

## THE ROLE OF LATVIAN PORTS WITHIN BALTIC SEA REGION

Astrida Rijkure, Inga Sare

Latvian Maritime academy, Riga, Latvia

e-mail: astrida.rijkure@inbox.lv; inga.sare@gmail.com

crossref <http://dx.doi.org/10.5755/j01.eis.0.7.5145>

Latvian ports play an important role in the national economy. Latvia has established itself as a transit country (mainly for the Russian, Central Asia and Belarus cargoes). Transit cargoes account for approximately 85% of the total volume of cargoes in the Latvian ports. The Latvian ports handle on average 60 million tons per year. The transportation and storage account for approximately 13% of the Latvian GDP, and the total revenues from transit cargoes account for approximately 4.4% of the GDP and are equal to 27.7% of the total volume of the export of services. Traditional competitors of the Latvian ports include Klaipeda, Tallinn, St. Petersburg and Primorsk ports. Also Ust-luga has joined the above list as it is developed rapidly by Russia. Thus, there is a threat that Russia might direct its cargoes to the ports of its own region by providing the sufficient capacity of its own ports. Therefore, it is necessary to pay special attention to the requalification of cargoes on the Latvian ports into the cargoes with high value added. The topicality of the issue of this research is determined by the current increased attention to the operation of the Latvian large ports, the efficiency of their operations and the competitiveness in comparison to other ports of the Baltic sea region, as well as the initiative of the European Commission regarding the review of the ports policy and their further operation on the European Union level. The article will be focused on Latvian large ports freight volume proportion in comparison to the Baltic Sea ports: Tallinn, Klaipeda, Ust-Luga. Calculations will be made using HHI index (Herfindahl-Hirschman Index), which describes „market power” division between all the subjects in the current market. Particular attention will be focused on cargo structure analysis of Baltic ports and restructuring of cargo circulation in the Baltic Sea region.

**Keywords:** Latvian ports, efficiency, HHI index.

### Introduction

The industry of transportation is developing dynamically. The volume of transportation is increasing not only in individual states, but also on the level of international transportation. The international transportation system includes all the main modes of transportation. International shipments form the very basis of the worldwide market economy. An increasing international turnover of goods leads to the increase of the cargo shipment. International shipments and the transit traffic monitoring via the territory of the Republic of Latvia are the main economical priorities of the state. The cargo shipment is an important part in the manufacturing – consumer chain; the costs of cargo shipment and customs form a considerable part of the final costs of the production. Every mode of transportation has its technical and economical peculiarities. A system of different modes of transportation is based on these peculiarities. In order for a port to function in this very competitive environment of cargo shipment where ports are competing to attract the maximum amount of cargos, it needs to operate efficiently. The evaluation of the port performance efficiency is especially important in the countries and regions, where ports are the driving force of the economical growth; where they provide such important aspects of economical growth as tax payments, the capital investment inflow, creation of new jobs and development of infrastructure.

**Article’s scientific problem.** The organizational structure of every port is unique, therefore it is far from being an easy task to measure and analyze the port performance efficiency

according to one specific standard. The difficulty to determine united standards is based on the fact that there is absence of the united method of how to summarize all the important aspects in order to measure the port performance efficiency.

**This research has several purposes.** First of all, it aims to analyze performance indicators of the large Latvian ports. It also aims to analyze the assessment methodology of the port performance efficiency of the existing ports in Latvia. Secondly, it aims to evaluate significance of the large Latvian ports within the Baltic region.

**In order to achieve the aims of this research, the following tasks have been set:**

- To analyse the port performance efficiency evaluation methods, as well as to analyse the latest scientific conclusions (on the basis of the chosen bibliography).
- To analyse the port performance indicators of the large Latvian ports, as well as to analyse the port performance indicators of ports in the Baltic region.
- To come up with proposals in order to improve the port performance efficiency in Latvia.

**Applied methods for the research.** In order to achieve the aim of this research successfully and to complete the tasks given the authors used the following research methods:

1. In order to batch and to analyze the data, the *Analytical method* has been applied. This method allows to carry out detailed research, based on wide range of scientific research materials.

2. In order to make the economical calculations, the *quantitative data analysis method* has been applied.
3. Static method has been used in order to process the static information regarding the port performance indicators of ports in Latvia, as well as the ports in Baltic region.
4. *Graphical method* (construction of charts, image creation, etc.) led to ascertain fact coherency in this thesis as well as it gave a chance to discover coherency characteristics and shape.

**Novelty** is equated and calculated HHI index for the ports in Latvia and the Baltic region. This index helps to evaluate the competitiveness and efficiency of the ports. It is important to stress that HHI index has been calculated recently; this competitiveness and efficiency assessment has not been done before.

The organizational structure of every port is unique, therefore it is far from being an easy task to measure and analyze the port performance efficiency according to one specific standard. The difficulty to determine united standards is based on the fact that there is not a united method of how to summarize all the important aspects in order to measure the port performance efficiency. The port performance evaluation is significant to any country since ports are very important once it comes to providing economical growth. Ports further economical growth in such aspects as participating in the international trade; drawing in investments; facilitating the development of production and services; creating jobs, as well as advancing the development of an entire region [1,577;2,53]. In order to measure the economical influence of the port, mainly the performance indicators and the related resources (such as the turnover of cargos and employment) are being used to make these calculations. The researcher Talley proposes that one of the options to achieve the economical goals of the port is to increase the turnover of the cargos [11,44]. The ports are being classified by the amount of reloaded cargos and these data are further on being published on the websites of port administrations or put in the databases of statistics offices. It is a common belief that the increase of the cargo turnover is an indicator of the increase of port performance efficiency. Researcher De Langen opposes to that by stating that the increase of the cargo turnover is mainly related to the flow of international trade and it does not have much to do with the increase of efficiency [5,25]. Many other researchers also admit that the amount of reloaded cargos does not indicate its economical influence on a port. It is not possible to choose unequivocal port performance indicators in order to evaluate port performance efficiency. There are many different opinions among researchers regarding this matter [3,21;4,199;12,408;13;699]. There is a significant lack of concrete solutions and so far no unified formulas for calculating the port performance efficiency (employing the port performance indicators) have been proposed. Those port performance indicators related to market tendencies and market structure are supposed to be used for the internal use of the industry in the context of development and competitiveness [8,7]. The indicators of market tendencies and structure would allow the port administrations and the European Commission to oversee such important aspects as the development of port capacity; the cargo concentration; the level of differentiation in different geographical levels of port systems; as well as to

oversee various segments of the market [6]. 8 indicators have been proposed in this category (figure 1).

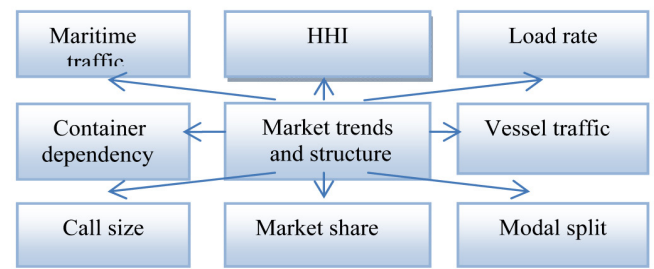


Figure 1. Market trends and structure indicators [7]

Herfindahl – Hirschman index characterizes “market power” division between the subjects of the given market indicating the concentration level of the market [10,11]. It is being calculated as a sum of all the squared market parts of market subjects in the combined amount applying the following formulas (1.1.), (1.2.) and (1.3.):

$$H^* = \frac{\left(H - \frac{1}{N}\right)}{1 - \frac{1}{N}}, \quad (1.1)$$

$$H = \sum_{j=1}^N s_{i,j}^2, \quad (1.2)$$

$$s_{i,j} = \frac{\sum_{t=1}^n x_{i,j(t)}}{\sum_{g=1}^n x_{i,g(t)}}, \quad (1.3)$$

where:

$N$  = number of ports in market;

$H$  = Herfindahl – Hirschman index,  $0 \leq HHI \leq 1$

$s_{i,j}^2$  = market share of port  $j$  regarding commodity  $i$ ;

$x_{i,j(t)}$  = volume of cargo  $i$  handled per port  $j$  in period  $t$ ;

$x_{i,g(t)}$  = volume of cargo  $i$  handled per geographical scale  $g$  in period  $t$ .

under 0.15 = low concentration degree;

between 0.15 and 0.25 = average concentration degree;

above 0.25 = high concentration degree.

#### Analysis of Performance of the Large Latvian Ports

There are three large ports in Latvia (namely, the ports of Ventspils, Riga and Liepaja). The proportion of the cargo turnover in these three ports (out of the common cargo turnover in all the ports in Latvia) is 97.9%. There are seven small ports (namely, the ports of Engure, Lielupe, Mersrags, Pavilosta, Roja, Salacgriva, Skulte) [19]. Although it can be observed that the common cargo turnover is experiencing an increase, however there are some negative tendencies in several cargo groups. This is related to the increase of competition between the ports in the Baltic Sea region. The small ports still have the great profound on the enhancement of the economical activity in the regions.

In 2012, 75 193 thousand tonnes of cargos were handled in the ports in Latvia. The Freeport of Riga is the leader in terms of the amount of cargos handled. There were 36.06 million tons of cargos handled in Freeport of Riga in 2012 [17]. It can be stated that there is a tendency for the amount of cargos to increase since, in 2011, there were 34.05 million

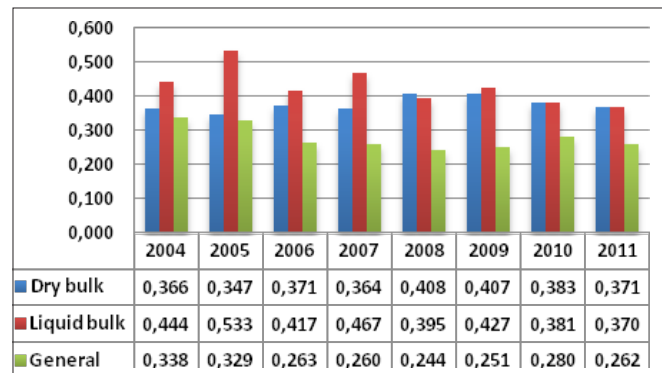
tons of cargos handled in Freeport of Riga. The amount of cargos handled at the Freeport of Ventspils is also changing, meaning, in 2010, there were 24.82 million tons of cargos handled at the Freeport of Ventspils, however this amount has increased to 30.35 millions of tons in 2012 [18]. When it comes to description of the development of the port of Liepaja, a positive tendency can be observed since the amount of cargos handled has increased from 4.3 million tons in 2010 to 7.4 million tons in 2012[16]. However, the small ports have experienced a decrease in the amount of cargos handled from 1.48 million tons in 2010 to 1.36 million tons in 2012.

**Table 1. Cargo turnover in ports of Latvia 2005–2012, thousand tons [14]**

Type of cargo	2010	2011	2012	2012./2011%
<b>Dry bulk</b>	<b>28566.8</b>	<b>33741</b>	<b>37278.9</b>	<b>10.5</b>
chemicals	3765	4552.8	3199.6	-29.7
coal	15298	20252.7	23043.8	13.8
woodchip	1780.3	1609.7	1588.3	-1.3
<b>Liquid bulk</b>	<b>21228.6</b>	<b>23133.4</b>	<b>24957.2</b>	<b>7.9</b>
crude oil	204	140.6	197.9	40.8
oil products	20283.2	22381.6	23955	7
<b>General cargo</b>	<b>11364.5</b>	<b>11946.5</b>	<b>12956.9</b>	<b>8.5</b>
containers	2669.5	3185.6	3676.5	15.4
TEU	256 271	305 939	366 824	19.9
Ro-Ro number	2195.8	2850.3	3164.4	11
wood products	168 210	195 132	209 838	7.5
wood products	5415.5	4785.2	4438	-7.3
thsd.m <sup>3</sup>	6154.9	5580.7	5218.5	-6.5
metals	525.6	381.3	514	34.8
<b>Total</b>	<b>61159.9</b>	<b>68821</b>	<b>75193</b>	<b>9.3</b>

The analysis of the amount of cargos handled in Latvian ports leads to a conclusion that there is a tendency for the amount of cargos handled to increase. The steepest increase can be observed in the past years peaking in 2012, when there were 75.19 million tons handled in the ports of Latvia. It is a 23 % increase in comparison to the amount of cargos handled in 2004. The economical recession of 2008 did not significantly influence the amount of cargos handled in the ports in Latvia. A minor decrease could be observed in 2009 and 2010; however the reduction of the cargos handled was insignificant (approximately 3% decrease). Based on the analysis of the cargo structure in the ports in Latvia, it can be stated that the dominant group is bulk cargos. 29 % of these bulk cargos are coal cargos, but 7 % of the bulk cargos are chemical bulk cargos. The second largest group of cargos handled are liquid bulk cargos. However, oil products form the most sizable proportion making up to 32% of all the cargos handled in the ports in Latvia. The sector of general cargos is experiencing an increase in the amount of containerized cargos handled. TEU in general increases 20% a year. However, it is important to point out that the most significant amount of containerized cargos are being handled in the port of Riga, which handles 96% of all the containerized cargos handled in the ports in Latvia[20]. The amount of timber cargos handled, as well as the amount of metal cargos handled is significantly decreasing.

The authors of this research assumed that bulk cargos and general cargos are mainly being handled in the Freeport of Riga, Freeport of Ventspils, port of Liepaja, port of Salacgriva, port of Skulte, port of Mersrags and port of Roja (Figure 2). However, regarding the liquid bulk cargos, the authors assumed that the liquid bulk cargos were mainly handled in the Freeport of Riga, Freeport of Ventspils and port of Liepaja (time period of 2004 – 2008); additionally to previously mentioned ports the port of Skulte started to handle liquid bulk cargos during the time period of 2009 – 2011. These assumptions are based on the calculations where the HHI has been applied. This index describes the level of the cargo group concentration in a particular region.



**Figure 2. Herfindahl-Hirschman Index in Latvian ports, 2004–2011**

In order to make the necessary calculations, the proportion of the bulk cargos in 2010 has been taken as an example. The chosen ports are the Freeport of Riga, Freeport of Ventspils and port of Liepaja and the proportion of the bulk cargos (handled in the previously mentioned ports) is being squared. It is being assumed that the percentage of the common amount of bulk cargos handled in the ports of Salacgriva, Skulte, Mersrags and Roja is equal, therefore creating the following formula (1.4.):

$$H = \sum_{j=1}^N s_{R,j}^2 + s_{V,j}^2 + s_{L,j}^2 + (4 * s_{SSMR,j}^2), \quad (1.4)$$

where:

$s_{R,j}, s_{V,j}, s_{L,j}$  = market share of total handled bulk cargos in ports of Latvia (Freeport of Riga, Freeport of Ventspils, port of Liepaja)

$s_{SSMR,j}$  = market share of total handled bulk cargos in ports of Latvia (port of Salacgriva, port of Skulte, port of Mersrags, port of Roja)

$N$  = number of ports;

$j$  = bulk cargos;

$H$  = concentration degree of bulk cargos.

Calculations in example are made for year 2010:

$$H = (0.610418)^2 + (0.306205)^2 + (0.066717)^2 + 4 * (0.00416)^2 = 0.471$$

Herfindahl – Hirschman Index has been calculated using formula (1.5.)

$$HHI = \frac{\left( H - \frac{1}{N} \right)}{1 - \frac{1}{N}}, \quad (1.5)$$

where:

HHI = Herfindahl – Hirschman Index;

$0 \leq \text{HHI} \leq 1$ ;

N = number of ports;

H = concentration degree of bulk cargoes.

The result is that concentration degree of bulk cargoes in Latvia is:

$$\frac{0.471 - \frac{1}{7}}{1 - \frac{1}{7}} = 0.383.$$

The calculations proved that the level of concentration is high in all cargo groups. It leads to a following conclusion that the handling of cargoes is concentrated in these three large ports. The level of concentration is not expected to decrease. This statement is based on the observation that the large ports have been market leaders for a very long time already and the small ports do not have the capacity to steeply increase the turnover in order to substantially change the results of the index calculations.

### The role of Big Latvian ports within the region of the Baltic Sea

The most significant cargo flows in the Baltic region are aligned with the global shipping lines. The size of the ships (draught) being able to come into the Baltic Sea is restricted by the Danish Sea Pass. The ships being able to come into the Baltic Sea have to fulfill the requirement of having the draught only up until 17.5 meters – container ships. This is the main reason why the ports in the Baltic Sea region only attend short-sea shipping lines and feeder ships, which transport cargoes from/to the hub ports of Europe (Rotterdam, Antwerp and Hamburg). The substantial part of the cargoes handled in the ports of Baltic countries is supposed to be shipped further on to Russia or other CIS countries (approximately 80% of all the containers handled in the ports of Latvia match this description). Another important aspect is that there are several ports, which are considered to be freezing up ports, namely the ports of Saint Petersburg, Tallinn and Riga. The winters which tend to be especially cold not only entangle the operation of the ports, but also put an extra burden on expenses, (expenses of iceboats, maintaining the fleet, tugboat) sometimes even creating idle standing. The high possibility of the port being frozen is a disadvantage of the Freeport of Riga and it gives a certain advantages to the ports of Liepaja and the Freeport Ventspils. However, the Freeport of Riga is still several hundreds of kilometers closer to the Eastern border, which gives a chance to remarkably reduce costs (for the sender of cargoes) once it comes to the railroad rates. It is a growing tendency to use containers for the cargo shipments to handles shipments from country to country and continent to continent. This tendency can be observed globally, as well this statement proves to be correct in the region of Baltic Sea. The amount of containers shipped in the Baltic Sea has been affected by such factors as the shift to a different economical model in the Baltic's in 90s; the economical recession in Russia during 1999 – 2000 and the following development in Russia and Poland. Another additional factor is that there is an increasing amount of imported readymade products. However, it needs

to be pointed out the current level of containerization in the Baltic States and Russia can be evaluated as low.

The following factors of attended cargoes in the logistic corridor in Latvia need to be taken into consideration: the geographic asymmetry of the cargo flow (approximately 90% of the cargoes flow in the direction East to West); the relative homogeneity of production of the types of cargoes (two thirds of all the cargoes handled are coal and oil products, which have a very limited potential of additional value; as well there are significant ecological factors which need to taken into account); homogeneity of the countries of origin. The former factor inquire to mobilize the actives of logistic infrastructure under government administration and to carry out a coordinated and aggressive aim for the cargo flow from the West (especially containerized and automobile-building cargoes), as well as the attraction of investments to the logistics corridor of Latvia by organizing united, coordinated and custom made industry offers and communication. The following ports can be considered competitors to the ports in Latvia, namely, the ports of Primorsk, Saint Petersburg, Ust-luga, Tallinn, Klaipeda (Butinge oil terminal) and Kaliningrad. The ports in Latvia are the region leaders. This statement is based on the analysis of the Baltic Sea region statistics (figure 3). Russia is sharply developing the ports of its region, in order to decrease the cargo flow in other transit corridors. The recently opened port of Ust-luga is increasing its amounts of cargoes handled by 250% a year. Furthermore, in 2012, several new ro-ro and container lines have been opened in the Baltic Sea (they are specifically working towards the ports in Russia). Moreover, an oil terminal and the pipe BTC-2 started operating. Therefore, Latvia needs to reorient its port structure. The investments in Russian port development indicate that Russia might be planning to partly conduct its cargoes away from Latvian transit corridor, in the future preferring its own ports. Consequently, the only competitive factors of the ports of Latvia would be such aspects as lower rates (since geographically Latvia has a more favourable position than the Russian ports; another factor could be a better quality of services offered, meaning, faster handling of cargoes, faster border-crossing, simplified custom procedures and faster cargo load operations etc.)

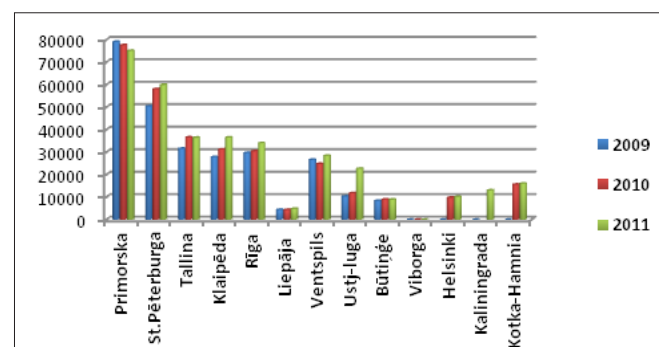


Figure 3. Cargo turnovers in ports of Baltic Sea region 2009–2011, thousand tons [15]

In comparison to other ports in the Baltic Sea region, the ports of Latvia have not experienced a decrease in amount of cargoes handled. This statement is based on the analysis of the consequences of the recent worldwide recession. These

consequences, namely the decrease of the cargos handled in ports, can still be observed in 2012. For instance, the ports in Lithuania, namely, the port of Klaipeda and the ports in Estonia, especially the port of Tallinn is experience a sharp decrease of 10 – 20 % a year. In 2007, the ports in Estonia experienced a severe decrease in amount of cargos handled. It happened due to the so called scandal of the “bronze soldier” when Russia completely stopped its coal and oil transit via the ports in Estonia. Meanwhile, Latvia managed to attract considerable amounts of these cargos to its transit corridor. If the proportion of the ports in the Baltic Sea region is being analysed, it can be clearly seen that the ports of Russia form the biggest part in terms of the amount of cargos. However, it is important to point out that several of these Russian ports have specialized in handling cargos of a particular kind, for instance, the port in Primorsk. Once the sector of bulk cargos is being analysed, it can be observed that the biggest proportion of the bulk cargos handled is at the Freeport of Riga, meaning that it forms 23.3 % of all the cargos (figure 4). This proportion is mainly due to the coal cargos handled. The port of Klaipeda handled 16.9% of all the bulk cargos handled in the region of Baltic Sea. The dominant kind of bulk cargos were the cargos of fertilizers.

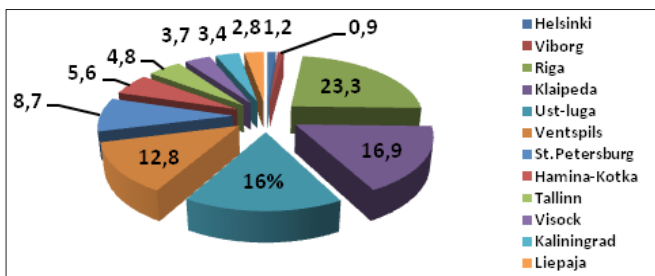


Figure 4 Proportion of bulk cargos in the ports of Baltic Sea region, 2011 [15]

Once the segment of general cargos is being analysed, it can be seen that the port of Saint Petersburg is the leader. This port handles the biggest amount of container cargos in the Baltic Sea (figure 5). In 2011, the port of Riga only formed 7 % out of the total amount of the general cargos.

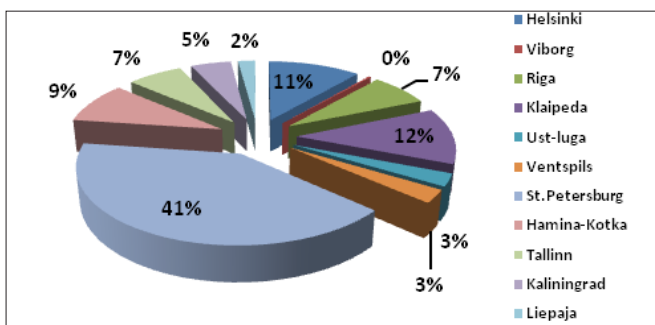


Figure 5. Proportion of general cargos in the ports of Baltic Sea region, 2011 [15]

The port of Primorsk is the dominant one in the sector oil liquid bulk cargos. This port has specialized in handling the liquid bulk cargos, meaning mainly oil products. In 2011, the port of Primorsk handled 41% of the entire amount of liquid bulk cargos in the Baltic Sea region (figure 6). In 2011, the

port of Tallinn had a significant amount of handled liquid bulk cargos forming 14 %. In comparison to former examples, the amounts of liquid bulk cargos handled in the ports of Latvia are relatively low in 2011, respectively Ventspils – 8%, Riga – 4% out of the total amount of liquid bulk cargos handled in the Baltic Sea region.

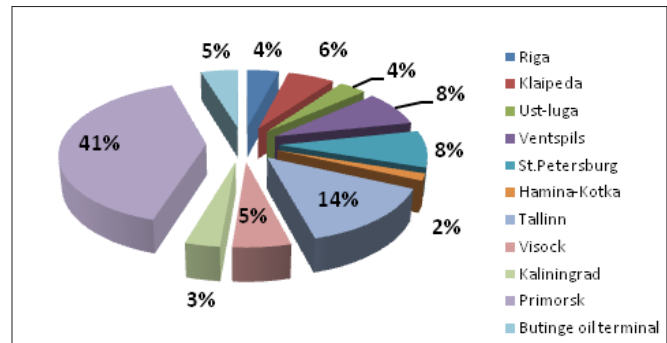


Figure 6. Proportion of liquid cargos in the ports of Baltic Sea region, 2011 [15]

In order to calculate the HHI, the authors have chosen the big Latvian ports; the following Russian ports – Saint Petersburg, Primorsk, Ust-luga, Viborg, Visotsk; as well as the Butinge oil terminal in Lithuania and the port of Tallinn in Estonia. In order to make the necessary calculations, the proportion of the liquid bulk cargos in 2011 has been taken as an example. The proportion of the liquid bulk cargos of all the ports mentioned above have been squared, therefore creating a formula (1.6.):

$$H = \sum_{j=1}^N s_{R,j}^2 + s_{V,j}^2 + s_{L,j}^2 + s_{St.P,j}^2 + s_{P,j}^2 + s_{U,j}^2 + s_{Vb,j}^2 + s_{Vs,j}^2 + s_{K,j}^2 + s_{B,j}^2 + s_{T,j}^2 \quad (1.6)$$

where:

$s_{R,j}$ ,  $s_{V,j}$ ,  $s_{L,j}$ ,  $s_{St.P,j}$ ,  $s_{P,j}$ ,  $s_{U,j}$ ,  $s_{Vb,j}$ ,  $s_{Vs,j}$ ,  $s_{K,j}$ ,  $s_{B,j}$ ,  $s_{T,j}$  = market share of total handled liquid cargos in ports of chosen Baltic Sea region ports (Freeport of Riga, Freeport of Ventspils, port of Liepaja, port of St. Petersburg, port of Primorsk, port of Ust-luga, port of Viborg, port of Visock, port of Klaipeda, Butinge oil terminal and port of Tallin);

N = number of ports;

j = liquid cargos;

H = concentration degree of liquid cargos.

Calculations in example are made for year 2011:

$$H = (0.0846)^2 + (0.0032)^2 + (0.0428)^2 + (0.0889)^2 + (0.4244)^2 + (0.0366)^2 + (0.0004)^2 + (0.0577)^2 + (0.0623)^2 + (0.0505)^2 + (0.1486)^2 = 0.230$$

Herfindahl – Hirschman Index has been calculated using formula (1.7.)

$$HHI = \frac{\left( H - \frac{1}{N} \right)}{1 - \frac{1}{N}} \quad (1.7)$$

where:

HHI = Herfindahl – Hirschman Index;

0 ≤ HHI ≤ 1;

N = number of ports;

H = concentration degree of liquid cargoes.

The result is that concentration degree of liquid cargoes in chosen Baltic Sea region ports is:

$$\frac{0.230 - \frac{1}{1}}{1 - \frac{1}{1}} = 0.153.$$

Once the HHI has been analysed, the authors came to conclusion that the concentration level of the bulk cargoes is average. In 2011, it has increased a little bit, taking into consideration that the ports of Riga, Ventspils, Klaipeda and Ust-luga have increased their turnover of the bulk cargoes; however the ports of Tallinn and Saint Petersburg have decreased their amounts of bulk cargoes (figure 7).

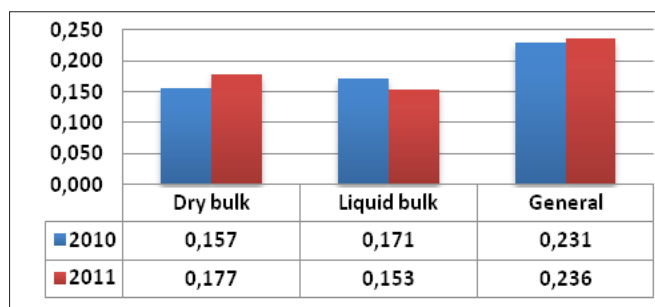


Figure 7. Herfindahl-Hirschman Index in Baltic ports, 2010–2011

Due to the fact that the port of Ust-luga has involved in the handling the liquid bulk cargoes, the level of concentration in the sector of liquid bulk cargoes has definitely decreased. Meanwhile, the level of concentration in the sector of general cargoes can be estimated as average. However, there is a strong tendency for it to increase which is related to the fact that the port of Saint Petersburg holds a high proportion in the sector of the general cargoes (up to 52%). The authors of this research believe that the level of concentration in the sectors of bulk cargoes and general cargoes will continue to increase in the future taking into consideration that there are strong leaders among the ports. However, authors predict an index decrease in the sector of liquid bulk cargoes since the port of Ust-luga has presented itself as a competitive market player (it could be anticipated that it will only increase its turnover in the following years). In order for Latvian ports to not lose its competitiveness among the ports of the Eastern shore of the Baltic Sea, they need actively use their advantages listed below:

- multifunctional technical equipment which allows to handle different types of cargoes;
- well developed transport infrastructure;
- attending of the ships regardless of the weather conditions;
- territory for further development;
- excellent preconditions in order to develop an industrial and distributional park;
- Geographical advantage of providing the shortest road to Russia (according to Loyd's List Register publications).
- another geographical advantage of no need to cross any

other transit countries (such as Belarus or Ukraine)

- There is a work in process regarding the development of new container trains. Currently there are several operating container trains in such connections as Riga – Moscow, Scandinavia – Ukraine, a container train operating from another city in Latvia, namely Rezekne. In 2008, the first test container train was launched from the boarder of China (the station of Dostik). Although it was just a test ride, which was not followed by regular cargo shipment, it was however a message that the transit corridor of Latvia would be able to take on this kind of a task.
- There is a united railroad system with the NVS countries, including united invoicing system, the same kind of rolling stock for trains and united way handling the information.

Up to the current day the state, as well as the private sector have failed to attract the cargo flow (especially, containerized cargoes and automobile-building cargoes) and the investments from the West in a coordinated and aggressive way. Regardless of the increase in the amount of cargoes handled in the ports in Latvia, it is necessary to find new solutions, in order to use the full capacity of the advantages of the geopolitical location and the multimodal logistic infrastructure. It needs to be done in a way that would maximize the macro economical effect of the industry. Therefore it is necessary to significantly increase the amount additional value of the cargoes handled by the industry of logistics in Latvia. In order to do so, it is necessary to concentrate on the formerly mentioned, as well as on other qualitative cargoes. These kinds of cargoes have the potential to create new jobs and specialized services, therefore augment the development of the entire industry from specializing in transit to specializing in logistics. While taking in consideration the close interaction of the processes of transport and logistics with other sectors of economics, it is essential to tailor integrates solutions for two significant actors of economy, namely, the exporting manufacturers and strategic importers (for instance, optimizing/ consolidating deliveries of raw materials for industries and deliveries of completing details). Therefore, the costs of logistics component would be decreased and it would strengthen the economy.

In order to increase the involvement of the cargoes to the Latvian transport market and to provide services with higher additional value, it is essential to take the following steps into consideration:

- find solutions regarding the matter of the providing the rolling stock, taking into consideration the changes occurring in the common infrastructure of wagons in the Baltic and NV states.
- advance a regular movement of the cargo trains (mainly container trains) in the several closed routes with Russia and other NVS countries (it would also provide guaranteed wagon availability).
- provide capacity reserve, in order to be able to handle the existing cargoes and also to be able to handle the possible extra cargoes (meaning mainly container cargoes).
- it is significant to put all the administrative procedures in order.

In order to achieve the formerly set goals, it is essential to provide a centralized and coordinated corporation (as well as communication) with cargo owners, investors and international logistics enterprises, all of which would potentially be interested in cooperation. This interaction should happen on both levels, meaning on the level of reaction when there are actual incoming requests; but also on the level of being proactive when it is necessary to carry out a process of aggressive cargo draw in. It is necessary to provide the industry of logistics a united image by organizing aligned international marketing activities (participation in international expos, trade mission, road shows, during the official visits of government representatives, creating aligned marketing materials and exhibition booths etc.). Additionally it would require carrying out the “super – forwarder” function, including the development of multimodal and integrated offers of logistics industry and delivery chains in order to draw in strategic cargos and investments. The fragmented approach has proved to be ineffective since the private sector or the governmental logistics actors by themselves are unable to achieve such goals as, for instance, the draw in of NATO multimodal reverse cargos; supply for the automobile-building industry in Russia; development of automobile-building operations; container shipments between Baltic Sea and the Black Sea; the draw in of internationally recognized port terminal operators or the draw in of avio-cargos). It is significant to create and develop the cooperation with Russia, the countries of NVS and Central Asia, as well as the foreign companies which have manufacturing plants located in these countries which makes the delivery of goods from/to Europe and USA an important matter to these companies. It is also fundamental to expand the cooperation with Russia and the countries of NVS and Central Asia in order to develop the sector continental railroad container shipments. The goal of the ports in Latvia is to hold the leader position in the region of Baltic Sea countries by maintaining the existing cargo flows, as well as drawing in new cargo flows setting the cargos with high additional value as a priority (container cargos, ro-ro etc). The same kind of the increase in the amounts of cargos handled is predicted by several international researchers. For instance, as a part of TEN – T policy, the international research organization NEA anticipates that by 2030 the amount of cargos handled in the ports of Baltic region (namely ports of Latvia, Lithuania, Estonia and Poland) will reach 287 million tonnes of cargos (in comparison it was 179 million tons in 2008) [9,59]. This prognosis has been stated in their research „Ports and their connections within the TEN-T”. Several similar prognoses have been stated in the frames of Northern Dimension, where the opinions of Belarus and Russia were taking into consideration.

Once the cargo turnover of the years of 1996 and 2011 is being compared in the ports of Latvia, it can be seen that the turnover has increased by 52.8%. According to this prognosis, it is being planned that by 2020 the cargo turnover in the ports of Latvia could reach 100 million tons, since the annual increase of 5% indicates that if in 2011 the cargo turnover reached 68 million tons then by 2020 it should be 105 million tons. In order to accomplish this kind of turnover, it is necessary to be able to provide corresponding quality and capacity of motoroads and railroads, as well it is crucial to increase the capacity at the border crossing points (such

as Terehova and Zilupe). It is significant to provide the reconstruction of the port infrastructure (as well as building new infrastructure) so it could meet the needs of demand of TEN-T network port. It is essential to support the increase of the overland route capacity, as well as to further the cargo operation diversion from populated territories in order to decrease traffic jams, increase the environmental conditions and safety. Latvian ports have been developed as a part of united transport logistics chain connection between Baltic Sea and other EU countries, NVS countries, Asia and USA. The main aim is to develop the national economy and to provide the outside trade using seas while fully utilizing the advantages of the Latvian ports. Another goal is to increase the amount of export services provided, again utilizing the existing transportation infrastructure (and developing new one) and to further regional development.

### Conclusions

1. The organizational structure, location and offered services vary from port to port. The combination of these factors makes every port unique, therefore it is far from being an easy task to measure and analyze the port performance efficiency according to one specific standard.
2. The turnover of Latvian big ports within the time period of 2004 – 2011 has increased. The turnover of the Freeport of Riga has increased for 29.5% (equals 34.05 million tons); the turnover of the Freeport of Ventspils has increased for 2.3% (equals 28.45 million tons) and the turnover of the port of Liepaja has increased for 8% (equals 4.86 million tons).
3. The dominant type of cargos is bulk cargos. The coal bulk cargos form 29 %, but the chemical bulk cargos form 7% of the entire amount of bulk cargos. The second largest group is liquid bulk cargos. Oil products form the majority of these types of cargos going up as much as 32% of all the liquid bulk cargos. The amount of TEU increases for approximately 20% a year. The most important contribution to the increase of container cargos is given by the port of Riga which handles 96 % of all the container cargos handled in the Latvian ports.
4. Latvian ports have a high concentration level (HH index) in all the groups of cargos, which means that the majority of cargo handling is being concentrated in the three big ports. The level of concentration is not expected to change since the big ports have been market leaders for a long period of time, but the small ports do not have the capacity for a rapid increase of a turnover.

The big Latvian ports have not experience a sharp decrease in their turnovers. However, the other ports in the Baltic Sea region have gone through this kind of decrease. The port of Klaipeda in Lithuania and the port of Tallinn in Estonia experience a decrease of approximately 10 – 20% a year. In 2007, the ports in Estonia experienced a severe decrease in amount of cargos handled. It was related to the so called “scandal of the bronze soldier” when Russia completely stopped its coal and oil transit via the ports in Estonia. Meanwhile, Latvia managed to attract considerable amount of these cargos to its transit corridor.

## References

- Bichou K. (2006) “Review of port performance approaches and a supply chain framework to port performance benchmarking”, *Research in Transportation Economics*, Vol. 17, p.567–598. [http://dx.doi.org/10.1016/S0739-8859\(06\)17024-9](http://dx.doi.org/10.1016/S0739-8859(06)17024-9)
- Bichou K., Gray R. (2004) “A Logistics and Supply Chain Management Approach to Port Performance Measurement”, *Maritime Policy & Management*, Vol. 31, No.1, p.47–67. <http://dx.doi.org/10.1080/0308883032000174454>
- Brooks M.R., Schellinck, T.&Pallis, A.A. (2010) “Constructs in Port Efficiency Research”, *World Conference on Transport Research Society*, Lisboa, Portugal, p.1–28.
- Cullinane K., Song D-W., Ji P., Wang T-F. (2004) “An Application of DEA Windows Analysis to Container Port Production Efficiency”, *Review of Network Economics* 3(2), p.184–206. <http://dx.doi.org/10.2202/1446-9022.1050>
- De Langen P., Nijdam M., Horst M. (2007) “New indicators to measure port performance”, *Journal of Maritime Research*, Vol. 4, No.1, p.23–36.
- European Sea Port Organization (2012) “Port Performance Indicators: Selection and Measurement”, 2012.
- Kaisar E., Pathomsiri S., Haghani A. (2006) “Developing Measures of Us Ports Productivity and Performance: Using DEA and FDH Approaches”, *Transport Research Forum*, p.1–7.
- Newton S., Kawabata Y., Maurer H., Pearman A., Van Meijeren J., De Jong G. (2010) “Ports and their connections within TEN-T”, *European Commission, Directorate-General Mobility and Transport*, p.59.
- Parmenter, D. (2007) “Key Performance Indicators, Developing, implementing and using winning KPIs”, New Jersey, USA, p.1.
- Talley W. K. (2006) “An Economic theory of port”, *Research in Transportation Economics*, Vol.16, p.43–56. [http://dx.doi.org/10.1016/S0739-8859\(06\)16003-5](http://dx.doi.org/10.1016/S0739-8859(06)16003-5)
- Tongzon J., Heng W. (2005) “Port privatization, efficiency and competitiveness: Some empirical evidence from container ports (terminals)”, *Transportation Research, Part A* 39, p.405–424. <http://dx.doi.org/10.1016/j.tra.2005.02.001>
- Wang T-F., Cullinane K., Song D. W. (2003) “Container port production efficiency: A comparative Study on DEA and FDH Approaches”, *Journal of the Eastern Asia Society for Transportation Studies*, Vol.5, p. 698–701.
- Central Statistical Bureau of Latvia (January 15, 2012) - [Electronic resource] – [www.csp.gov.lv](http://www.csp.gov.lv).
- Eurostat (March 12, 2013) - [Electronic resource] - <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/>.
- Port of Liepaja homepage (January 4, 2013) - [Electronic resource] – [www.liepaja-sez.lv](http://www.liepaja-sez.lv).
- Port of Riga Freeport homepage (February 3, 2013) - [Electronic resource] – [www.rop.lv](http://www.rop.lv).
- Port of Ventspils Freeport homepage (February 21, 2012) - [Electronic resource] – [www.portofventspils.lv](http://www.portofventspils.lv).
- Ministry of Transport of the Republic of Latvia homepage (January 17, 2013) - [Electronic resource] - [www.sam.gov.lv](http://www.sam.gov.lv).
- Unpublished materials of Latvian port, transit and logistics council.

The article has been reviewed.

Received in April, 2013; accepted in September, 2013.