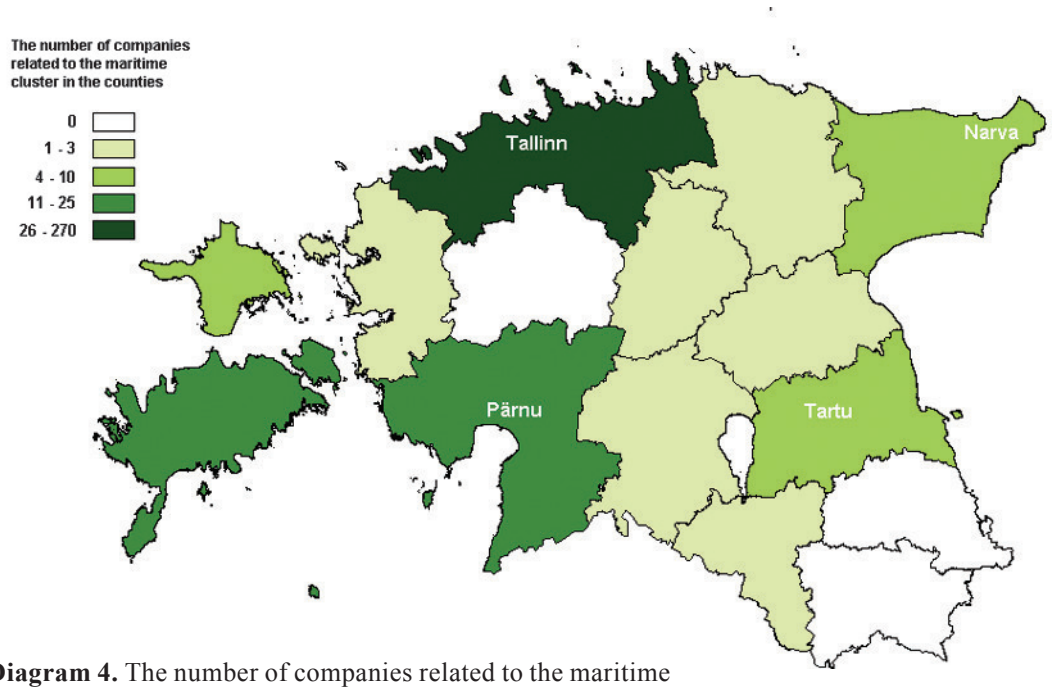

Diagram 4. The number of companies related to the maritime cluster in the counties (Source: Estonian Land Board, 08.03.2011).

8.1 Shipping

Shipping sub-cluster includes companies providing maritime passenger transport, pilotage of ships, sea and coastal cargo services, and towage services. Within the frames of the current research, the shipping sub-cluster includes 23 companies. Total turnover of the shipping sub-cluster in 2008 was approximately 14.6 billion kroons that constituted 27% of the total turnover of the maritime cluster.

The company with the biggest turnover in the shipping sub-cluster is Tallink Grupp AS with the turnover of 12.39 billion kroons in 2008. Tallink Grupp AS is a shipping company providing mini-cruise and passenger transport services in the Baltic Sea. Tallink Grupp AS also offers ro-ro cargo services. The main sea lines being operated are Tallinn-Helsinki, Tallinn-Stockholm and Paldiski-Kapellsär (Tallink Grupp, 2011). According to the annual report 2007/2008 of Tallink Grupp AS, the company's turnover in 2008 also included the data of land-based companies. Tallink Grupp AS together with its subsidiaries operated three hotels in Tallinn, the fourth hotel in Tallinn started working in 2009, and in 2010 the company started operating a hotel in Riga. Accommodation sales constituted 1.2% of the sales revenue of 2008 in this business segment. The fiscal year of Tallink Grupp AS does not coincide with the calendar year. As Tallink Grupp AS constitutes about 90% of the shipping sub-cluster in 2008, we have inserted two diagrams to provide a better overview. The first diagram (see Diagram 5) illustrates the share of Tallink Grupp AS turnover in the shipping sub-cluster. The other diagram includes the rest of the nine companies with the biggest turnover. This diagram shows that the significance of Tallink Grupp AS has rapidly grown since 2007. The other diagram, (see Diagram 6) compares the turnovers of the ten shipping sub-cluster companies with the biggest turnover, without Tallink Grupp AS. Tallink Grupp AS is followed by the Ookeani Konteinervedude OÜ with the turnover of 0.73 billion kroons in 2008. Ookeani Konteinervedude OÜ represents HAPAG-LLOYD ocean shipping line in Estonia and the company's main activity is international container transport. This company is followed by Nordic Jetline

AS and Eesti Merelaevandus AS with the turnovers of 0.21 and 0.16 billion kroons respectively. Nordic Jetline AS stopped its activities in the Gulf of Finland in the autumn of 2008 for the following winter (Roonemaa, 2008), and in spring 2011 we can conclude based on the information on the company's web page that in 2011 there is no shipping between Tallinn and Helsinki. Among the ten companies with the biggest turnovers there is also Silja Line Eesti AS as its turnovers belonged to the TOP 10 in 2004-2006. But as it is stated in the Tallink Grupp AS annual report 2005/2006, the company purchased Silja OY AB in July, 2006. This was likely to cause the considerable increase in the turnover of Tallink Grupp AS in 2007.

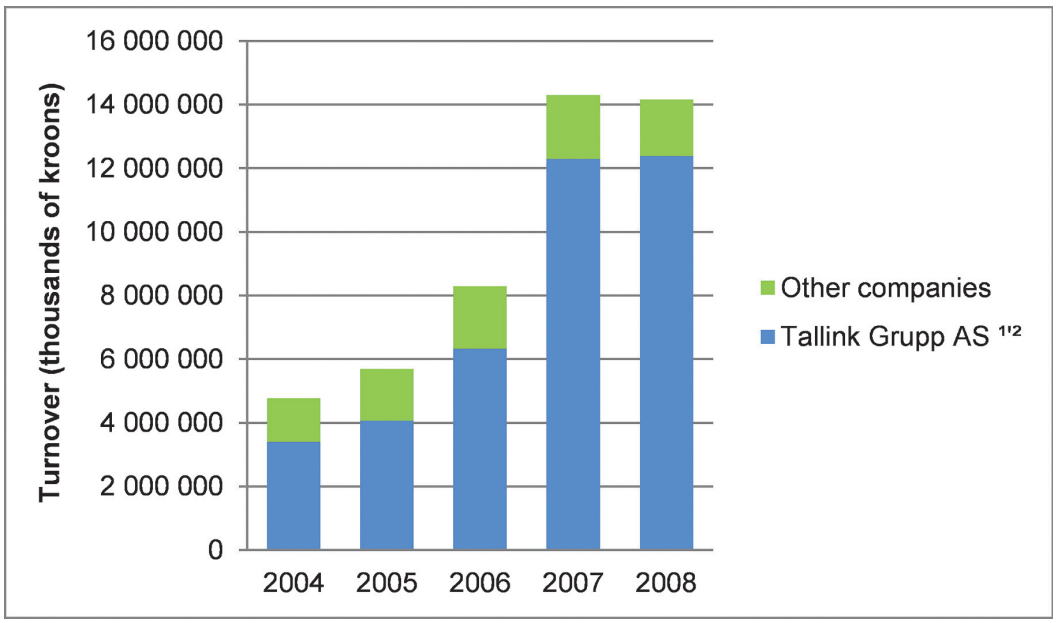

Diagram 5. The share of Tallink Grupp AS turnover in the shipping sub-cluster during the period 2004-2008.

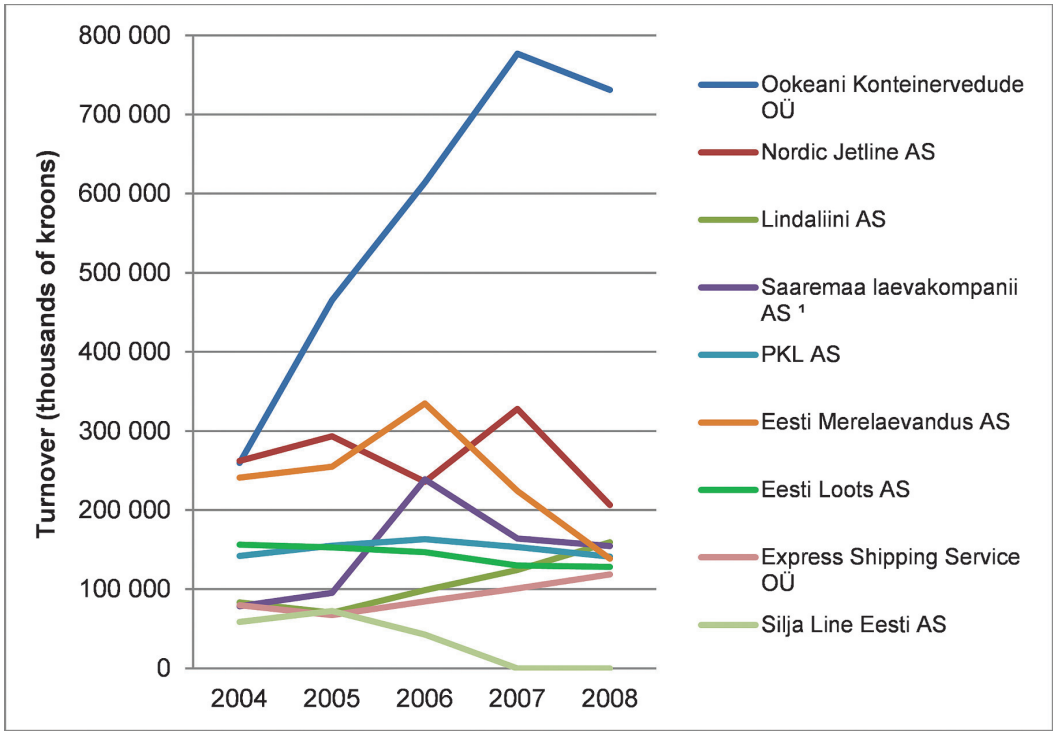

Diagram 6. Turnover comparison of the ten shipping sub-cluster companies with the biggest turnover during the period 2004-2008, without Tallink Grupp AS.

The biggest employer in the shipping sub-cluster is Tallink Grupp AS with the average number of employees 6564 in 2008. The number of employees has been constantly increasing throughout the five years. As Tallink Grupp AS has considerably more employees than the other TOP 10 companies in the shipping sub-cluster, we have compiled two diagrams to compare the number of employees. The first diagram (see Diagram 7) illustrates the share of Tallink Grupp AS number of employees as compared to that of the other shipping sub-cluster TOP 10 companies. The other diagram (see Diagram 8) presents the comparison of the average number of employees in the shipping sub-cluster TOP 10 companies without Tallink

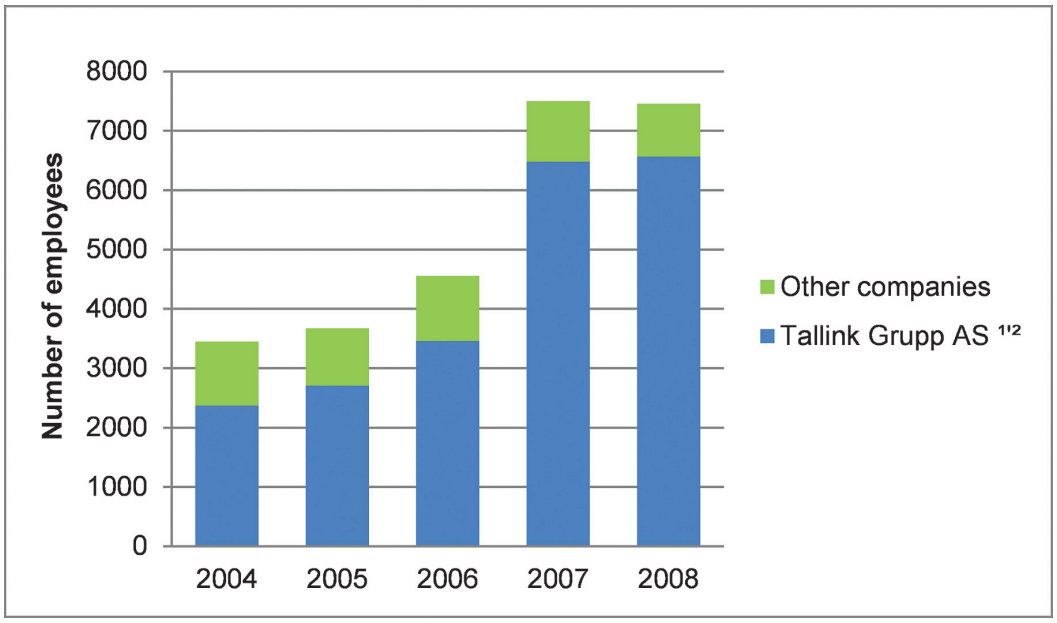

Diagram 7. The share of Tallink Grupp AS number of employees in the shipping sub-cluster during the period 2004-2008.

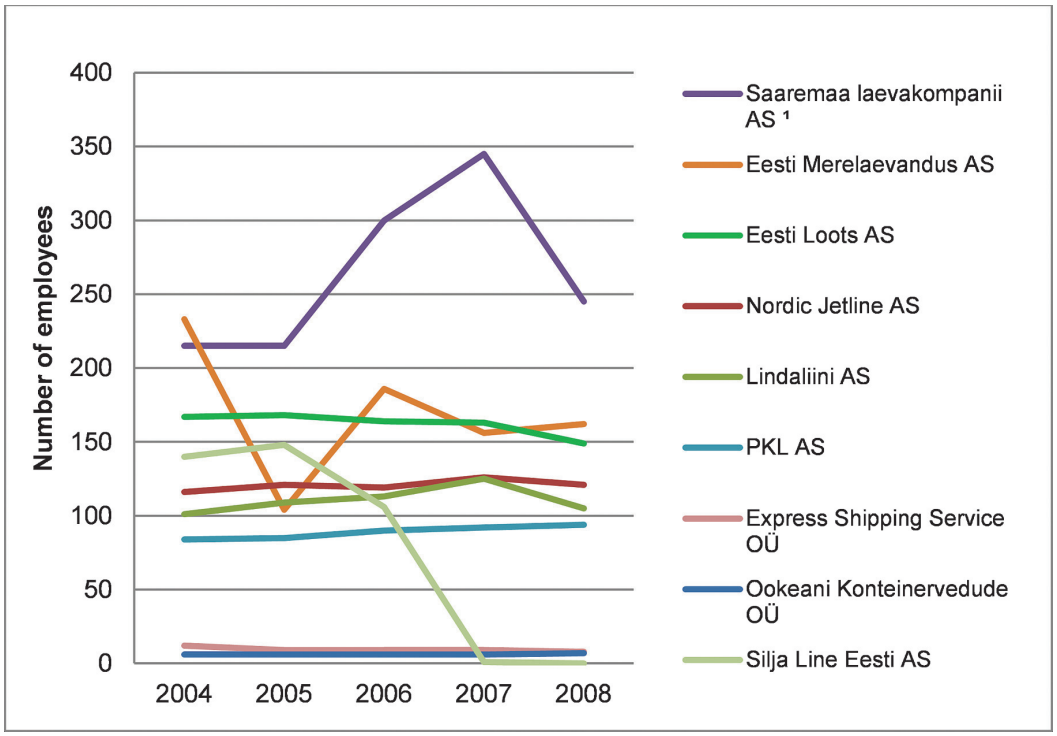

Diagram 8. Comparison of the number of employees in the ten shipping sub-cluster companies with the biggest turnover during the period 2004-2008, without Tallink Grupp AS.

Grupp AS. The second biggest employer is Saaremaa Laevakompanii AS. The number of employees in Saaremaa Laevakompanii AS was on the increase until 2007 when it reached 345, but in 2008 it came down to 245. The main activity of Saaremaa Laevakompanii AS is the passenger and vehicle transport by ferry boats that guarantees the shipping connection between the Estonian mainland and the islands of Western Estonia (Saaremaa Laevakompanii, 2011).

Shipping sub-cluster has been the biggest employer starting from 2006 also in the comparison of sub-clusters. Before 2006, it was shipbuilding and repair sub-cluster.

8.1.1 Ship Register

Estonian sea and inland vessels (including fishing vessels) are recorded in the ship register. Non-propelled vessels and ships under construction can be registered there as well. Ship register is fully electronic. Data on state vessels and chartered uncrewed vessels temporarily brought under Estonian flag is kept in the Estonian Maritime Administration (Ministry of Justice, 2011). According to the ship register data there are 372 vessels with a valid register part in the Estonian ship register as at May 3, 2011. As at the same date, there are 295 vessels with a closed register part.

The closed register part may have occurred as a result of the vessel being deleted from the ship register or when the ship register part is being transferred (Law of Ship Flag and Registers of Ships Act, § 59, section 1).

86% (320) of the vessels with the valid register part are sea vessels, 8% (30) are inland vessels, and 6% (22) vessels are floating crafts. The distribution according to vessel types is presented in the diagram below (see Diagram 9).

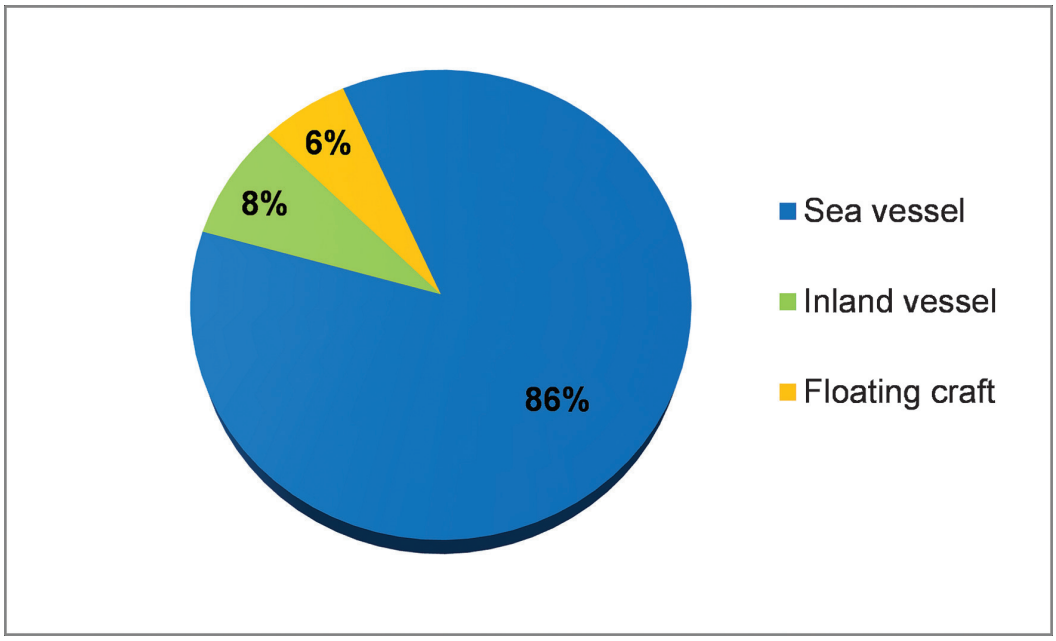

Diagram 9. Distribution of vessels with the valid register part based on the vessel types. (Source: Ship Register 03.05.2011)

Most of the vessels with the valid register part are fishing vessels. There are 127 (that is 34%) fishing vessels. A dominant group is also made up by recreation or yachting and technical or ancillary vessels. There are 91 recreation or hobby ships, most of them being sailing yachts.

There are 88 technical or ancillary vessels, including pilot vessels, rescue ships, diving support vessels, tow vessels, etc. The diagram below illustrates the distribution of vessels with the valid register part based on vessel categories (see Diagram 10).

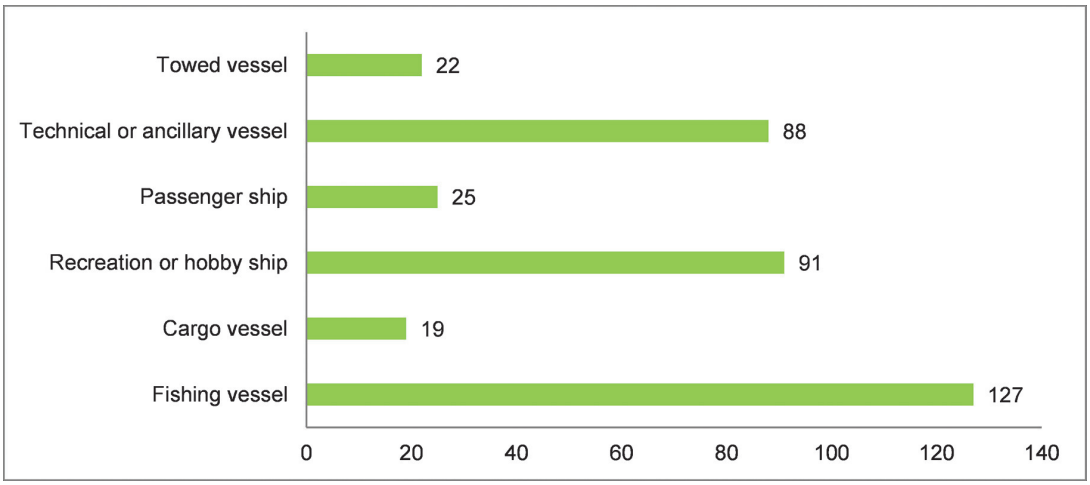

Diagram 10. The distribution of vessels with the valid register part based on vessel categories. (Source: Ship Register 03.05.2011)

The construction dates of vessels recorded in the Estonian Ship Register are extremely varied. The oldest vessel registered was built in 1907. The vessel is Blue Sirius which was built in Norway and its home port is Tallinn now. There are not many vessels in the ship register that have been built before the 1970s. Most of the vessels have been built after the 1970s. The diagram below (see Diagram 11) demonstrates the number of vessels with the valid register part as at 03.05.2011, based on the construction year. There are 297 vessels recorded in the ship register with the construction time within the period 1970-2011. There are many registered vessels with the construction year 2000 and 2002. Most vessels with these launch years are recreation or hobby ships. There are also many registered vessels built in 1971. In case of floating crafts with the valid register part, the construction year is not recorded and there are altogether 22 of them.

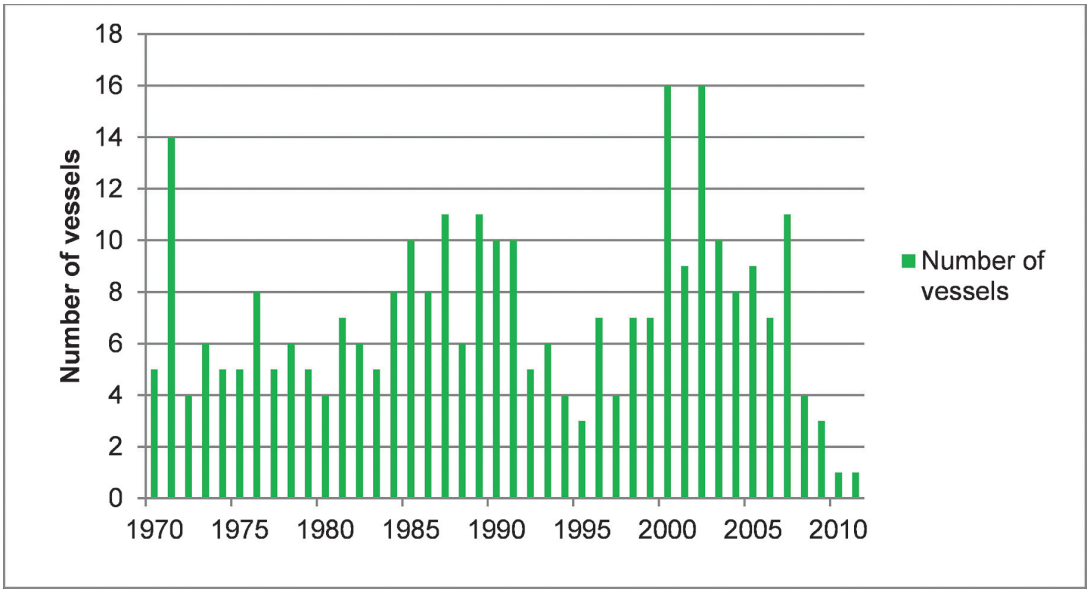

Diagram 11. Numbers of vessels with the valid register part built in 1970-2011 (Source: Ship Register 03.05.2011)

As at 03.05.2011, there are 43 (12%) sea vessels over 300 GT out of all vessels with the valid register part. 14 (33%) of them are cargo vessels that have been built during the period 1961-1996. 11 vessels (26%) are technical or ancillary vessels built in 1970-2007. The oldest vessel over 300 GT is Suur Tõll that was built in 1914, its gross tonnage is 2420.37 and it belongs to the category of ice breakers and museum vessels. On the diagram below (see Diagram 12), the vessels over 300 GT recorded in the ship register are shown. On this diagram, the vessels are grouped based on the vessel category, construction date, and gross tonnage. There are many passenger ships registered in 1971. There are four ships altogether and their gross tonnage is over 9000 GT. The vessel with the biggest GT in the ship register is Via Mare with the gross tonnage of 8023, it belongs to the category of passenger ships and it was built in Germany, Bremerhaven. As at the same date in the ship register, the average gross tonnage of all the vessels is 390 GT.

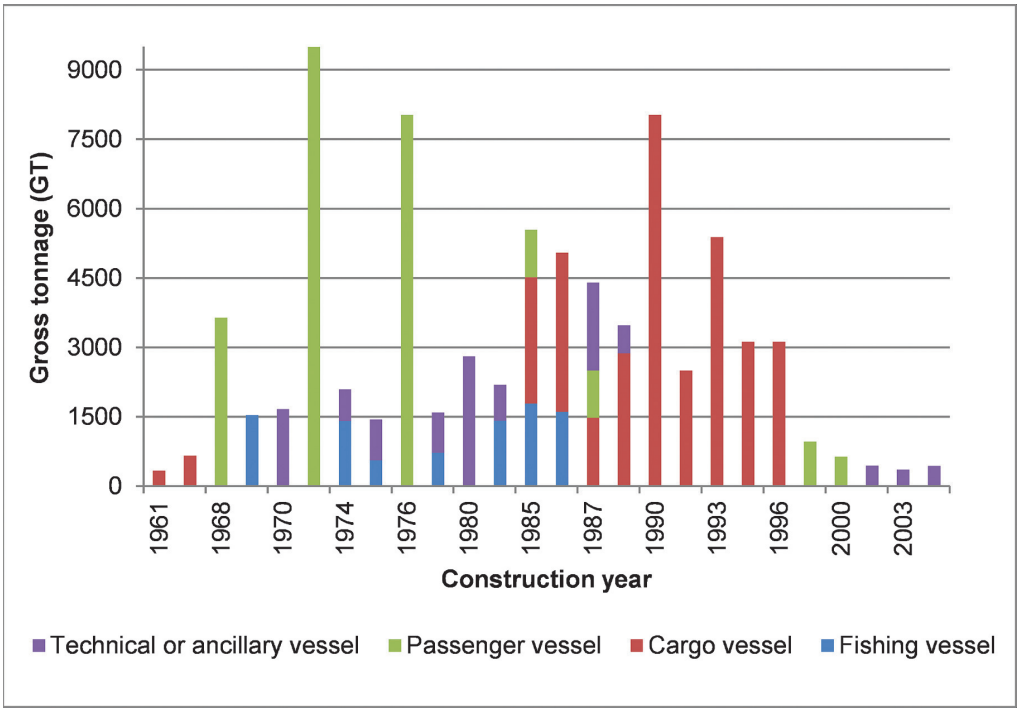

Diagram 12. Vessels over 300 GT with the valid register part grouped according the construction year and gross tonnage. (Source: Ship Register 03.05.2011)

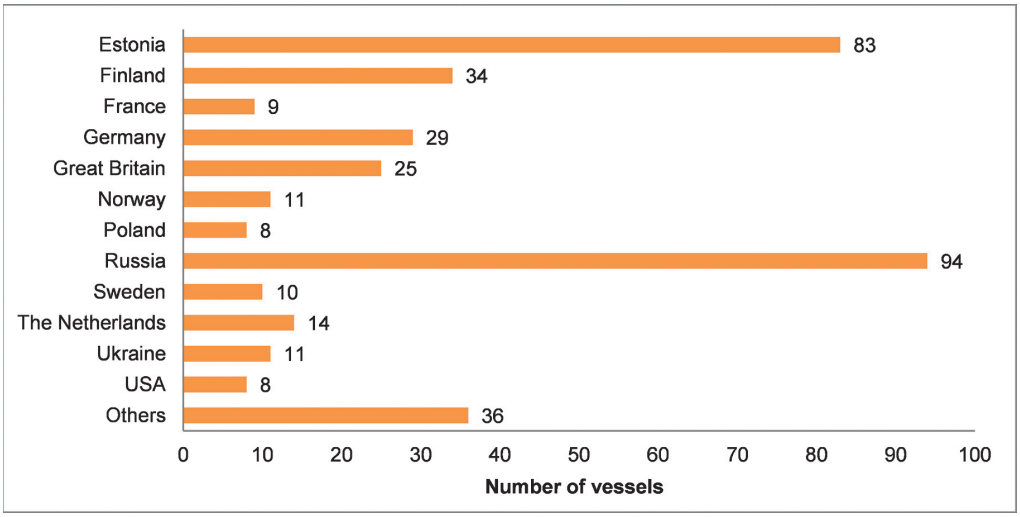

Diagram 13. Construction sites of all the vessels with the valid register part in the ship register. (Source: Ship Register 03.05.2011)

It is possible to compare the construction sites of the vessels registered, based on the data in the Estonian ship register. Most vessels with the valid register part or 25% of all the vessels have been built in Russia. Most vessels in the ship register built in Russia are either fishing vessels, technical or ancillary vessels. The second biggest country of origin in the ship register is Estonia. 22% of all the vessels with the valid register part have been built in Estonia. The diagram below (see Diagram 13) illustrates the distribution of construction sites of the vessels with the valid register part as at 03.05.2011. Other countries include, for example, Spain, Italy, Poland, Denmark, USA, etc.

8.2 Ports

There are 117 ports in the Estonian port register as at June 2011 (Estonian Maritime Administration, 2011). 42 of them are merchant shipping ports and 35 ports are open for international transport. Loading and unloading goods has been quite stable during the recent years in the Estonian ports. According to the Statistical Office (2011), 46.10 billion tons of goods were transported via Estonian ports and ca 72% of it was goods in transit.

Diagrams below depict transport of goods through Estonian ports in 2000-2008. Diagram 14 presents the loading of goods for transporting to abroad, unloading the goods transported from abroad and five most transported product categories in 2000-2008 (excl. transit). The goods transported via Estonian ports during those years were mostly trailer products. Diagram 15 demonstrates the loading and unloading of transit goods and brings forth the five more transported product categories in transit during the period 2000-2008. Most of the transit goods transported through Estonian ports these years are oil products, and the diagram demonstrates that in 2008 this product category constitutes the majority of the goods transported. In the same year, about 87% of the whole transit transport is constituted by loading.

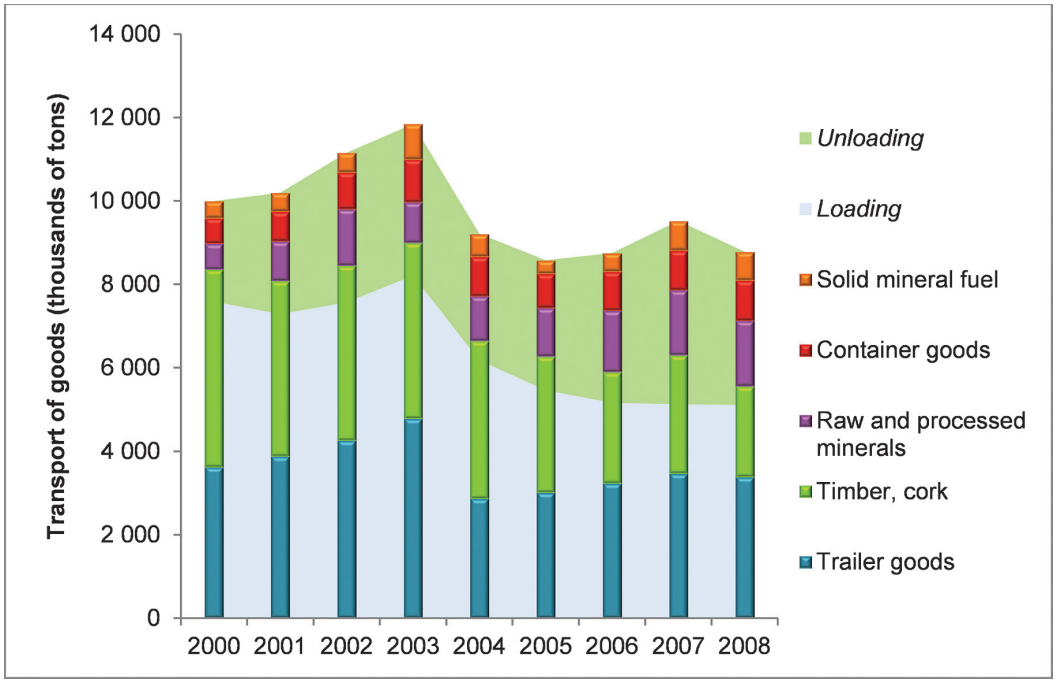

Diagram 14. Loading of goods for transporting abroad and unloading the goods transported from abroad and five most transported product categories in 2000-2008 (excl. transit). (Source: Estonian Statistical Office, 2011)

The diagram also shows that most of the transport of goods is loading. E-database of the Statistical Office (2011) has added a note to this data that the weight of the goods includes the weight of the package but not the tare weight of the containers and rolling stocks, and that the categories of goods are based on nomenclature of the transport statistics classification of the categories of goods TSK 2000.

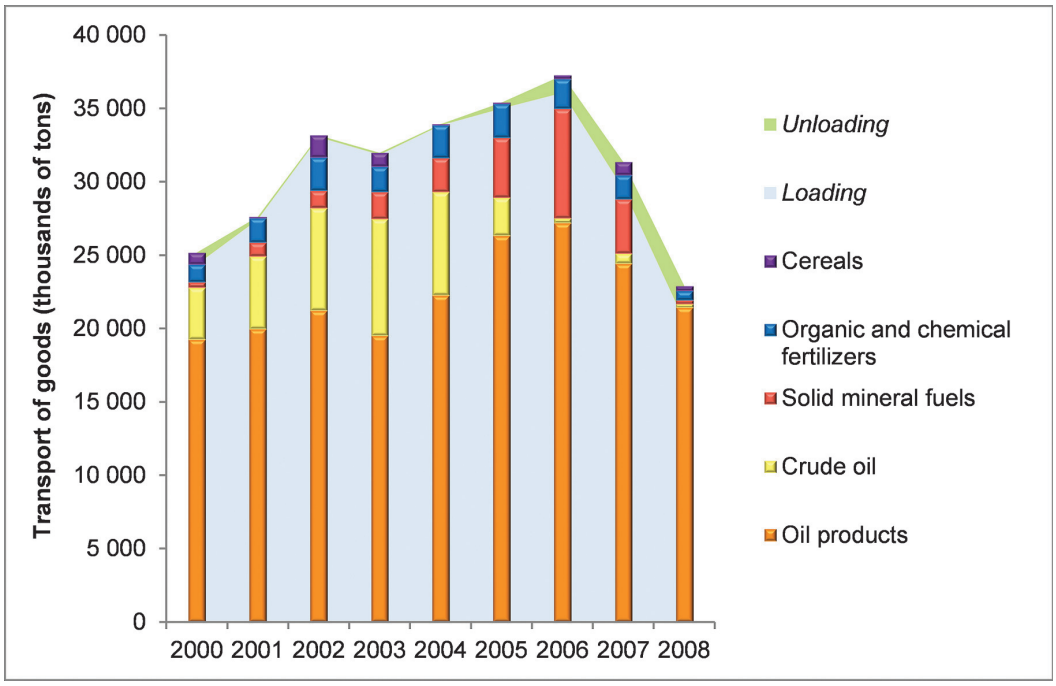

Diagram 15. Loading and unloading of transit goods and the five most transported product categories in transit during the period 2000-2008. (Source: Statistical Office 2011)

According to the data of the Statistical Office (2011), 8.23 million passengers passed the Estonian ports in 2010. Diagram 16 illustrates passenger transport by the Estonian sea transport companies during the period 2005-2010. The main international lines outlined on the

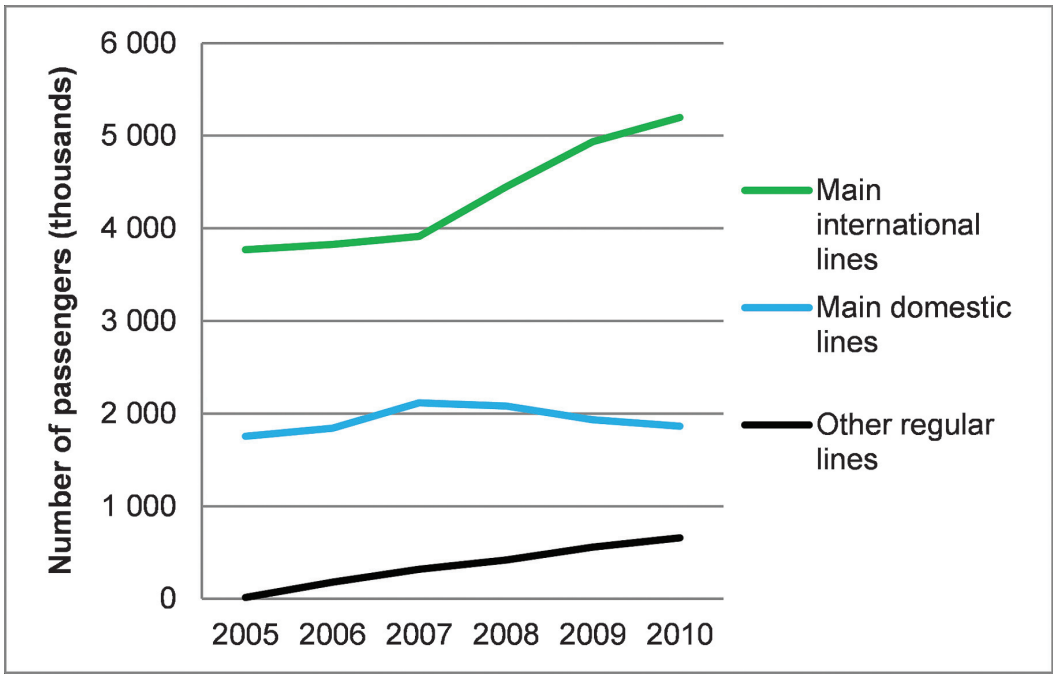

Diagram 16. Passenger sea transport during the period 2005-2010. (Source: Statistical Office 2011)

diagram are Tallinn-Helsinki-Tallinn, Tallinn-Stockholm-Tallinn, and Paldiski-Kappelskär-Paldiski. The main domestic lines are Virtsu-Kuivastu–Virtsu, Rohuküla-Sviby-Rohuküla, Triigi-Sõru-Triigi, Munalaid-Kihnu-Munalaid, Pärnu-Kihnu-Pärnu, and Papissaare-Vilsandi-Papissaare. Passenger transport in the international lines has been increasing throughout the recent years. The increase in passenger transport of the other regular lines has been smaller.

Based on the Statistical Office database (2011), we have compiled Diagram 17 showing the number of containers gone through the Estonian ports during the years 2004-2010. 152 069 TEUs were transported via Estonian ports in 2010 which is about 16% more than in 2009.

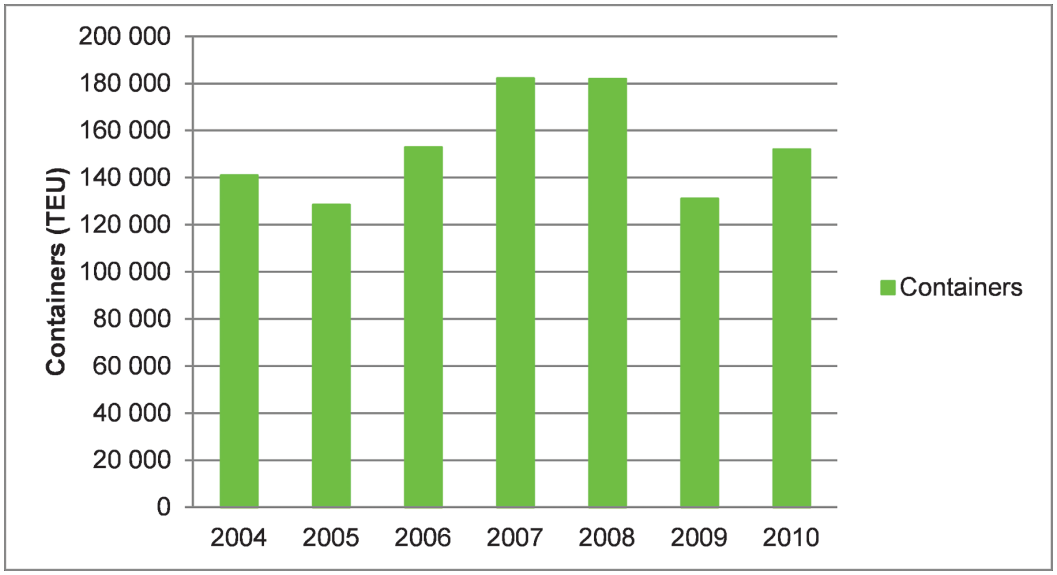

Diagram 17. Transport of sea containers through Estonian ports in 2004-2010. (Source: Statistical Office 2011)

The sub-cluster of ports mainly includes companies providing services related to port operations and usage of fairways, and to a lesser extent the services connected with passenger sea transport and stevedore works. Within the frameworks of the current thesis, 11 companies are included in the sub-cluster of ports. The total turnover of this sub-cluster was 2.9 billion kroons in 2008 that is ca 5% of the total turnover of the whole maritime cluster in the same year.

The company with the biggest turnover in this sub-cluster is Tallinna Sadam AS with the turnover of 1.17 billion kroons in 2008. Tallinna Sadam AS is the biggest complex of cargo and passenger harbours, and it consists of Old City Harbour, Muuga Harbour, Paldiski South Harbour, Paljassaare Harbour, Saaremaa Harbour, and Old City Marina (Tallinna Sadam, 2011).

As the turnover of Tallinna Sadam AS constitutes approximately 70% of the total turnover of this sub-cluster, two diagrams have been compiled to provide a better overview. The first diagram (see Diagram 18) displays the share of Tallinna Sadam AS turnover as compared to the other bigger companies by turnover in this sub-cluster. The second diagram (see Diagram 19) displays the comparison of the ten biggest companies by turnover in the ports cluster during the period 2004-2008, without Tallinna Sadam AS. The second biggest company by turnover in this sub-cluster is Sillamäe Sadam AS with the turnover of 0.18 billion kroons in 2008. Sillamäe Sadam AS is located in Eastern Estonia and the location enables efficient transit with neighbouring areas (Port of Sillamäe, 2011). Kunda Nordic Tsement AS also deserves a special attention in this sub-cluster. Kunda Nordic Tsement AS is a part of international HeidelbergCement Group and is mainly involved with producing construction cements and limestone rubble, but it also provides port services (Kunda Nordic Tsement, 2011).

As in this sub-cluster only companies related to the ports are analyzed, we managed to find out the turnover figures of Kunda Port that is a part of Nordic Tsement AS. Due to that and in order to give a better overview, we have used only the figures of Kunda Port in these diagrams. Ten biggest companies by turnover included also Pärnu Kaubasadam AS that has been deleted from the Commercial Register in 2009.

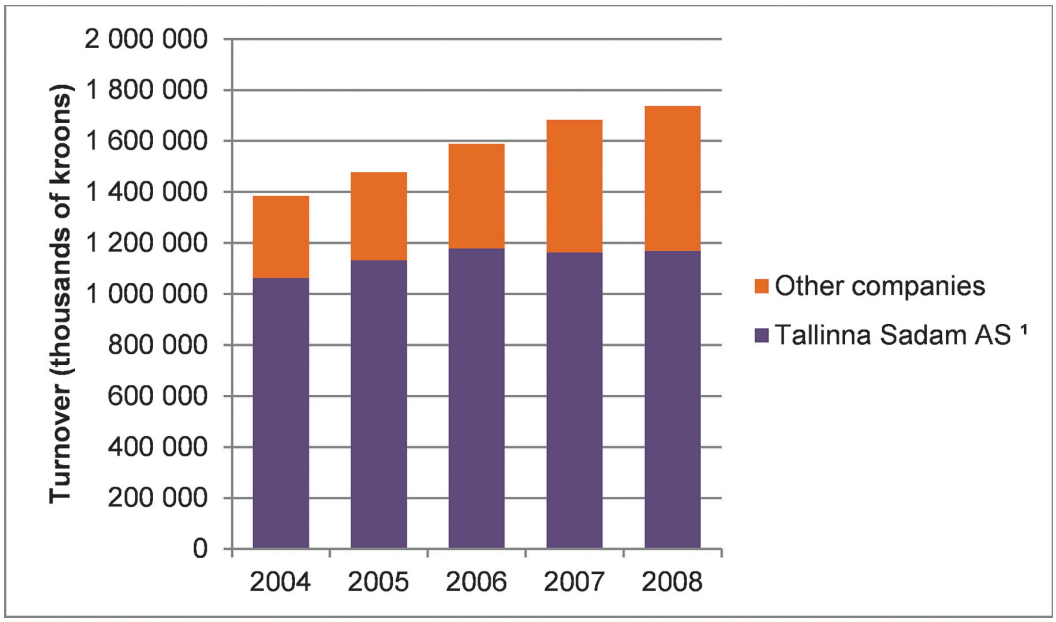

Diagram 18. The share of the turnover of Tallinna Sadam AS in 2004-2008 in the ports' sub-cluster.

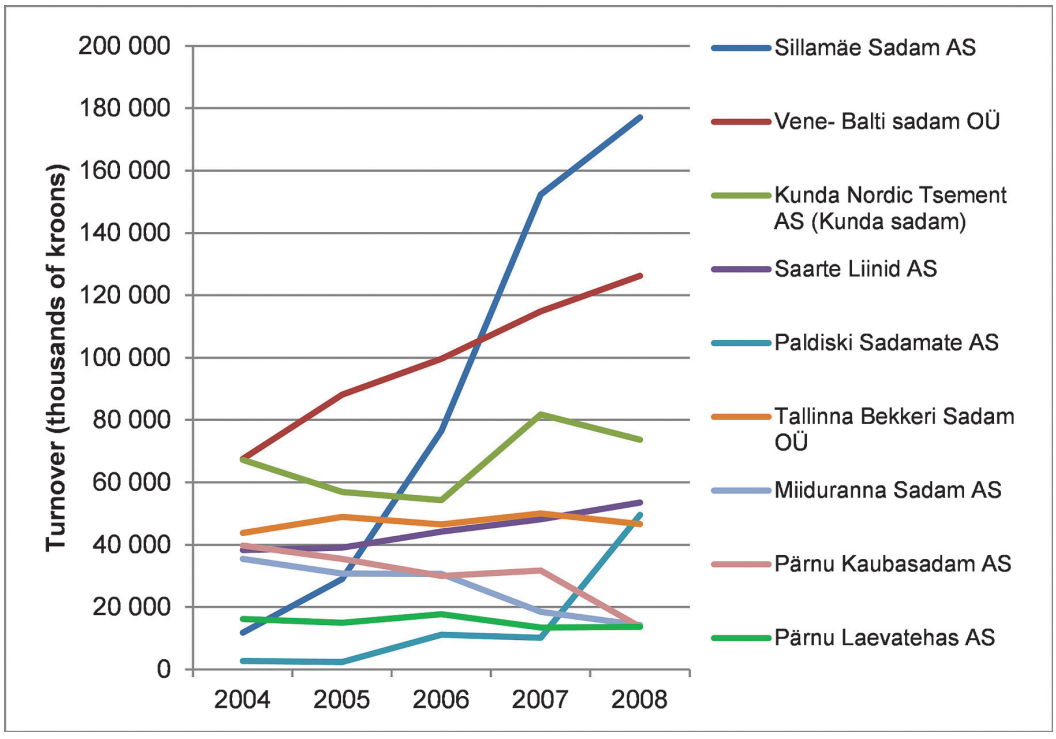

Diagram 19. Turnover comparison of the ten biggest companies by turnover in ports' sub-cluster 2004-2008, without Tallinna Sadam AS.

The biggest employer in the ports' sub-cluster is Tallinna Sadam AS with the average number of employees 497 in 2008. As the number of employees in Tallinna Sadam AS constitutes the majority of the total number of employees in this sub-cluster, there are two diagrams to

provide a better overview. The first diagram (see Diagram 20) shows the comparison of the average number of employees in Tallinna Sadam AS with that of the other sub-cluster companies with the biggest turnovers. This diagram shows that although the number of employees in Tallinna Sadam AS has decreased lately, the company is still the biggest employer in this sub-cluster. The other diagram (see Diagram 21) shows the comparison of the average numbers of employees in the rest of the ten biggest companies by turnover in 2004-2008, without Tallinna Sadam AS. We can see here that the second biggest company by employee number in this sub-cluster is Vene-Balti Sadam OÜ with the average number of employees

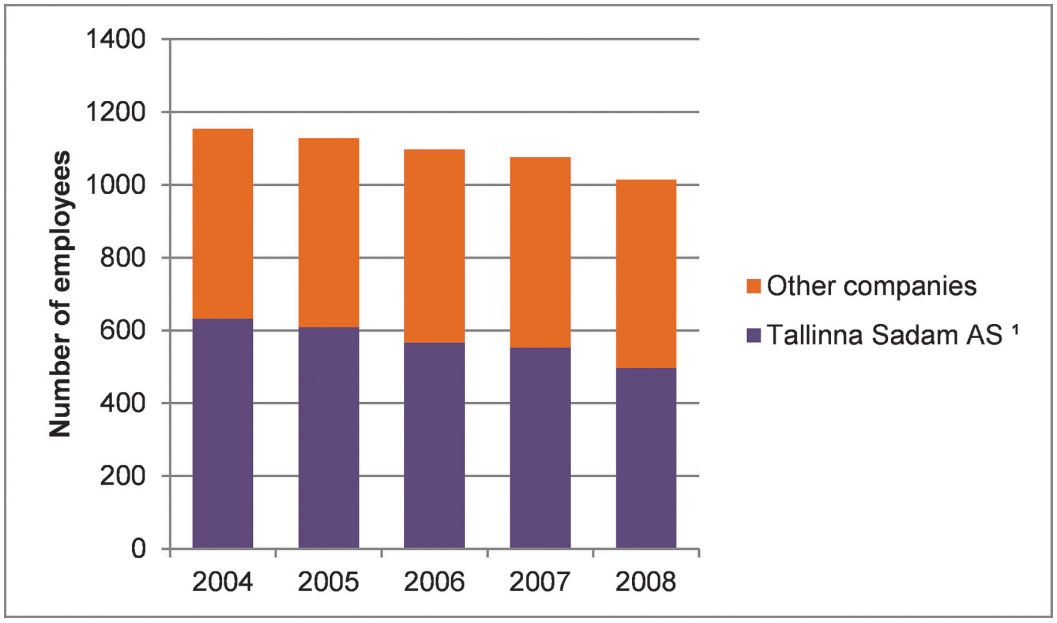

Diagram 20. The share of Tallinna Sadam AS average number of employees in the ports' sub-cluster during the period 2004-2008.

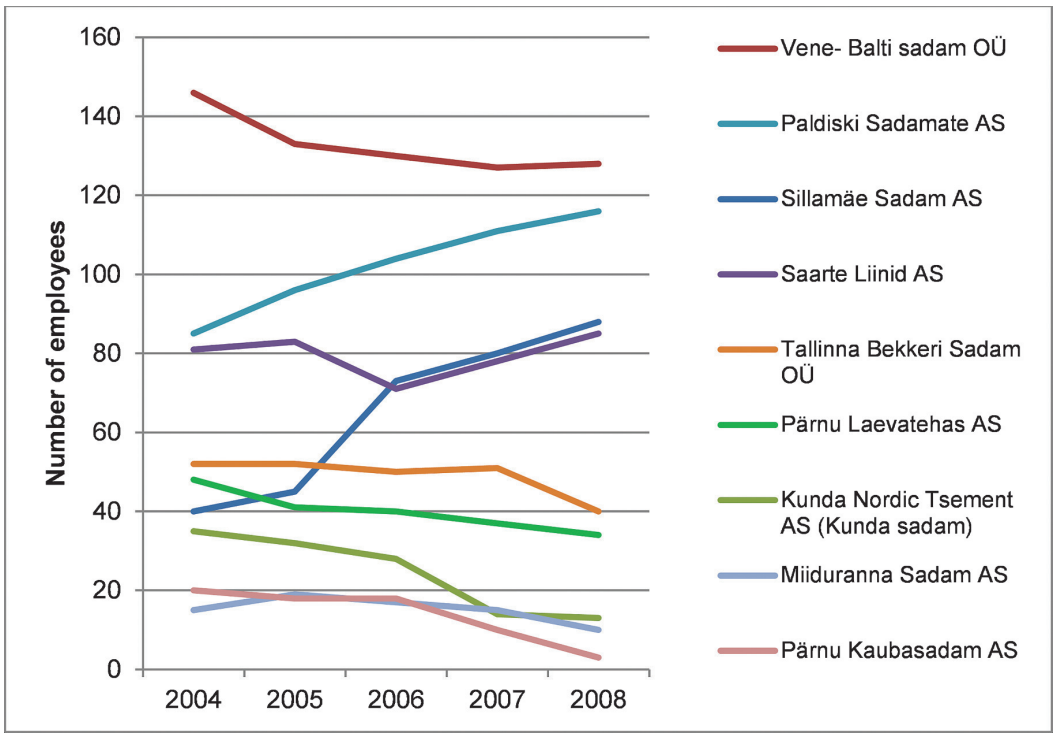

Diagram 21. Comparison of the average number of employees of the ten ports' sub-cluster companies with the biggest turnover during the period 2004-2008, without Tallinna Sadam AS.

128 in 2008. Comparing the number of employees we have also used only the number of employees in Kunda Sadam that is a part of Kunda Nordic Tsement AS, so that we can claim that only the companies related to ports and usage of fairways are used as the basis of this comparison.

8.3 Port Operators

Port operators are acting in the territories of different ports and the total number of such companies is 28 in the current maritime cluster research. Sub-cluster of port operators consists mainly of companies dealing with transit of goods, loading and unloading, and also companies offering bunkering, stevedore and cargo handling services. The total turnover of this sub-cluster was 6.7 billion kroons in 2008 which constituted approximately 12% of the maritime cluster's total turnover.

The diagram below compares the turnovers of the ten biggest companies by turnover in the port operators sub-cluster (see Diagram 22). This diagram shows that the company with the biggest turnover in this sub-cluster is Neste Eesti AS with the turnover of 3 billion kroons in 2008. Unfortunately we failed to find out the share of maritime activities in its turnover. The main activities of Neste Eesti AS are receiving oil products from ships and railways, storing the products in the terminals, excise warehouse services, and issuing products to clients (Neste Eesti, 2011). The turnover of Neste Eesti AS has been increasing since 2004. The second biggest company by turnover in this sub-cluster is Vopak E.O.S AS with the turnover of 1.73 billion kroons in 2008. Vopak E.O.S AS is a part of Royal Vopak group and it deals with processing and storing liquid and gaseous chemicals and oil products (Vopak E.O.S, 2008). The turnover of Vopak E.O.S AS has been on the increase since 2005. The bigger companies

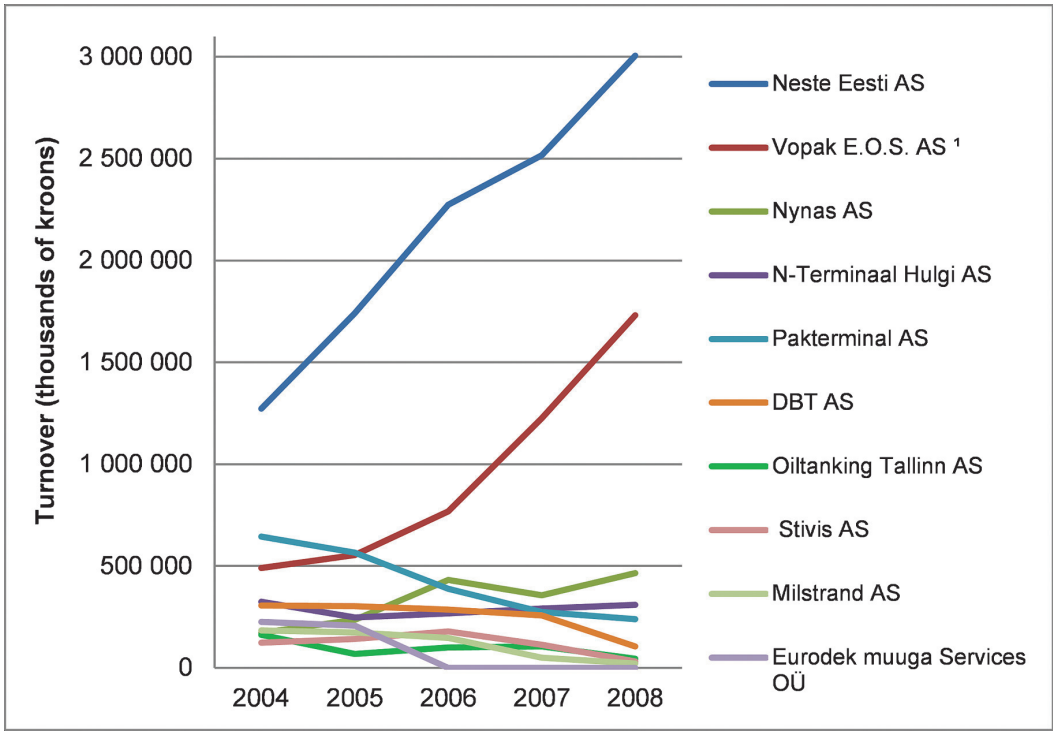

Diagram 22. Turnover comparison of the ten biggest companies by turnover in the port operators' sub-cluster 2004-2008.

are followed by Nynas AS with the turnover of 0.47 billion kroons. Nynas AS was known as Nybit AS until 2007 but then there was a name change. The turnover of Pakterminal AS in 2008 was 0.24 billion kroons and in the same year the company was purchased by Vopak E.O.S AS (Vopak E.O.S, 2010). The company Eurodek Muuga Services OÜ that was involved with processing oil products was deleted from the Commercial Register June 18, 2008 but there was no data to be found about this company already from 2006.

Port operators' sub-cluster is not very big by the number of employees. Comparison of the number of employees in the ten biggest companies by turnover in this sub-cluster is shown in the following diagram (see Diagram 23). The biggest employer in 2008 is Vopak E.O.S. with the number of employees 164 and this has been on the increase since 2004. DBT AS has 153 employees and Stivis AS 99. This diagram illustrates the fact that the number of employees in many companies has started to decrease since 2006.

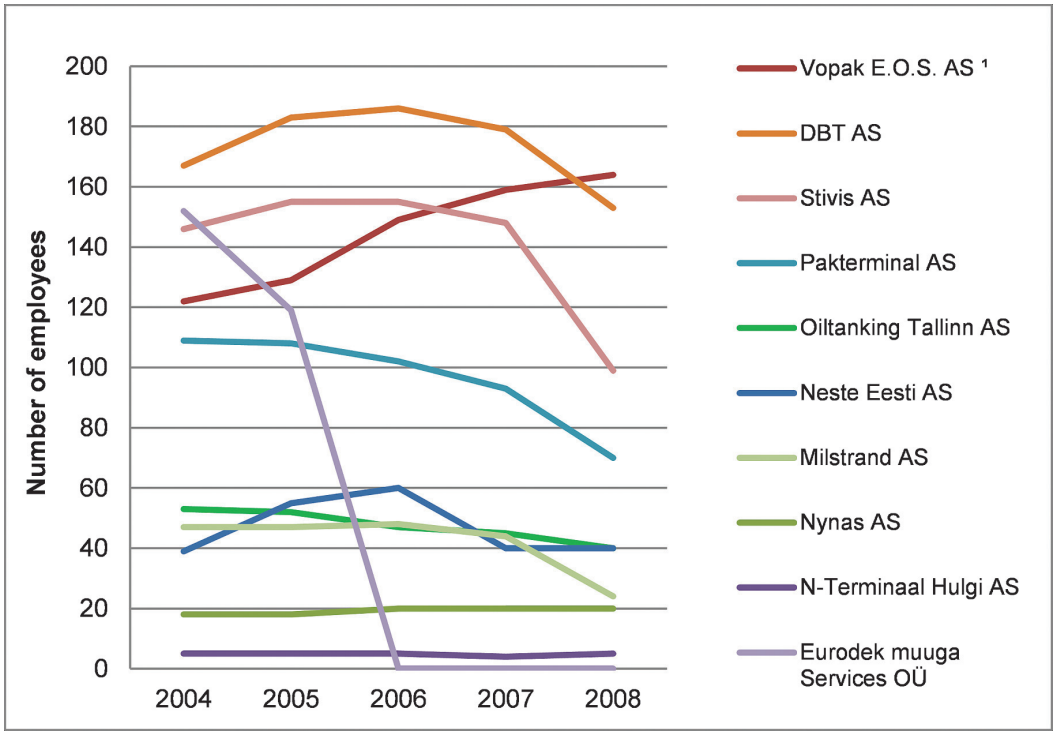

Diagram 23. Comparison of the average number of employees in the ten port operators' sub-cluster companies with the biggest turnover during the period 2004-2008.

8.4 Maritime Service and Intermediate Commercial Transactions

The sub-cluster of maritime service and intermediate commercial transactions is the biggest in the comparison of turnovers. This sub-cluster includes companies providing services like bunkering ships, transport services, dispatch of goods, ships agency services and logistics services. This sub-cluster also includes companies dealing with technical supervision and certifications. In the current thesis, 152 companies have been selected for this sub-cluster and it is the biggest sub-cluster by the number of companies. Total turnover of this sub-cluster in 2008 was approximately 17.8 billion kroons that constituted about 33% of the total turnover of the maritime cluster.

There are three bigger companies in this cub-cluster. Turnover comparison of the ten companies with the biggest turnover in this sub-cluster is shown in the diagram below (see Diagram 24). Transtrade AS with the annual turnover of 5.77 billion kroons had the biggest turnover of all the companies in this sub-cluster in 2008. The diagram shows that the company's turnover

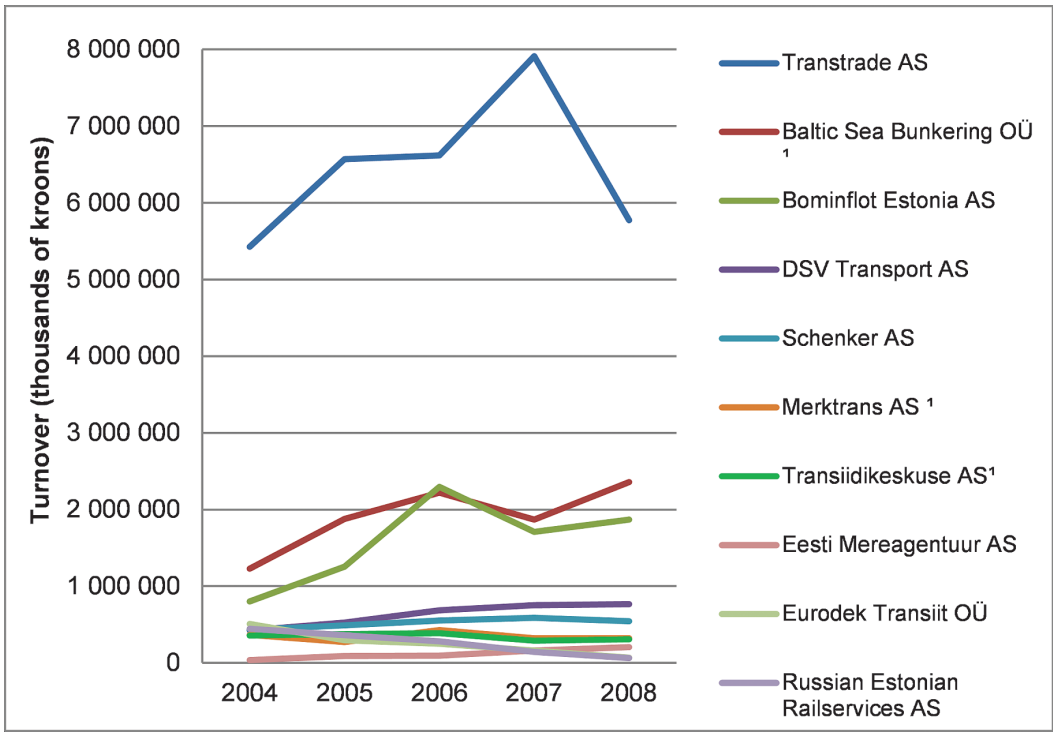

Diagram 24. Turnover comparison of the ten companies with the biggest turnover in the sub-cluster of maritime service and intermediate commercial transactions during the period 2004-2008.

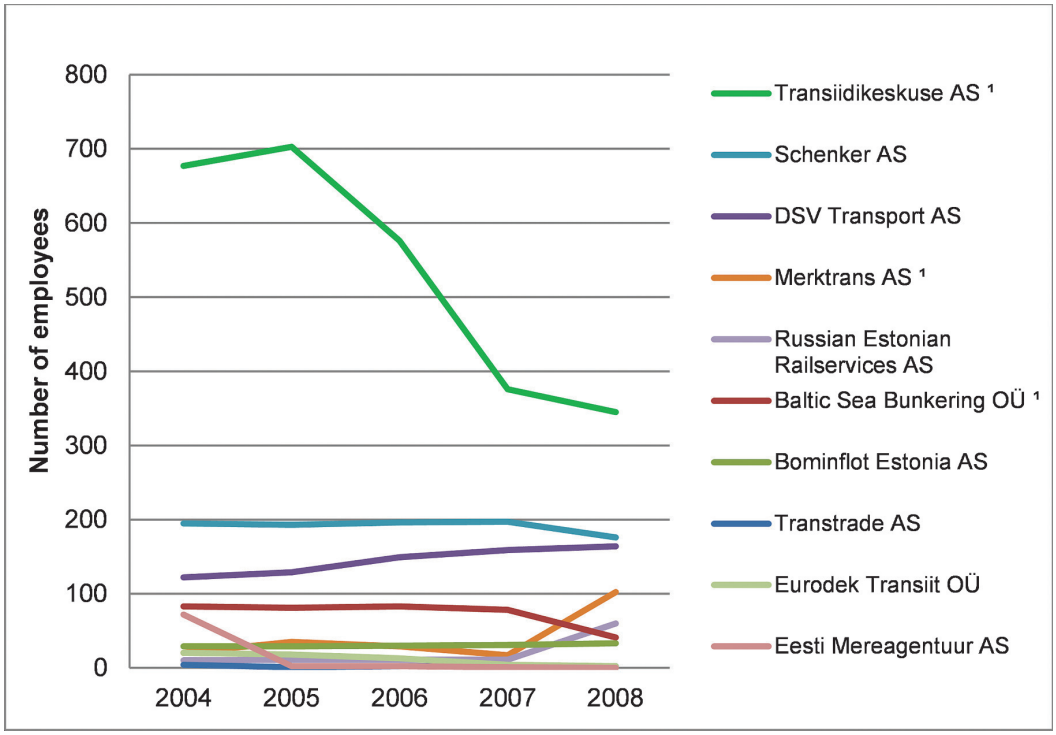

Diagram 25. Comparison of the number of employees in the ten companies with the biggest turnover in the sub-cluster of maritime service and intermediate commercial transactions during the period 2004-2008.

has been on the increase until 2007 and then decreased abruptly. Transtrade AS is mainly involved with providing transport and logistics services. The second biggest company by turnover in this sub-cluster is Baltic Sea Bunkering OÜ with the turnover of 2.36 billion kroons in 2008. Baltic Sea Bunkering OÜ is a group of companies dealing with ship bunkering. The third biggest company by turnover is Bominflot Estonia AS with the turnover of 1.87 billion kroons in 2008. Bominflot Estonia AS is in the business of retail sales of petrol and diesel, the company also provides services related to usage of port and seaways and ship bunkering.

The following diagram (see Diagram 25 on page 31) shows the comparison of the number of employees in the ten companies with the biggest turnover in the sub-cluster of maritime service and intermediate commercial transactions. The biggest employer in this sub-cluster is Transiidikeskuse AS with 345 employees in 2008. The number of employees in Transiidikeskuse AS was increasing since 2004 and started to decrease again from 2005 and this company is the only one in this sub-cluster that has made significant changes in the number of employees during the last five years. Important employers in this sub-cluster are also Schenker AS with 176 employees and DSV Transport AS with 164 employees.

8.5 Shipbuilding and Repair

The sub-cluster of shipbuilding and repair includes companies mainly involved with the construction, repair and maintenance of ships, floating crafts and platforms, as well as boat and yacht building and metal industry, for example producing and installation of terminal containers. In the current research, 45 companies are included in the shipbuilding and repair sub-cluster making this the third biggest sub-cluster considering the number of companies. Total turnover of this sub-cluster in 2008 was 7.8 billion kroons that constituted approximately 14% of the total turnover of the maritime cluster.

The biggest company in the shipbuilding and repair sub-cluster is BLRT Grupp AS with the turnover of 5.99 billion kroons in 2008. BLRT Grupp AS is the group of shipyards and metal industry including two ship repair plants - one in Tallinn and the other in Klaipeda (Lithuania) - and many other subsidiaries. BLRT Grupp AS provides repair services in many Estonian ports during loading or unloading and also in the foreign port or even on the ship's way from one port to another (BLRT Grupp, 2005). The turnover of BLRT Grupp AS constitutes 77% of the total turnover of shipbuilding and repair sub-cluster. In order to provide a better overview, two diagrams are compiled to illustrate the turnovers of this sub-cluster. The first diagram (see Diagram 26) shows the share of the BLRT Grupp AS turnover as compared to the other ten companies with the bigger turnover in this sub-cluster. Other companies on this diagram are the rest of the nine companies with the biggest turnover in this sub-cluster. The other diagram (see Diagram 27) shows the turnover comparison of the nine biggest companies, without BLRT Grupp AS. This diagram shows that the second biggest company in this sub-cluster is Loksa Laevatehase AS with the turnover of 0.63 billion kroons. Loksa Laevatehase AS mainly deals with the manufacturing of metal constructions and their parts. Diagram 27 also includes Lindal Private Shipping OÜ that dealt with construction and maintenance of ships and other floating crafts but the company declared bankruptcy in 2006. Cargotec Estonia AS was known before as Balti ES AS. Cargotec purchased Balti ES AS located in Narva in 2007 (Cargotec, 2007). Baltic Workboats AS was known before as Saare Töölaevad AS.

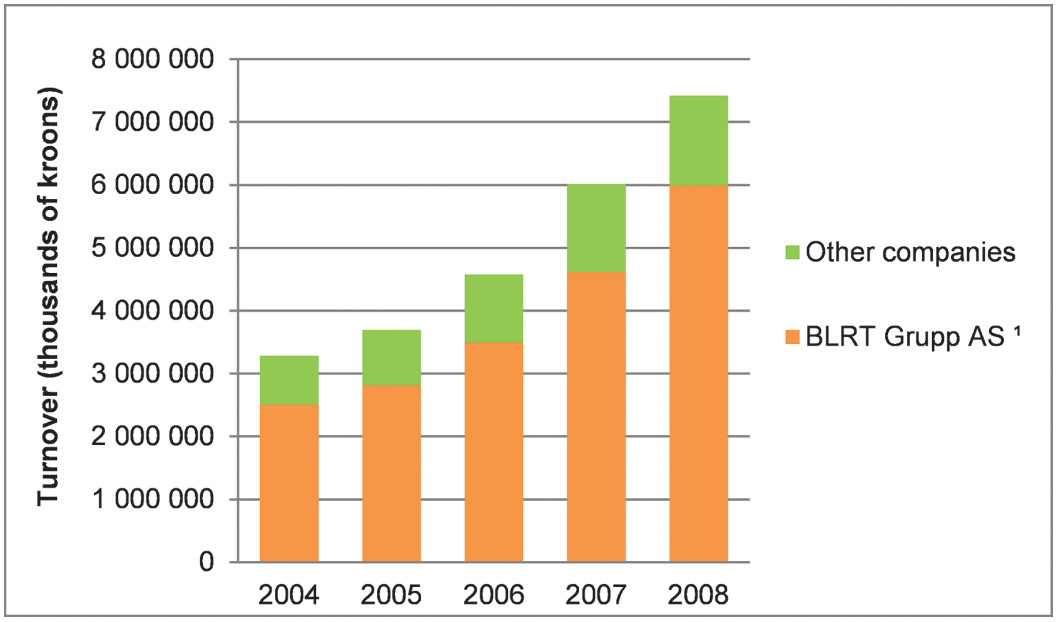

Diagram 26. The share of BLRT Grupp AS turnover in the shipbuilding and repair sub-cluster during the period 2004-2008.

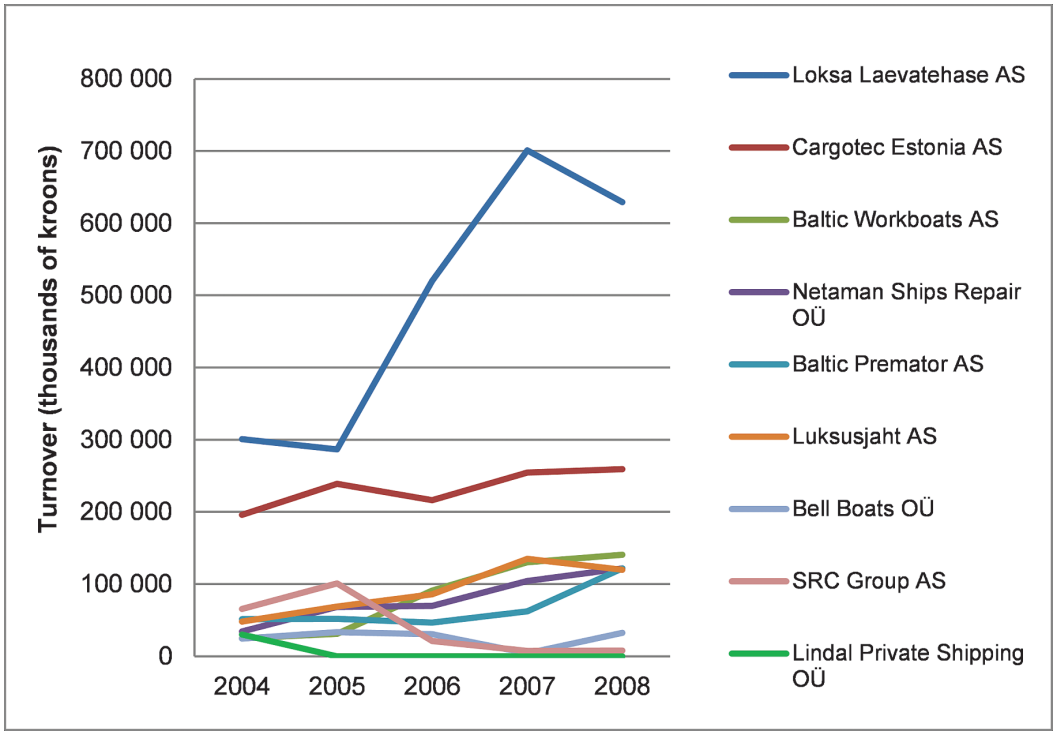

Diagram 27. Turnover comparison of the ten companies with the biggest turnover in the shipbuilding and repair sub-cluster during the period 2004-2008, without BLRT Grupp AS.

The biggest employer in the shipbuilding and repair sub-cluster is BLRT Grupp AS whose number of employees reached 3247 in 2008. As in case of comparing the turnovers, we have also used two diagrams to compare the average numbers of employees. As majority of people work for BLRT Grupp AS, the first diagram (see Diagram 28) illustrates the share of number of employees in BLRT Grupp AS as compared to that of the other ten biggest companies in the shipbuilding and repair sub-cluster. The other diagram (see Diagram 29) compares the average number of employees in the rest of the ten companies with the biggest turnover in

2004-2008, without BLRT AS. This diagram shows that the second biggest employer in this sub-cluster is Loksa Laevatehase AS that employed 629 people in 2008 and the third biggest employer was Cargotec Estonia AS with 551 employees.

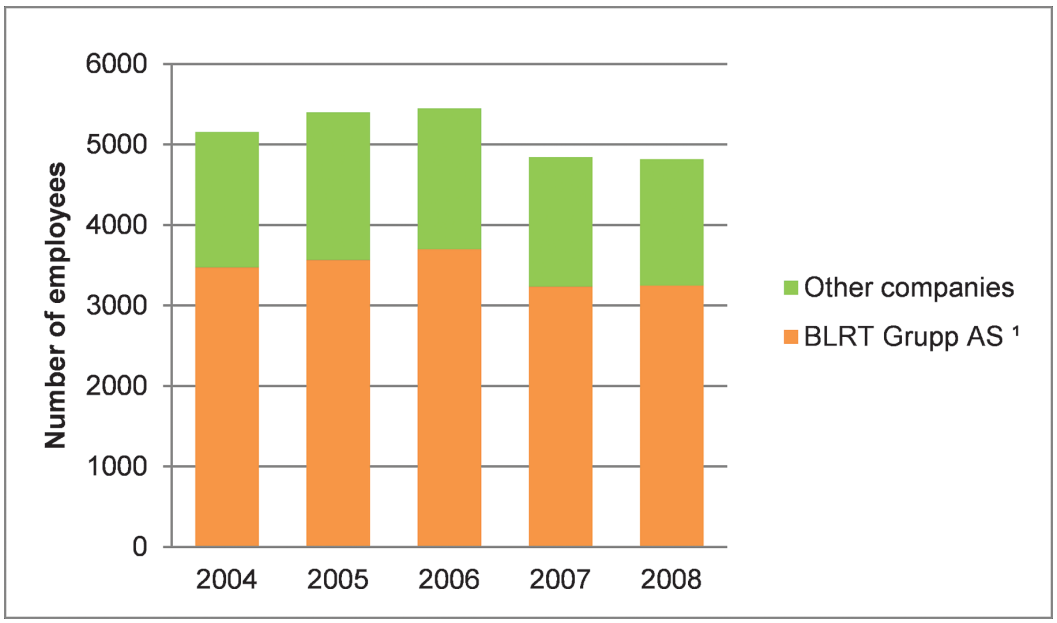

Diagram 28. The share of BLRT Grupp AS number of employees in the shipbuilding and repair sub-cluster during the period 2004-2008.

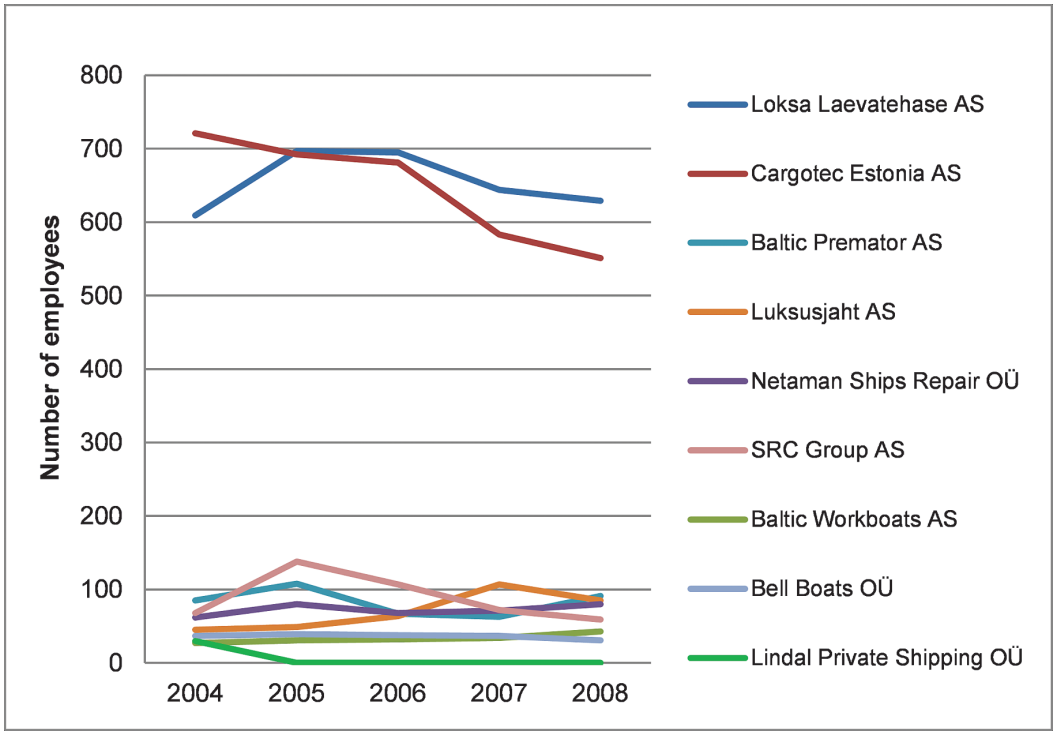

Diagram 29. Comparison of the average number of employees in the ten companies with the biggest turnover in the shipbuilding and repair sub-cluster during the period 2004-2008, without BLRT Grupp AS.

8.6 Public Sector. Science and Education

This sub-cluster includes companies that operate in the public sector and have direct influence on the Estonian maritime affairs. Areas related to maritime affairs are managed by Ministry of Economic Affairs and Communications in Estonia. The objective of the Ministry of Economic Affairs and Communications (MEC) is to create overall conditions for the growth of the competitiveness of the Estonian economy and its balanced and vital development through the drafting and implementing Estonian economic policy and evaluating its outcomes (The Ministry of Economic Affairs and Communications, 2011b). The Ministry of Economic Affairs and Communications is responsible for the welfare of Estonian domestic and foreign maritime affairs. This can be done through legislation and regulations, but also as a result of initiating advantageous transactions (The Ministry of Economic Affairs and Communications, 2011a).

A governmental agency operating within the area of MEC is Maritime Administration. The objective of Maritime Administration is implementing the state's economic policy in the maritime affairs and ensuring safe navigation (Statute of Maritime Administration, §12).The main functions of the Maritime Administration are creating conditions for ensuring the safety and security of water traffic in Estonian maritime waters and navigable inland waters, participating in drafting of legislation related to the activities of the Administration and participating in the development of policies, strategies and development plans related to the Activities of the Administration (Statute of Maritime Administration, §13). Other ministries are related to the maritime affairs as well, e.g. the Ministry of the Environment is responsible for the preservation of the marine environment, Ministry of Agriculture is responsible for the development of fishing industry, and the Ministry of Internal Affairs is responsible for marine monitoring, rescue, pollution management, and maritime spatial planning.

This sub-cluster may also include many other national organisations that have contact with maritime companies but in case of which it is difficult to specify the maritime activities separately from others. For example, national organisations and authorities conducting monitoring, analyses etc. in the ports.

The Ministry of Education is responsible for maritime education in Estonia. In Estonia, it is possible to acquire maritime education in Estonian Maritime Academy (EMA) which provides vocational training as well as higher education. Estonian Maritime Academy offers the opportunity of acquiring a degree in tertiary education (university degree) based on a higher vocational training but also entering the M.A. teaching programs in cooperation of Tallinn Technical University. EMA also provides retraining and in-service training for maritime specialists and these trainings take place in different locations in Estonia. Areas related to maritime affairs are also being taught in Tallinn Technical University, Estonian Agricultural University, etc.

8.7 Yachting and Recreation

This sub-cluster includes companies that are mainly involved with providing recreation and tourism services. The word "recreation" derives from the Latin word "recrea'tio" meaning revival and recovering. The English word "re-create" is also derived from this Latin stem and its most accurate possible meaning would be "creating again" or "rebirth" (Rajaleidja, 2011). The yachting and recreation sub-cluster includes 13 companies. The total turnover of this sub-cluster was 0.17 billion kroons in 2008.

There are three companies with a bigger turnover in the sub-cluster of yachting and recreation. The company with the biggest turnover is Rapala Eesti AS with the turnover of approximately 137 million kroons in 2008. Rapala Eesti AS is in the business producing fishing and sports equipment. As the company's turnover constitutes the biggest share of the total turnover in this sub-cluster, we have compiled two diagrams to provide a better overview. The first diagram (see Diagram 30) illustrates the share of Rapala Eesti AS turnover in this sub-cluster. The second diagram (see Diagram 31) shows the turnover comparison of the other

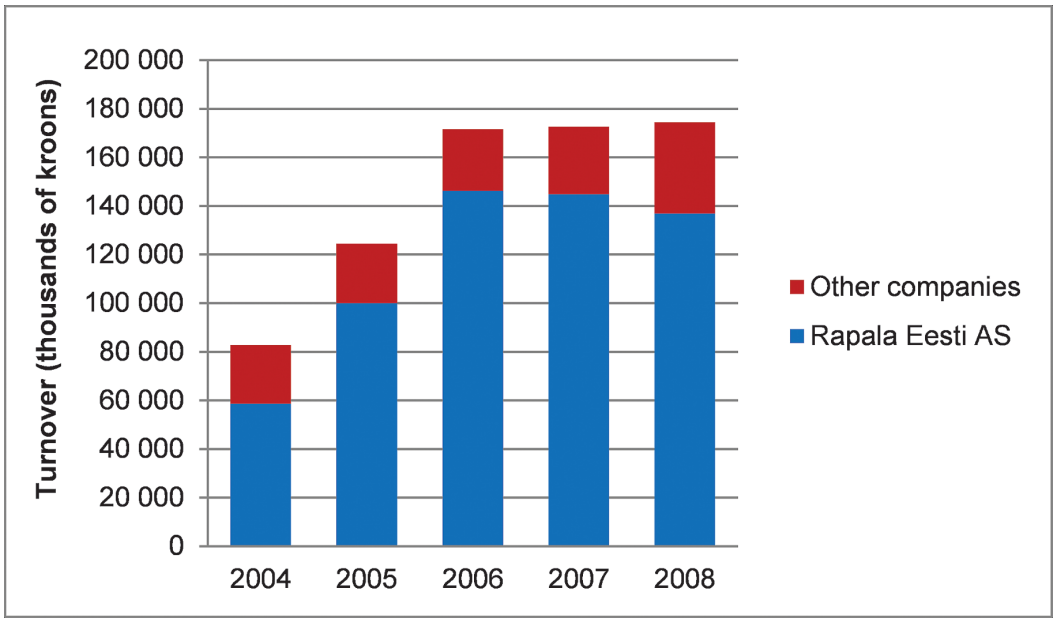

Diagram 30. The share of Rapala AS turnover in the sub-cluster of yachting and recreation during the years 2004-2008.

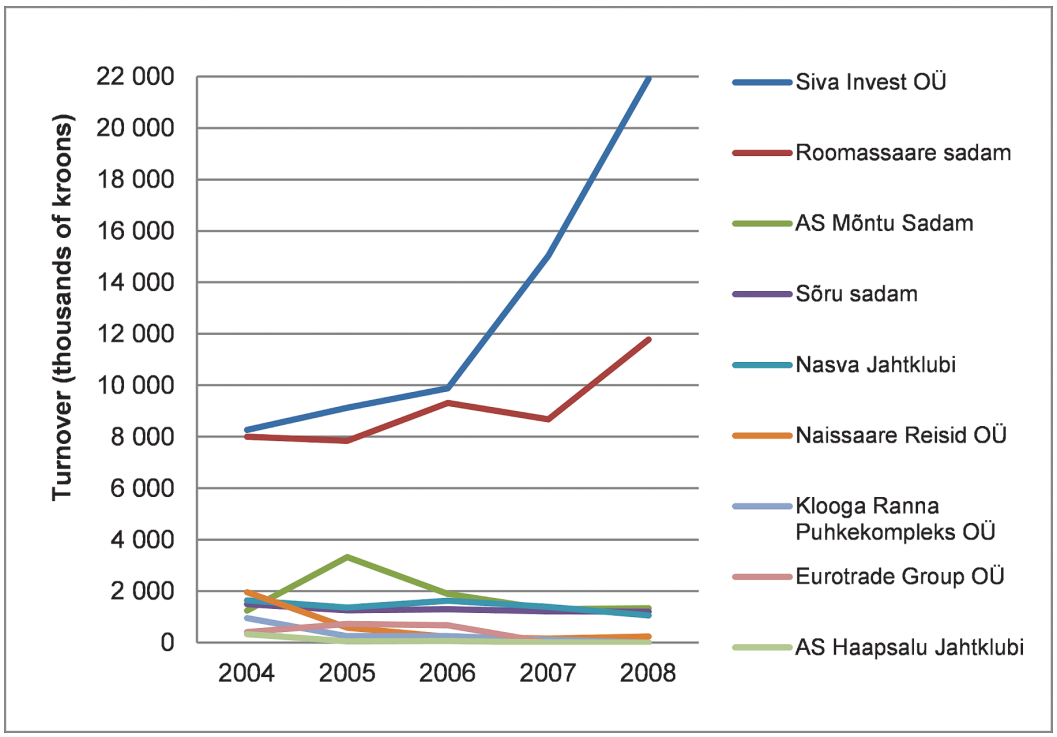

Diagram 31. Turnover comparison of the ten companies with the biggest turnover in the sub-cluster of yachting and recreation in the period 2004-2008, without Rapala Eesti AS.

companies with bigger turnovers in this sub-cluster. This diagram shows that the two companies with the biggest turnover are Siva Invest OÜ and Roomassaare sadam. Siva Invest OÜ turnover was 22 million kroons in 2008 and the turnover has significantly started to increase since 2006. Siva Invest OÜ provides catering, tourism and accommodation services. The third biggest company by turnover is Roomassaare sadam with the turnover of 12 million kroons. Roomassaare sadam is mainly involved with recreational activities. Klooga Ranna Puhkekompleks OÜ, Eurotrade Group OÜ and AS Haapsalu Jahtklubi which also belong to

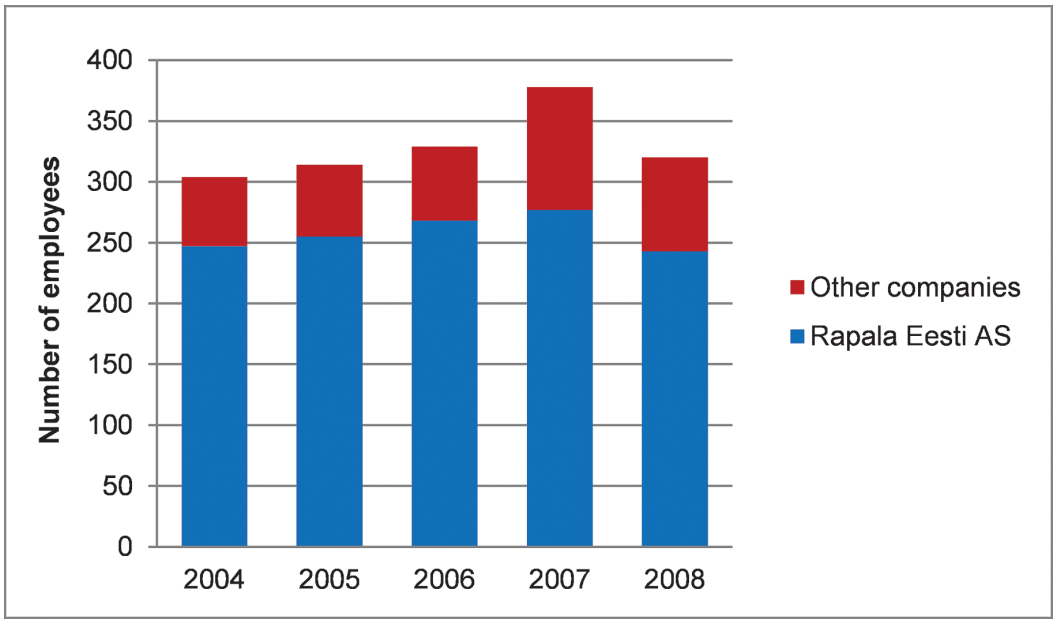

Diagram 32. The share of the number of employees in Rapala Eesti AS in the sub-cluster of yachting and recreation during the years 2004-2008.

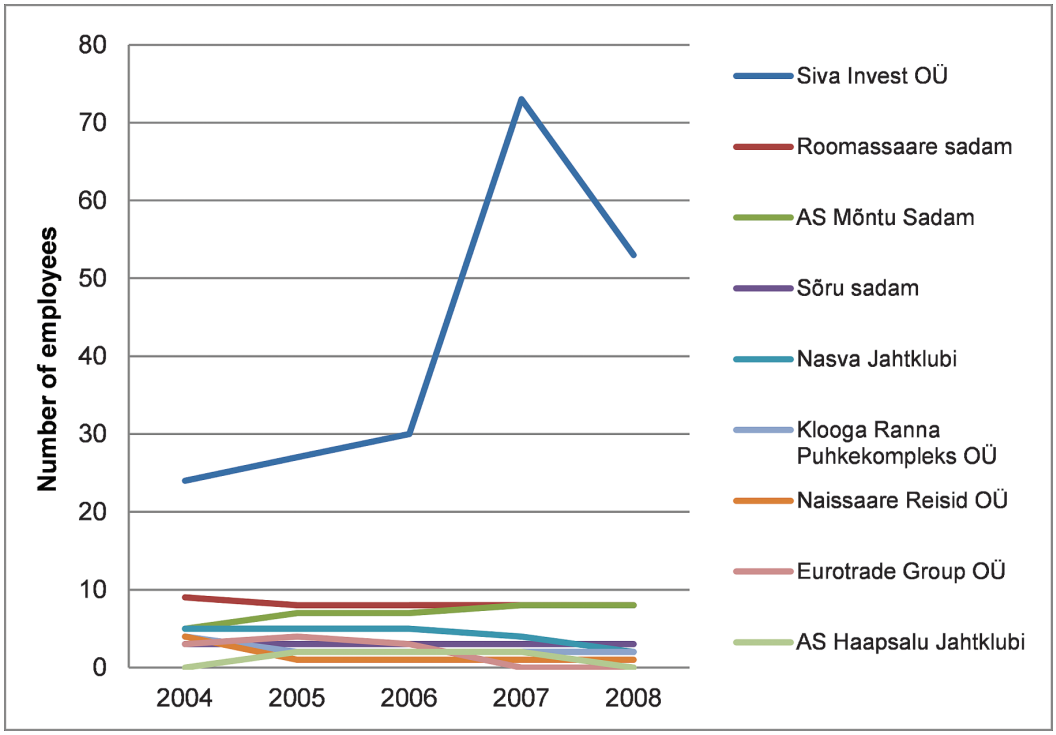

Diagram 33. Comparison of the average number of employees in the ten companies with the biggest turnover in the sub-cluster of yachting and recreation during the period 2004-2008, without Rapala Eesti AS.

the sub-cluster of yachting and recreation, had no turnovers in 2008. Klooga Ranna Puhkekompleks OÜ was deleted from the Commercial Register in March 2011, and AS Haapsalu Jahtklubi was deleted in June 2010.

The average number of employees in this sub-cluster is quite small. The biggest employer is Rapala Eesti AS with 243 employees in 2008. The second biggest employer is Siva Invest OÜ with 53 employees in 2008. In order to provide a better overview, diagram 32 on page 37 illustrates the share of Rapala Eesti AS number of employees in comparison with the total number of employees of the rest of the companies with the biggest turnover in this sub-cluster. The second diagram (see Diagram 33 on page 37) shows the comparison of the number of employees in the other companies with the biggest turnovers in this sub-cluster.

8.8 Construction and Maintenance of Fairways and Marine Facilities

The sub-cluster of construction and maintenance of shipping lanes and water facilities includes companies mainly dealing with construction, diving and dredging activities, hydraulic engineering and underwater works. In the current research, 23 companies were included in this sub-cluster. There are also companies who are mainly active in the construction business and hydraulic engineering and construction of ports constitutes only a small part of the companies' activities.

As explained in the chapter "Source Materials and Methods for Maritime Cluster Research", the maritime sector constitutes approximately 20% of the turnover of the companies in the sub-cluster of shipping lanes and water facilities. The total turnover of the companies included to this sub-cluster in the current research was 11 billion kroons in 2008 and the share of the maritime sector was 2.2 billion which constitutes 20%.

Nevertheless, we have decided to use total turnovers of the companies to describe this sub-cluster. The biggest company in this sub-cluster is Merko Ehitus AS with the turnover over 4.65 billion kroons in 2008. Merko Ehitus AS is a construction company providing services in Estonia, Latvia, and Lithuania. The company provides a wide range of services including construction of different buildings, port facilities, and road networks (Merko Ehitus, 2011). Based on the consolidated annual report of 2008, the share of hydraulic engineering in the total turnover of Merko Ehitus AS in this year was 36.6 million kroons. The second biggest company by turnover in this sub-cluster is Nordecon AS with the turnover of 3.87 billion kroons in 2008. According to the consolidated annual report of the company in 2009, Nordecon AS or previously known as Eesti Ehitus AS went through the name change in March 2009. Nordecon AS focuses on the project management of buildings and facilities and general contracting. In these areas, the company is also active in the field of road construction and maintenance, environmental and port constructions, concrete works and real estate development. It also became clear from the consolidated annual report 2009 that the port construction constituted 14% in 2006, 33% in 2007 and 24% in 2008 of the sales revenue in the construction segment. The third biggest company by turnover is Skanska EMV AS with the turnover of more than 1.75 billion kroons. Skanska EMV AS is mainly active in the business of construction works, project management, real estate development and construction equipment rental. Turnover comparison of the ten biggest companies also includes AS Uus Ehitus RC that declared bankruptcy in October, 2010. The diagram below (see Diagram 34) compares turnovers of the ten biggest companies by turnover in this sub-cluster.

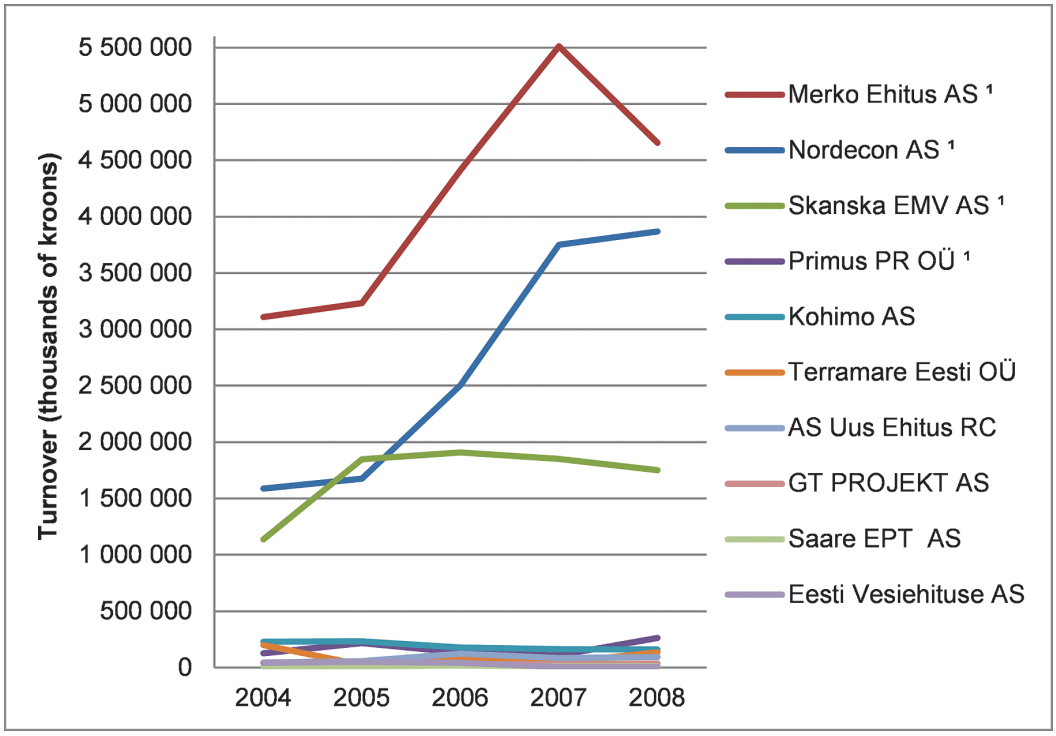

Diagram 34. Turnover comparison of the ten companies with the biggest turnover in the sub-cluster of shipping lanes and water facilities during the period 2004-2008.

The company with the biggest number of employees is Nordecon AS that employed 1232 people in 2008. The second biggest employer is Merko Ehitus AS employing 960 people in the same year. The following diagram (see Diagram 35) compares the numbers of employees. The number of employees has increased most in Nordecon AS and Merko Ehitus AS.

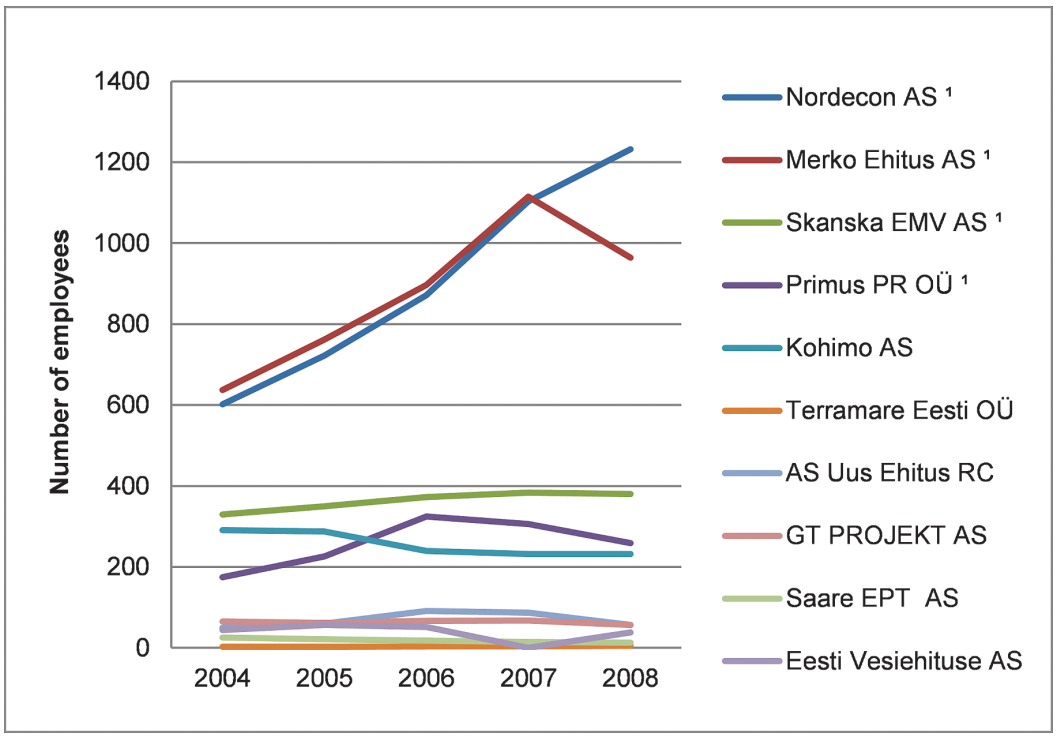

Diagram 35. Comparison of the average number of employees in the TOP 10 companies in the sub-cluster of shipping lanes and water facilities during the period 2004-2008.

8.9 Fishing and Fish Processing. Aquaculture

Fishing is an important industry both in the Estonian coastal areas and inland waters. According to the Statistical Office (2011), 83 548.2 tons of fish was caught from the Baltic Sea in 2009. This number includes deep-sea fishing as well as coastal fishing. Deep-sea fishing constitutes 83% of this figure and coastal fishing only 17%. Most of it was sprats (47 298.5 tons) and Baltic herring (33 164.5 tons). Diagram 36 illustrates the fishing in the Baltic Sea.

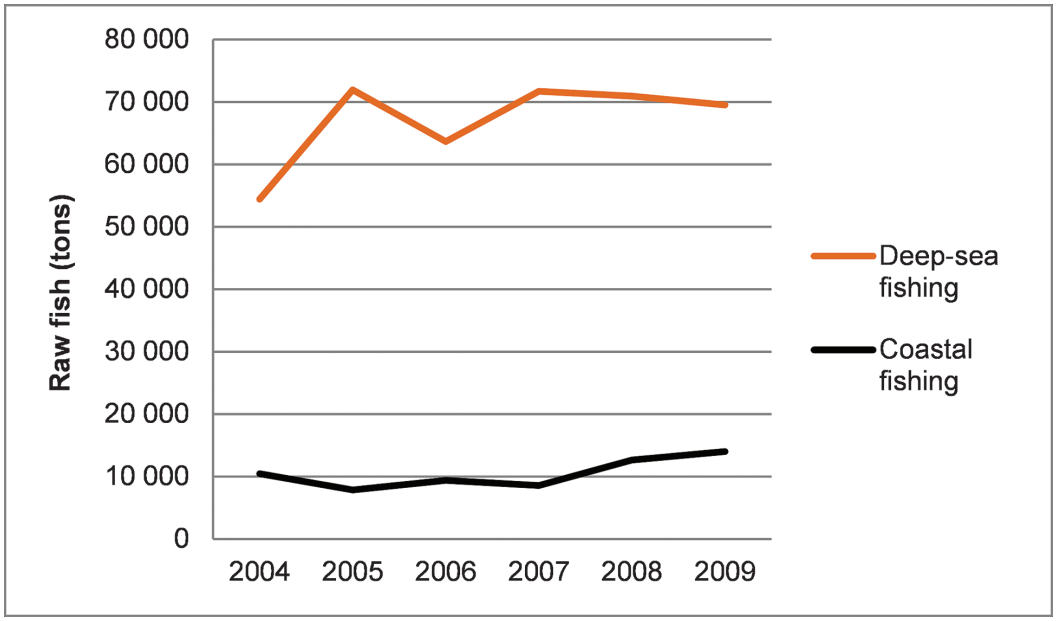

Diagram 36. Fishing in the Baltic Sea during the period 2004-2006 (Source: Statistical Office 2011).

The volume of ocean fishing in 2009 was 10 881 tons (does not include catch in the Baltic Sea). From the ocean mostly shrimps (8587 tons) and redfish (1748 tons) are being caught. Diagram 37 illustrates the volume of ocean fishing during the period 2004-2009. This diagram shows that ocean fishing has decreased throughout those six years.

Most of the inland fishing takes place in Lake Peipsi and in 2008 this constituted 76% of the whole inland fishing. The total amount of fish caught in the same year was 2748.9 tons. The following diagram (see Diagram 38) compares the inland fishing during the years 2004-2009.

The sub-cluster of fishing/fish processing and aquaculture includes companies dealing with fishing, processing marine products, producing fishery products, and fish-farming. Aquaculture means growing aquatic organisms in the pools, sea bays, pounds, ponds, etc. where it is possible to control the living conditions to a certain extent. In the current research, 74 companies were included in the sub-cluster of fishing/fish processing and aquaculture and this sub-cluster is the second biggest based on the number of companies. Total turnover of this sub-cluster in 2008 was 2.2 billion kroons that constituted approximately 4% of the total turnover of the maritime cluster.

The company with the biggest turnover in this sub-cluster is Paljassaare Kalatööstus AS with the turnover of 480 million kroons in 2008. The main activity of Paljassaare Kalatööstus AS is the production and sales of fishery products; the company belongs to the Vichiunai Group (Paljassaare Kalatööstus, 2011). The second biggest company by turnover is Reyktal AS with

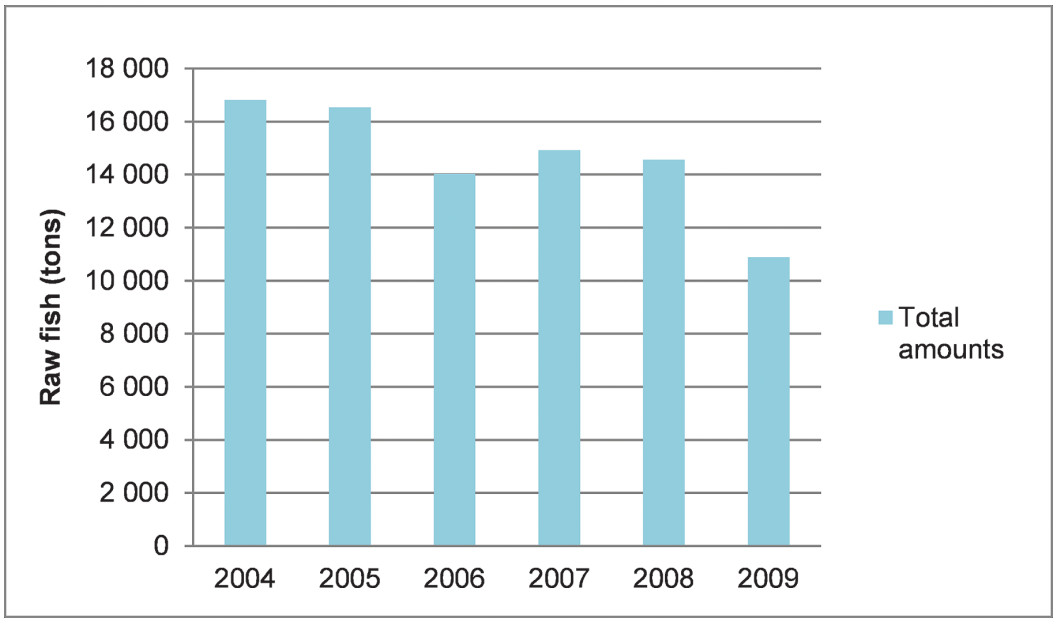

Diagram 37. Ocean fishing during the period 2004-2006 (Source: Statistical Office 2011).

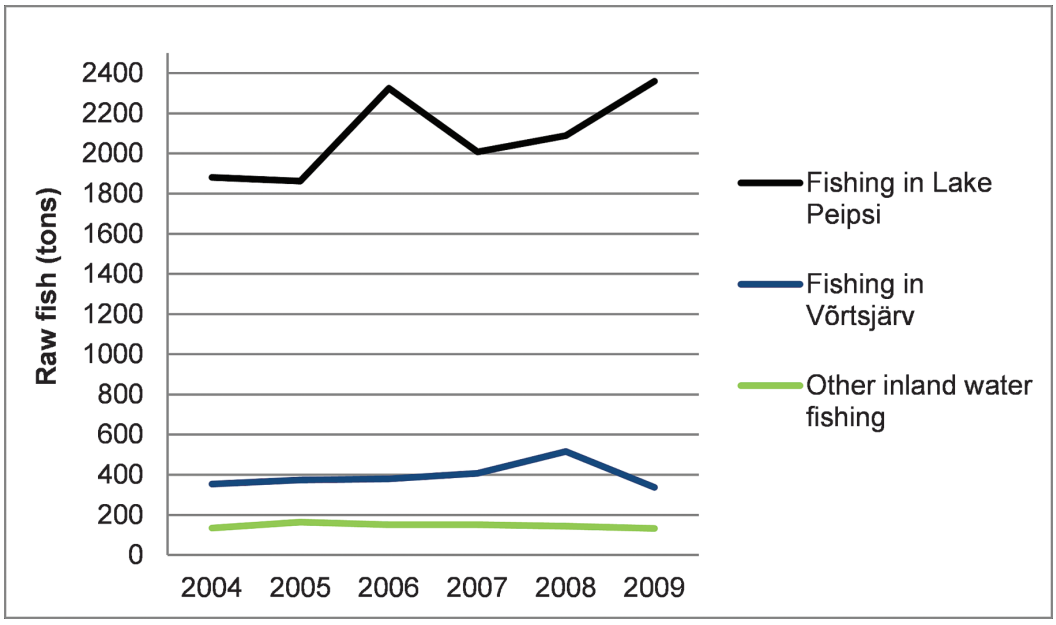

Diagram 38. Inland fishing during the period 2004-2009 (Source: Statistical Office 2011).

the turnover of 344 million kroons. Reyktal AS mainly deals with shrimp fishing and processing other marine products. Viru Rand was formerly known as Viru Kalatööstuse OÜ that went through the name change on January 2, 2008 (Eesti Majanduslugu, 2010). One of the TOP 10 companies by turnover in this sub-cluster is Beetak AS with the biggest turnover in 2006 but then the turnover dropped 3.5 times and in 2009 the company declared bankruptcy. Hiiu Kalur AS includes also Dagomar AS. The diagram below (see Diagram 39 on page 42) compares turnovers of the ten companies with the biggest turnover in this sub-cluster.

There are two bigger employers in the sub-cluster of fishing/fish processing and aquaculture. In 2008 these were Maseko AS with 344 employees and Paljassaare Kalatööstus AS with 338 employees. The following diagram (see Diagram 40 on page 42) compares the numbers of employees. This diagram shows that in the companies with the biggest average number of employees, the numbers have decreased until 2006 and after that they have stabilized.

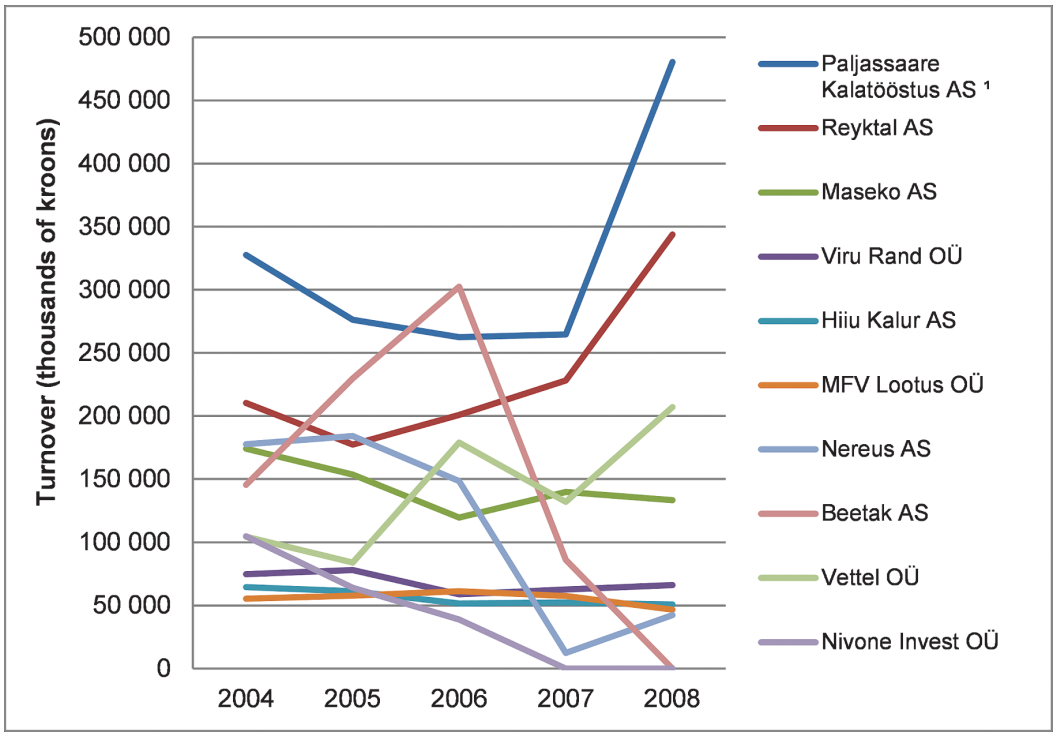

Diagram 39. Turnover comparison of the ten biggest companies by turnover in the sub-cluster of fishing/fish processing and aquaculture during the period 2004-2008.

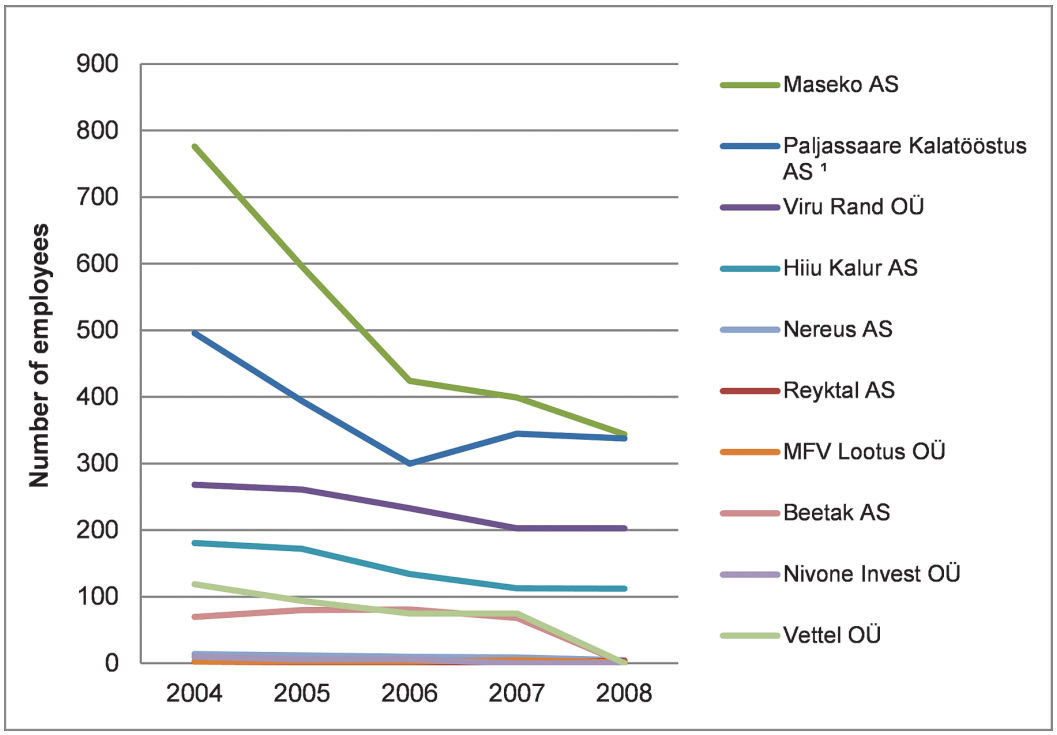

Diagram 40. Comparison of the average number of employees in the ten companies with the biggest turnover in the fishing/fish processing and aquaculture sub-cluster during the period 2004-2008.

9 Estonian Maritime Cluster and Estonian Economy

Clusters are historical phenomena; their structure, size, and influence on the economy of a certain country are changing in time. The mechanisms of achieving the influence are changing as well. Therefore, after discussing theoretical ways of cluster analysis (see Chapters 1-6), it is reasonable to analyze the issues about the present and future role of the maritime cluster in the Estonian economy in the coming decades, about its possible connections with other sectors of Estonian economy, about the factors leading to successful fulfilment of this role and also about the possible critical connections and moments in taking full advantage of all the opportunities of the maritime cluster.

As it was stated in the chapter previously referred to, it is important to avoid equating cluster to the mechanical summary of the economic sectors included, and the term national cluster has to be regarded with utmost precaution, even when we leave aside the issue of foreign or domestic ownership. The characteristic feature of a cluster as a category used in regional development theory as well as in economic theory is the territorial proximity of the companies, a certain territorial community. Talking about a certain Estonian cluster, we are relying on the intuitive understanding that it includes sectors, sub-sectors, and companies that are located in Estonia and "work together", intensifying each other specifically in the Estonian territory. In the current international economy, the state's economic sectors that could be considered as belonging to one cluster, in reality do not have to be at all of primary importance for each other in producing inputs and outputs. Significant inputs and outputs can be produced by foreign companies instead. For example, for Estonian ports the visiting frequency of cargo vessels belonging to other countries is much more important than that of the vessels belonging to Estonian companies. On the other hand, the Estonian maritime transport companies, fishing companies, or shipyards formally belonging to the Estonian maritime cluster, can in reality be operating far beyond the Estonian territory, for example between Finland and Sweden, in Lithuania or in Africa. In that case, the companies may have significant connections with the companies belonging to the Estonian maritime cluster but these are more of an indirect nature than in the case when an Estonian shipping company uses an Estonian port or repairs an Estonian ship in the shipyard located in Estonia.

Summarizing the figures of all the sectors included in the maritime cluster (ports, shipbuilding, passenger and cargo shipping, maritime tourism, fishing) and comparing that to the general figures characterizing our economy as a whole, we can see that the part of economy in question gives (directly) ca 5% of the total turnover of Estonian companies, a little less than 4% of our employment and also a little less than 4% of the Estonian tax revenues (Järve 2010). Still, these are approximate figures because as J. Järve points out, "Some of the areas related to maritime affairs are not distinguishable, they are forming a part of a more general area that is difficult to view separately." The area providing the biggest share of employment is maritime tourism (employs more than 10 thousand people), the second biggest employer is the area related to ports. Based on tax revenues - especially payroll related taxes - the most important sectors are ports and maritime tourism, followed by passenger and cargo transport.

Maritime economy is even more important for providing export earnings and equilibrating Estonian balance of payments than for the Estonian domestic economy. According to many researches (Varblane 2008), the export of Estonian traditional industrial production is under a lot of pressure due to the prices of the production input going up and the heavy competition coming from the countries of Eastern Asia, while at the same time, the role of high-technology industries (ICT, biotechnology, materials sciences) prioritized in the Estonian innovation politics as future providers of export earnings, has been quite small so far.

As it is correctly emphasized in the working document of the Estonian maritime development plan (National Development Plan 2010), the weakness of Estonia is the small size of its own merchant navy. At the same time, it is disputable if this is what brings along the weakness of internal connections in the Estonian maritime cluster as it is stated in this document - the connections between other maritime sub-clusters may be strong and compensate for the absence of the shipping sector.

Therefore, export of services is of utmost importance from the point of view of equilibrating the balance of statements.

In the export of services, the main emphasis is laid on the area of transport and storage services as well as on that of tourism, and the maritime economic component in both of these areas is extremely important.

The fact emphasized in the document of Estonian maritime policy that most of the Estonian export to abroad go by sea, is also significant.

The mechanical adding up of the results of companies related to maritime affairs, does not give the full picture of the significance of the maritime cluster in the Estonian economy though. Cluster approach as an analytical way is characterized by an attempt to consider the extensive influences and amplifications between the companies and the maritime-centred analytical framework will definitely be too limited for such analysis of influences, even in case the analysis involves the counter-impacts of the maritime clusters. For example, cargo transport constitutes - especially nowadays - only one link in the logistical chain of transporting goods. Focusing the analysis only on how to improve the efficiency of maritime transport and port operations and the cooperation between them, we can be able to find some efficiency reserves but we do not necessarily manage to improve the efficiency of this logistical chain after all. This may depend either on the railway operations or land border crossing or on the nature of the relations with the consignors or consignees, or on how effectively the movement of goods in the logistical chain is controlled and coordinated while most of the movement is happening inland, not on the sea. Therefore, to improve the functioning of this chain, it may be practical to address this not in the context of the maritime cluster but rather in that of the transport and logistics or transit cluster. As indicated (Lemberg, Terk 2007), in Estonia only the minority of the turnover of the companies belonging to the transport sector is constituted by the turnover of companies directly involved with transport (water transport, road transport, other land transport, air transport), most of the turnover is constituted by the so-called other related areas (storage services, cargo handling, cargo forwarding, port and airport services, navigation services, passenger service, etc.). Among those other services, the majority does not relate to operating one specific mode of transport but to operating many different modes or even the whole logistical chain. Therefore, classical analysis of transport and logistics companies by the modes of transport does not work so well any more. It is quite difficult to separate maritime tourism - whether we are talking about the areas relating to cruise ships or yachts - from tourism cluster (here we bear in mind the wide approach to the cluster, the so-called hospitality industry/hospitality cluster).

In case we include into transit and tourism clusters also the companies from sectors directly or indirectly related to these clusters, their size is not going to be smaller than that of the maritime cluster, but it can be even bigger. The importance of transit cluster in Estonian GDP (in the sense of the transit of products) was over 9% during the golden period of transit related to oil and oil products, and this cluster is estimated to constitute over 6% of the Estonian GDP today as well (Laidvee 2007). The share of tourism in the Estonian GDP as the so-called "full cluster" (including also commerce related to tourists) is estimated to constitute over 10% of our GDP.

This does not mean that dealing with the maritime cluster and its internal connections is not important, but rather that it would be practical to deal with the system consisting of three related clusters and the ways to improve the efficiency of this system (see Diagram 41). Most of the maritime cluster companies belong in addition to the maritime cluster also to one or even two related clusters. In case of such an approach, it is possible to identify critical issues in the internal connections of the maritime cluster as well as those in the "collusion" with the related companies in the transport/logistics cluster and tourism cluster.

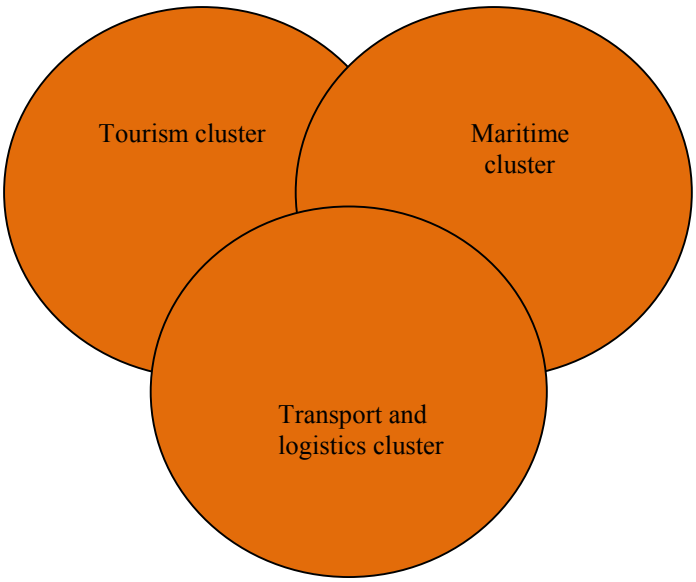

Diagram 41. Maritime cluster and its related clusters

Central elements of the triple system described above are the sea, the passengers arriving by sea, and cargo. But in case of this approach, some elements of maritime economy are moving more to the centre and the others more to the periphery. Of course, ports and port management are important providing the input to so many others (and, naturally, also depend on them). But then again, it is possible to view shipbuilding/repair and fishing as quite autonomous sub-systems, the further development and perspectives of which are more dependent on the external factors or the administrating success of the sub-sector itself, but not so much on the development of the connections with the rest of the elements in the "triple system".

Sea transport of passengers and maritime tourism have become local international business areas which means that at least the leading companies of this area are increasingly operating in the external markets and on the routes connecting foreign states. At the same time, it is definitely easier for the companies in this field, like Tallink, to arrange interlocking with the other companies in the maritime cluster and in its related clusters, for example in the area of developing ports or tourism land services.

In spite of the fact that the ports are the connecting links of the business areas examined, it is obvious that only by expanding, developing, and improving the administration of ports it is not possible to raise the competitiveness of the ports in the competition of the international transit corridors. It is necessary to make the whole logistical chain from consignor to consignee work properly.

The volume of Estonian export and import transportation in tons is not very likely grow under the current circumstances where our economy is getting more expensive and the share of the service economy in it is increasing. In case of the positive scenario, the volume of transit operations is likely to increase, and increase considerably (considering the transit of goods

related to Russia, Kasachstan, China, and possibly also the product flow transit to the south related to Finland), but realization of this positive scenario depends, except for the efficiency of our ports, also on our foreign political background, successful activation of the transit channels going through Estonia in their entirety, and the activities of the competing channels. The reality that the transport of oil and oil products as the main cargo is being replaced by the container goods creates possibilities to start the business based on distribution centres in the Estonian territory in addition to the so-called traffic transit of the products. Successfully operating land-based distribution centres, even if they are located relatively far from the ports, can be a considerable argument for getting additional amounts of goods to the ports.

Due to the environmental limits set on the ship fuels and the respective taxing, the partial shifting of the product flow back from the sea to the land is predicted. In case such a shift is going to take place, there is no reason to regard it as a long-term situation because most probably the environmental limits are becoming stricter for other modes of transport as well.

An interesting issue is also the export of many services related to maritime and transport cluster to other countries, i.e. their possible leaving from the cluster operating in the Estonian territory and their sales as separate services for the ports of other states. First and foremost, the export of ICT solutions used in our ports can be of interest.

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