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RESEARCH OF COMPETITIVE ENVIRONMENT OF KLAIPĖDA SEAPORT COMPARING TO OTHER SEAPORTS IN THE EASTERN BALTIC SEA REGION

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Abstract. Constructive and systematic management of a seaport may determine its successful competitive ability in the international market. The analysis of competitive ability of Klaipėda Seaport highlighted its weakest points, influencing the overall competitiveness of the port. The encouragement of port competitive ability is often stressed, however, there is a lack of methodologically based competitive models that include all key factors determining port competitive ability. The current paper gives stages of evaluation both the significance of indices and the importance of criteria in the international market allowed us to determine factors that have an impact on port competitive ability mostly. The method, allowing to predict cargo flows, was used in the description of scenarios for the encouragement of port competitiveness. In order to ensure these cargo flows the port development is also concerned, as an integrated task, which would allow the evaluation of possible changes of cargo flows, port investments and influence of other ports on cargo flows, etc.

Keywords: competitive ability, determinants of seaport competitive ability, scenarios of the encouragement of seaport competitive ability.

1. Introduction

The concept 'competitiveness' comes from the Latin word 'concurrentia', meaning certain fight, collision, competition. Both foreign and Lithuanian scientific literature contains plenty of definitions of this concept. By Wu and Lin (2008) company's competitive superiority allows its economic competitive ability that is described as possession of exclusive features, their sustention and proper use in the competitiveness process by business entity.

According to Wilson and Gilligan (2005) competitiveness is the ability of certain entities to lead and, as a result of it, to have better results in comparison to other entities.

Griffiths and Zammuto (2005) state that companies' competitive ability depends on how they manage their resources (i.e., finance, employees, technologies, marketing, production and other functional knowledge, strategic advantage) and how they make use of occurring opportunities, etc.

In opinion (Marčinskas, Diskienė 2001), complex and constantly changing business environment determines a change in the ways competitive ability is gained and sustained; these ways are valued ambiguously in scientific literature.

Porter (1998) distinguishes three main competitive strategies that give a long-term competitive advantage to a company:

- cost leadership strategy;
- differentiation strategy;
- concentration strategy.

In order to gain competitive advantage and to create competitiveness strategy, organizations try to find their individual way that best suits them. The main sources for competitive advantage are innovations, technologies, quality and price.

Organization's competitiveness may be gained due to the influence of different factors. Normally, they are divided into two major groups: external and internal factors. External factors are factors of the competitive ability of macro environment, while internal factors are factors of organization's internal environment that are controlled by every company. Meanwhile, external factors are not influenced by company's actions, and subject to current situation of external environment they may create certain favourable or unfavourable business conditions.

Marčinskas and Diskienė (2001) discern these external factors: political – legislative, economic, socio – cultural.

Porter (1998) has done a lot in the analysis of the competitiveness concept, and, according to his 'diamond' model of competitive advantage, such external determinants of competitive ability are singled out: government's role, role of potential and role of international business.

In addition, according to Porter's 'diamond' model, the following four determinants of internal competitive ability are discerned:

- conditions for determinants,
- conditions for demand,
- associated and serving industrial sectors,
- company's strategy, structure and competition.

Porter (1998) states that 'diamond' model shows how all these determinants create dynamism of business environment, stimulate and intensify competition.

Thus, in order to create favourable conditions for a business sector to compete successfully both in the internal market and on international scale, it is vitally important to take into consideration most of determinant factors of competitive ability. Organizations should create their own competitiveness strategies and develop their competitive ability, considering the most important individual typical competitiveness determinants.

This article presents the research of the competitive ability of Klaipėda Seaport, comparing it to other competitive seaports in the Baltic Sea region.

2. The Concept of 'Port Competitive Ability'

The research of the Seaport rivals is the way to analyse and evaluate the activity of ports competing in the same market. The overall goal of the competitiveness analysis is to determine the main rivals' behaviour, their strengths and weaknesses, and, according to them, improve those marketing strategies of Klaipėda Seaport that would guarantee successful operating.

One of the widely discussed problems is the establishment of a deep-water port. Competition between neighbouring ports, increasing cargo flows and ships' tonnage show that deepening of port channel and expansion of port's area (as a deep-water port) are necessary.

Successful operation of the port requires assurance of interaction with other transport modes, thus it is vital to take into consideration the fact that current interaction of network between Klaipėda Seaport and Lithuanian railways is not as effective as it should be.

In addition, interaction with other transport modes requires provision of extra, cargo-related, services, such as storage, packing, sorting, marking, etc., so as to create added value and expand the spectrum of client services. A great influence on the port's attractiveness would come from the establishment of a public logistics centre near by port. However, currently the works of such logistics centre's establishment are not carried out because there are some problems related to land acquisition issues.

Moreover, another factor related to the port competitive ability is the setting of flexiable loading, railway tariffs and their ability to raise freight to Klaipėda Seaport. Thus, loading companies must constantly observe market conditions, dynamics and compete with neighbouring ports for better loading tariffs for their customers. However, not only the price of loading tariffs matters – railway tariffs are also of a great importance. Klaipėda Seaport greatly depends on set Belarusian and Russian railway tariffs because the majority of cargoes are exported to the East. From the beginning of the year 2009 the company 'Russian Railways' (*Rossijskie zheleznye dorogi*) has increased railway cargo tariffs: import – export transportation – 5%, transit transportation – 8,8%, while Belarus has increased railway tariffs for transit freight approximately by 8÷10%, irrespective of destination direction.

Port's work system and processes. Scientists: Beskovnik and Twrdy (2009), Christiansen *et al.* (2004), Hess *et al.* (2008) – stressed that characteristic integrity and dynamics of ports allow to examine its work as a certain functioning system or model. By developing the view of port as a system, it is possible to distinguish port's, as a system's, components.

Scientists Teng *et al.* (2004) presented a scheme of port's functioning processes in their scientific paper.

It has been proved that there is no general theoretical method for the encouragement of port's competitive ability. The importance of encouragement of ports' competitive ability is often mentioned but there is a lack of methodologically based competitiveness models that would include all major determinants of the port competitive ability.

To measure the competitiveness of major ports in Northeast Asia (NEA) it was necessary to identify the components which influence this. Researchers who implicitly assume that efficiency is a proxy for competitiveness and evaluates it (Wu, Lin 2008; Tongzon 2001; Wang 2004) rarely incorporates user's perceptions. Furthermore, the components highlighted in prior studies conducted elsewhere (Tongzon 2001; Malchow, Kanafani 2004; Sánchez *et al.* 2003; Wu, Lin 2008; Kolanović *et al.* 2008; Yeo *et al.* 2011) or at different times using different reference points, may be inappropriate. At best, many published competitiveness factors and evaluation structures are only superficially relevant to NEA. The numerous identified factors which might influence port competitiveness were reduced to 38 after eliminating overlapped.

Selected components of port competitiveness:

- availability of vessel berth on arrival in port;
- cargo proportion of transhipment cargo;
- cost for cargo handling, transfer and storage;
- cost-related vessel and cargo entering;
- deviation from main trunk routes;
- efficient inland transport network;
- free dwell time on the terminal;
- frequency of cargo loss and damage;

- frequency of large container ships' calling;
- frequency of ship's calling and diversify of ship's route;
- government, local autonomous entity, private sectors;
- inland transportation cost;
- inter-modal link;
- land distance and connectivity to major shippers;
- level of service for fresh water, bunkering and ship's products;
- level of ship's entrance and departure navigation aids systems;
- number of direct calling of ocean going vessel;
- port accessibility;
- port congestion;
- port sales: port promotion;
- port's safety;
- professionals and skilled labour in port operations;
- prompt response;
- promptness of issue document handling;
- real working time;
- recognition and reputation of port;
- reliability of schedules in port;
- service capacity for ship's size;
- size and activity of FTZ in port hinterland;
- size of contiguous city's economy;
- sophistication level of port information and its application scope;
- stability of port's labour;
- terminal productivity;
- volume of inducing cargoes by your company;
- volume of total container cargoes;
- water depth in approach channel and at berth;
- zero waiting time service;
- twenty-four hour/seven days a week service.

To eliminate less important determinants, a survey instrument was administered to 30 professionals including ship owners, shipping company executives, shippers, logistics related companies, and freight forwarders in NEA. Following this, 18 components were extracted from the survey, which were reduced to seven principal factors using factor analysis. These were: port service, hinterland condition, availability, convenience, logistics cost, regional centre and connectivity, providing a framework for evaluating the structure of port competition in this region.

Belgian scientists from Antwerp University applied Porter's 'diamond' model of competitiveness in their book about port's competitive abilities (Huybrechts *et al.* 2002). According to this model, port's competitive ability is determined by 5 key components: conditions for determinants (geographical and non-geographical determinants of port's characteristics), conditions for demand (demand of port's customers), port's competition (internal and international competition), related and associated industry sectors (transport companies, loading companies, etc.) as well as government (economical-financial country's state) and opportunities (*force majeure* likelihood and chances for other restraining determinants to occur that might impede port's work).

However, the application of Porter's 'diamond' model for seaports does not clearly define interaction of every system component and the results they determine. Only key competitive determinants are singled out.

On the basis of scientific literature, it has been identified that only integrated systematic management of port's work could determine successful competitiveness in the international market.

3. Scenarios for the Encouragement of Klaipėda Seaport's Competitiveness

Establishment of criteria values. Establishment of indices values is a very important stage in order to find out determinants that, according to experts, play the biggest role in the competitive ability of Klaipėda Seaport. The easiest method for the establishment of rank value and their succession was the attribution of value degrees to points. Thus, it is necessary to decide what value degree is attributed to every evaluation point (according to Likert's scale), e.g., whether one evaluation '5' is more important than two evaluations '4', etc.

In the first case, values attributed to points were obtained by multiplying the value of every point by square, e.g., 5 points are attributed the value of 25, 4 points – the value of 16, 3 points – the value of 9, 2 points – the value of 4, 1 point – the value of 1. Having calculated the value of each criterion (point), the succession was determined and the majority of points were given for the port's depth – 591, for the quality of infrastructure and potential – 537, for the quality of services – 519 (see Table 1).

In the second case, different significance values are attributed: for the chosen point 5 significance number +5 is attributed, for the point 4 significance number +2 is attributed, for the point 3 significance number 0 is attributed, for the point 2 significance number is –2, for the point 1 significance number –5 is attributed. In this case the established succession was the following: for port's depth – 117, for the quality of infrastructure and potential – 98, for the quality of services – 93.

Establishment of criteria values by using ranking method. In the third case, criteria values are analyzed by using ranking method hoping that this method could be a rather definite. According to the results of experts' survey, all evaluations of the question 'What influence these determinants have on the port's competitive ability?' are rated by using *Microsoft Office Excel*'s function RANK. Ranks are divided so as the sum of every expert's evaluation is 300. The establishment of criteria values for experts' survey requires rank values and all calculation results.

The sum of ranks for every criterion and the average for the sum of ranks are calculated. The average value of criterion is:

$$\overline{t_1} = 225.5 : 24 = 9.395833;$$

$$\overline{t_2} = 189.5 : 24 = 7.895833;$$

$$\overline{t_3} = 243 : 24 = 10.125 \text{ and etc.,}$$

where: $\overline{t_1}$, $\overline{t_2}$, $\overline{t_3}$ – average values of criterions.

Table 1. Setting the criteria, indicates importance to the evaluation values

No	Competitiveness criteria	Values
1	No 14 – port's depth	591
2	No 2 – quality of infrastructure and potential	537
3	No 11 – quality of services	519
4	No 7 – railway tariffs	512
5 *and* 6	No 12 – handling equipment capabilities *and* No 13 – size of container terminal (volume, width)	503
7	No 6 – loading rates	501
8	No 1 – geographical location of the ports	495
9	No 5 – tolling rates	489
10	No 3 – interaction with transport modes	483
11	No 4 – access road	467
12	No 15 – port aquatory	455
13	No 17 – storage opportunities	433
14	No 22 – international relations of country	419
15	No 19 – shipping and ferry lines	410
16	No 23 – the country's economic stability	405
17	No 24 – Information systems	388
18	No 21 – the country's political stability	386
19	No 10 – usage of Information systems	373
20	No 9 – port security	366
21	No 8 – port management model and financial resources	336
22	No 18 – public logistic centers in the port	320
23	No 16 – the port's annual turnover	298
24	No 20 – inland waterway transport	181

Criteria values are established according to the formula (1):

$$q_j = \frac{\overline{t_j}}{\sum_{j=1}^{n}\sum_{k=1}^{r} t_{jk}} \tag{1}$$

and respectively are:

$$q_1 = 9.395833 : 300 = 0.031319;$$

$$q_2 = 7.895833 : 300 = 0.026319;$$

$$q_3 = 10.125 : 300 = 0.0338,$$

where: q_1, q_2, q_3 – the criteria significance.

According to the obtained values of criteria significance, criteria range is established (priority succession):

$K14 > K2 > K11 > K13 > K7 > K12 > K1$

and

$K6 > K5 > K3 > K4 > K15 > K17 > K22 > K19 > K23 > K24 > K21 > K10 > K9 > K8 > K18 > K16 > K20$.

Credibility of experts' survey is conveyed through concordance coefficient of experts' opinions that defines the degree of concurrence of individual opinions (Zavadskas 2001, 2010):

$$W = \frac{12S}{r^2\left(n^3 - n\right) - r\sum_{k=1}^{r} T_k}, \tag{2}$$

where: r – number of experts; n – number of criteria that are being evaluated;

Concordance coefficient is equal to 1, if all ranges of experts are unvaried; concordance coefficient is 0, if ranges are different, i.e., they do not coincide (Zavadskas *et al.* 2001, 2010).

In order to calculate concordance coefficient, first of all, we need to find the values of S and T_k. The sum of deviations S in evaluation of results of each criterion is calculated according to the formula:

$$S = \sum_{j=1}^{n}\left(\sum_{k=1}^{r} t_{jk} - \frac{1}{n}\sum_{j=1}^{n}\sum_{k=1}^{r} t_{jk}\right)^2, \tag{3}$$

where: t_{jk} – rank attributed to j criterion of k expert; r – number of experts; n – number of criteria that are evaluated.

Sum of deviation squares: $S = 204185$.

k is index of correlative ranks in range, calculated according to the formula:

$$T_k = \sum_{l=1}^{H_l}\left(h^3 - h_1\right), \tag{4}$$

where: T_k – index of correlative ranks in k; H_1 – number of level rank groups in k range; h_1 – number of level rank groups, correlative ranks in a group after the evaluation of k expert; k – number of experts (Zavadskas *et al.* 2001).

$T_1 = 1884$;

$T_2 = 2910$;

$T_3 = 1944$ and etc.

Overall sum of T indices is equal to 82242.

Then, according to the formula of concordance coefficient, credibility of expertise is calculated:

$W = 0.41$.

Since the value of concordance coefficient $W = 0.41$ is bigger than 0, it is possible to state that the credibility of criteria values, obtained through ranking method, is sufficient.

In order to determine the significance of evaluation of concordance coefficient, it is necessary to know distribution of frequencies when there are different values of r experts and variants compared n. The significance of concordance coefficient is determined by the formula (Zavadskas *et al.* 2001, 2010):

$$x^2 = \frac{12S}{r \cdot n \cdot \left(n+1\right) - \frac{1}{n-1}\sum_{n=1}^{r} T_k}, \tag{5}$$

where: x^2 – the significance of concordance coefficient; S – sum of deviations; r – number of experts; n – number of criteria; T_k – index of correlative ranks in k.

4. Forecasting and Analysing Methods and Their Application in Practice

Mathematical statistical forecasting methods. When scenario of the encouragement of Klaipėda Seaport's competitive ability was being created, the use of forecasting method was very important because it allowed to calculate future cargo flows roughly. The development of Klaipėda Seaport and the encouragement of its competitive ability are aimed at ensuring these flows.

As one of the means for the planning of cargo flows, the following methodologies might be used:

- methodology of forecasting the flows which depends on the statistics obtained;
- calculation of intensity that depends on specific determinants.

With reference to research methodology, we may evaluate real (present) situation between ports as well as plan cargo flows, taking into consideration possible errors, and calculate the intensity of shipping that depends on various determinants (air conditions, ship breakdowns, etc.).

One-factor and multi-factor regression models, or in other words, mathematical statistical forecasting, is used in forecasting cargo flows.

One-factor regression models are used when a respective index of cargo and passenger shipping is tightly connected with one particular determinant (when functional connection exists). Commonly, such determinant is time. Forecasting task is solved as a linear or non-linear extrapolation of time series, e.g., forecasting of passenger or cargo circulation, forecasting of passenger or cargo volumes, using the least square, harmonic weighting, exponential smoothing and other methods. Commonly, the accuracy of forecasting is achieved when the results of forecasts are obtained using different methods as well as applying dynamic trends with variable parameters of regression equation at different time moments.

According to Martišius and Kėdaitis (2010), analytical expression of trend (deterministic component) $f(t)$ is found approximating time series and using the least square methods. Generally, the following functions (6, 7) are used:

$$y(x) = a_0 + \sum_{i=1}^{n} a_i x^i \tag{6}$$

and

$$y(x) = e^{a_0 + \sum_{i=1}^{n} a_i x^i}. \tag{7}$$

Parameters of these functions bear economic significance and are easy to interpret, e.g., line equation (polynomial of the first series)

$$y(x) = a_0 + a_1 x, \tag{8}$$

expresses consistent increase of levels of series a_1, when the primary level is equal to a_0.

In case of parabolic equation:

$$y(x) = a_0 + a_1 x + a_1 x^2, \tag{9}$$

coefficient a_1 expresses initial growth rate, a_2 – steady growth.

Parameters a_0, a_2, ..., a_n are found using the least square method:

$$\begin{cases} a\sum_{i=1}^{n} x_i^2 + b\sum_{i=1}^{n} x_i = \sum_{i=1}^{n} \tilde{y}_i x_i\,; \\ a\sum_{i=1}^{n} x_i + nb = \sum_{i=1}^{n} \tilde{y}_i \end{cases} \tag{10}$$

and

$$\begin{cases} a\sum_{i=1}^{n} x_i^4 + b\sum_{i=1}^{n} x_i^3 + c\sum_{i=1}^{n} x_i^2 = \sum_{i=1}^{n} \tilde{y}_i x_i^2\,; \\ a\sum_{i=1}^{n} x_i^3 + b\sum_{i=1}^{n} x_i^2 + c\sum_{i=1}^{n} x_i = \sum_{i=1}^{n} \tilde{y}_i x_i\,; \\ a\sum_{i=1}^{n} x_i^2 + b\sum_{i=1}^{n} x_i + nc = \sum_{i=1}^{n} \tilde{y}_i. \end{cases} \tag{11}$$

The essence of the least square method is to find such parameters and the sum of squared errors which would deviate as little as possible from the actual process:

$$\sum \left(x - x^*\right)^2 \to \min.$$

Analytical expression (trend) of function $f(x)$, the parameters which are found using the least square method, is mostly determined empirically, when some (several) functions are chosen to be compared and see which one of them reflects the link between x and $y(x)$.

With reference to the given time series, we determine analytical expression of two different functions $f(x)$ using the least square method:

Time series are supplemented having calculated respective values (Table 2).

Table 2. Calculation of time series

x	x_1	x_2	...	x_n
$\tilde{y}(x)$	$\tilde{y}_1(x_1)$	$\tilde{y}_1(x_2)$	...	$\tilde{y}_n(x_n)$
$f_1(x)$	$f_1(x_1)$	$f_1(x_2)$	...	$f_1(x_n)$
$f_2(x)$	$f_2(x_1)$	$f_2(x_2)$	...	$f_2(x_n)$
$\left(\tilde{y}_x - f_1(x)\right)^2$	$\left(\tilde{y}_1(x_1) - f_1(x_1)\right)^2$	$\left(\tilde{y}_1(x_2) - f_1(x_2)\right)^2$	...	$\left(\tilde{y}_n(x_n) - f_1(x_n)\right)^2$
$\left(\tilde{y}_x - f_2(x)\right)^2$	$\left(\tilde{y}_1(x_1) - f_2(x_1)\right)^2$	$\left(\tilde{y}_2(x_2) - f_2(x_2)\right)^2$	...	$\left(\tilde{y}_n(x_n) - f_2(x_n)\right)^2$

We calculate sums:

$$S_1(x)=\sum_{i=1}^{n}\left(\tilde{y}_i(x_i)-f_1(x_i)\right)^2; \quad (12)$$

$$S_2(x)=\sum_{i=1}^{n}\left(\tilde{y}_i(x_i)-f_2(x_i)\right)^2. \quad (13)$$

If $S_1(x)<S_2(x)$, then more accurate is analytical expression $y_1(x)=f_1(x)$; if $S_2(x)<S_1(x)$ – $y_2(x)=f_2(x)$ the bigger n, the greater weight of this criterion.

When calculating specific passenger and cargo flows, forecasting parameters of flows, having specific results of the overpast period (e.g., statistical data of cargo or passenger flows from several years), it is purposeful to calculate mathematical expectations (for passengers, specific freight, etc.) of random variables by using this formula:

$$m_{yi}=\frac{1}{n}\sum_{1}^{n}x_i, \quad (14)$$

where: x_i – the overall quantity of passengers or specific freight, shipped during a respective time period; n – quantity of period parts, during which they were shipped; $\sum x_i$ – quantity of freight (e.g., annual, monthly, weekly). In this case mathematical expectation expresses average flow volume.

Having mathematical expectation of specific flows, dispersion of specific random variables (passenger, cargo flows, etc.) can be found by using this formula:

$$\sigma_{yi}^2=S_\zeta^2=\frac{1}{n-1}\sum_{1}^{n}\left(x_i-m_{yi}\right)^2. \quad (15)$$

Accepting that a flow fluctuates steadily, forecasting error might be determined on the basis of mathematical expectation. Then the average squared error will be equal to:

$$e_{(t_0+\theta)}^2=\sigma_y^2. \quad (16)$$

This methodology was used for forecasting the container flows. It is purposeful to analyse loading and unloading of containers separately since the dynamics of these processes might be different.

Sheer value of the main cargo flows in the Eastern Baltic Sea ports fluctuates relatively marginally, thus it is possible to focus on their overall quantity and opportunities for the redistribution of cargo flows between the ports in the way that would be most favourable for Klaipėda Seaport. In order to determine future cargo flows, firstly, with reference to the already existing data of freight turnover of the Eastern Baltic Sea region ports, realistic and optimistic forecasts of freight turnover are estimated.

Realistic forecast was performed using *Microsoft Office Excel*'s function TREND that describes linear regression equation. This function calculates volumes according to this formula:

$$y=mx+b, \quad (17)$$

where: y – variables that are being forecasted; x – variables that are the basis for the forecast; m – index, that is calculated by the programme on the basis of the least square method.

The Table 3 and Fig. 1 contains realistic and optimistic forecasts up to the year 2030 for the loading turnover of the Eastern Baltic Sea Region ports. The data analysed includes statistical data of the loading turnover in Klaipėda, Riga, Liepaja, Venspils, Tallinn, Kaliningrad and Saint Petersburg ports during the year 2007–2010.

Results of forecasts, obtained during the calculation of loading volumes for the whole Eastern Baltic Sea Region, are presented in Table 3 and Fig. 1.

On the basis of realistic forecast data, when tendencies for cargo flows are assumed to be similar to the current ones, cargo flows through the Eastern Baltic Sea region ports should change in the following way: the overall flow should increase up to 424.8 tons by the year 2030.

Optimistic forecast shows the expected increase in turnover. This forecast is carried out using *Microsoft Office Excel*, where function GROWTH corresponds to exponential regression. This function calculates predictable volumes according to this formula:

$$y=b\cdot mx. \quad (18)$$

With reference to the data taken from optimistic forecast, where more rapid economic growth is foreseen, cargo flows, going through the Eastern Baltic Sea ports, should change this way: the overall flow in the Eastern Baltic Sea region should increase up to 537 mln. t by the year 2030.

Scenarios for encouragement of Klaipėda Seaport's competitive ability are formulated, taking into consideration predictable cargo flows. These scenarios provide opportunities for Klaipėda Seaport to direct more cargos to its port (Fig. 2).

Realistic scenario of Klaipėda Seaport's competitive ability. Realistic scenario is based on the presumption that tendencies for cargo flows will remain the same and that all ports will do their best in order to keep up with the changing situation and develop their infrastructure

Table 3. Loading volumes of the Eastern Baltic Sea region ports and their forecast up to the year 2030, thous. t

Loading volumes \ Years	2007	2008	2009	2010	2015	2020	2025	2030
Real fact	160204.0	188216.0	182977.6	199456.7				
Realistic forecast					246400.3	305535.5	375096.8	458086.0
Optimistic forecast					251524.0	323945.0	417218.2	537347.3

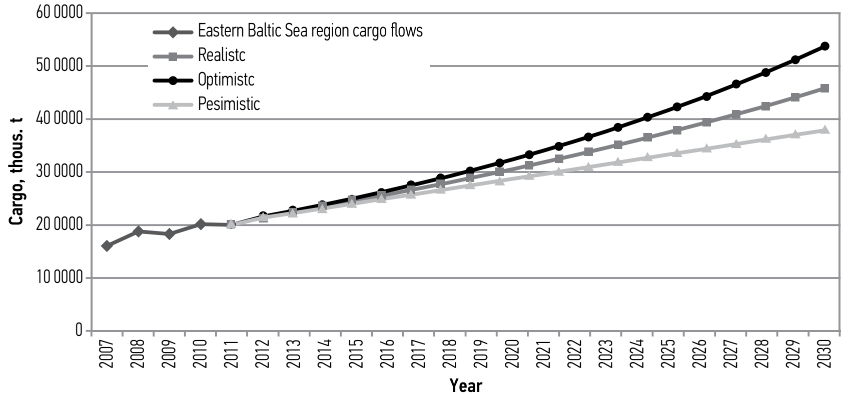

Fig. 1. Forecast of cargo flows of the Eastern Baltic Sea region ports up to the year 2030, thous. t

and suprastructure (dredge their entrance channels, aquatory, improve quays, expand their storage areas) as well as improve their work technologies, sustain existing cargo flows and attract new ones.

According to realistic forecast, the main loading volumes of the Eastern Baltic Sea region ports will not increase. Klaipėda Seaport is not so dependent on Russian transit freight. Diversion of oil products to Russian ports will not have such a big influence on the overall turnover of the port, thus similar cargo flow should be sustained.

Accepting the first scenario of ports' development, which states that cargo flows will spread evenly between current ports and that the situation will remain unchanged, it is possible to foresee that the turnover of Klaipėda Seaport will reach 34.7 mln. t by the year 2015, while by the year 2030 – the turnover will be more than 50.5 mln. t (predicted overall amount of container freight is very relevant for Klaipėda Seaport since this port is one of the leading ports in the Eastern Baltic Sea region serving namely container ships). According to statistical calculations, increase in container freight is foreseen, and this would, consequently, result in the increase of loading volumes of Klaipėda Seaport.

Optimistic scenario of Klaipėda Seaport's competitive ability. Optimistic scenario is based on the presumption that cargo flow should increase and Klaipėda Seaport, carrying out its development plans, will soon overtake neighbouring ports and become more competitive and more cargo-attractive.

Accepting the second scenario of ports' development that foresees the increase in cargo flows and states that Klaipėda Seaport will manage to take a bigger part of cargo flow, it is possible to predict that the turnover of Klaipėda Seaport will reach 35.2 mln. t in the year 2015, while in the year 2030 the turnover will reach 55.3 mln. t. A favorable location – being one of the main international hub in the IXB Pan-European Transport corridor – is also strong advantage of Klaipėda Seaport. The connections of the port with transport and logistics network of neighbouring countries (Belarus, Ukraine and Russia) allows to achieve the synergy effect and benefit from cooperation between different stakeholders within international East-Wes tsupply chain.

Having the results of container handling in 2010, Klaipėda Seaport maintained the position of the largest container port in the Eastern Baltic from Tallinn to Kaliningrad (294954 TEU).

Geographic location and container handling development of new Klaipėda Seaport container transhipment hub (container terminal with an annual capacity of 100 0000 TEU by 2023, length of berth 1430 m, terminal storage capacity 24000 TEU and 728 plugs for reefer containers) allows to increase Klaipėda Seaport competitiveness among Eastern Baltic seaports.

Currently, ports of Klaipėda, Riga and Tallinn have ambitious development plans and they allocate large investments for the improvement of ports' work. It is also worth mentioning that Russia is building two new ports (Primorsk and Ust Luga) that would play a significant role in the region's competitive ability and distribution of cargo flows. According to optimistic forecast (as well as according to realistic forecast), the overall flow of the main cargo – oil and its products – will remain similar to the current one. In addition, presuming that Russia aims at directing the majority of these cargos to its own ports, this would, consequently, have a huge negative impact on the ports of Tallinn and Ventspils, the majority of loading which is comprised of Russian oil transit products. Thus, if the major part of oil cargos is directed to Russian ports, the main aim of Klaipėda Seaport will be to sustain current oil flows and create favourable conditions for the shipment of oil, in comparison to neighbouring ports.

Comparing Klaipėda Seaport with the ports of Tallinn and Riga, Klaipėda Seaport has better geographical location: the port is more distant from the ports of Ust Luga and Primorsk, is nearer to Belarus and, finally, is the northernmost ice-free port in the region. If Klaipėda Port had more depth, it could gain even greater advantage in attracting oil flows from other ports.

It is also necessary to regard the need for bigger tonnage and terminal area, warehouse and storage area, to create better conditions for bigger ships to come to the port, it is crucial to have enough capacities to unload bigger cargo, to store it and later to transport it by other means.

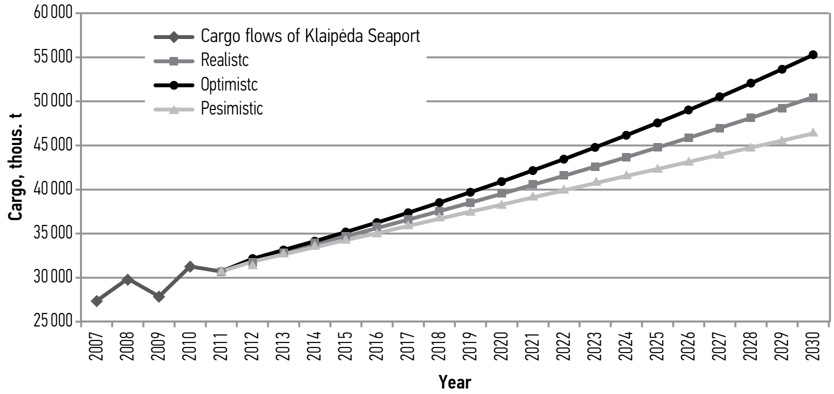

Fig. 2. Forecast of cargo flows of Klaipėda Seaport up to the year 2030, thous. t

The analysis of previous two scenarious, aimed at possible ports' development, reveal that basically all determinants for the encouragement of competitive ability have influence on the distribution of cargo flows. Thus, port's development is an integrated task which requares evaluation of possible cargo flows during certain period, possible changes of flows, port investments, influence of other ports on cargo flows, variation of transportation prices, etc.

5. Conclusions

- Forecasting method of flows was applied to the planning of cargo flows. With reference to the data, obtained from: realistic forecast, the overall cargo flow for the Eastern Baltic Sea ports should increase up to 458 mln. t by the year 2030; from optimistic forecast, the overall cargo flow of the Eastern Baltic Sea ports should increase up to 537.3 mln. tons by the year 2030.
- Considering the development of Klaipėda Seaport, which states that cargo flows will distribute evenly between current ports, the forecasts of it show that the turnover of Klaipėda Seaport will reach by the year 2030: realistic scenario – 50.5 mln. t; optimistic scenario – 55.3 mln. t.
- The development of port is an integrated task which requares evaluation of possible cargo flows during certain period, possible changes of flows, port investments, influence of other ports on cargo flows, variation of transportation prices, etc. This requires further market research.
- The connections of the port with transport and logistics network of neighbouring countries (Belarus, Ukraine and Russia) allows to achieve the synergy effect and benefit from cooperation between different stakeholders within international East-West supply chain.
- Increasing container handling and forecast scenarios allow to predict that Klaipėda Seaport will become regional container hub in the Baltic Sea Region.

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