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PARAMETRIC FEATURES AND CRITERIA OF THE DEVELOPMENT OF THE MARKET FOR LINEAR TRANSPORTATION

Abstract. The need to develop scientific regulations is determined by the basic conditions and new trends in the global market for linear technologies, the problems of functioning of maritime transport enterprises on the market of transportation services.

The experience of the development of the global maritime market confirms the influence of the number of operators on the economic balance of the subsystem. As the number of shipping and carrier companies increases, the degree of satisfaction of the need for goods transportation according to urgency criteria increases. At the same time, with an increase in the number of shipping companies, competition in the main segments of the freight market intensifies, which ultimately leads to a slowdown in the growth of tariff and charter rates at development stages. Therefore, a relatively low rate of return on capital, especially for vessels with a high level of innovative technologies, remains. The key players in the container market are the state business and diversified business.

The conditions of operation of shipping companies within the maritime trade market system are analyzed. An assessment of the development prospects of linear shipping companies in the light of new trends. The process of consolidation of the container technology market is considered and evaluated, and the factors that are not conducive to cartel agreements are highlighted. Criteria features of the positioning of marine transport enterprises are identified.

The specifics of competitive positioning of container terminals in the Black Sea-Azov region are noted. The analysis of the working conditions of national stevedoring container operators is conducted and the problems of their competitive positioning on the regional market of linear transportation are revealed. For example, a graphical model showing monthly dynamics of container turnover of Ukrainian ports in 2017 is represented.

The parametric features of the functioning of container lines passing through the ports of Ukraine are substantiated. The conditions for achieving the adequacy of the technical and economic level of the national sea trading ports with respect to the requirements of the external system are noted. Thus, an information and logistic model is suggested. It reflects the interconnection between the system parameters affecting the sustainable development of the maritime business in the sector of container technologies. As a result, the conditions for making rational decisions regarding investments of maritime transport enterprises have been substantiated.

Keywords: container technologies, consolidation influence, monopoly in commercial shipping, investment quality, sea transport enterprises, world container carriers, Black Sea-Azov region, Ukraine container turnover.

JEL Classification F14, L91, Q25, Q27

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ПАРАМЕТРИЧНІ ОСОБЛИВОСТІ ТА КРИТЕРІАЛЬНІ УМОВИ РОЗВИТКУ РИНКУ ЛІНІЙНИХ ПЕРЕВЕЗЕНЬ

Анотація. Необхідність розроблення наукових положень диктується основними умовами і новими тенденціями в системі глобального ринку лінійних технологій, проблемами функціонування морських транспортних підприємств на ринку транспортних послуг.

Досвід розвитку світового ринку морської торгівлі підтверджує закономірність впливу числа операторів на економічну збалансованість підсистеми. При зростанні числа судноплавних і операторських компаній зростає ступінь задоволення потреби в перевезеннях вантажів за критеріями терміновості. Разом з тим зі збільшенням числа судноплавних компаній посилюється конкуренція в основних сегментах фрахтового ринку, що призводить у кінцевому підсумку до уповільнення зростання тарифних і чартерних ставок на етапах розвитку. Тому залишається порівняно низька норма прибутку на капітал, особливо у суден із високим рівнем інноваційних технологій. Ключовими гравцями контейнерного ринку є держава і диверсифікований бізнес.

Проаналізовано умови функціонування судноплавних компаній у системі ринку морської торгівлі. Дано оцінку перспективам розвитку лінійних компаній з урахуванням нових тенденцій. Розглянуто і дано оцінку процесові консолідації ринку контейнерних технологій і відзначено фактори, які не сприяють картельним угодам. Виявлено критеріальні особливості позиціонування морських транспортних підприємств.

Відзначаються особливості конкурентного позиціонування контейнерних терміналів у Чорноморсько-Азовському регіоні. Проаналізовано умови роботи національних стивідорних контейнерних операторів і виявлено проблеми їхнього конкурентного позиціонування в регіональному ринку лінійних перевезень. Наприклад, представлена графічна модель, що відображає динаміку контейнерообігу портів України по місяцях за 2017 рік.

Обґрунтовано параметричні особливості функціонування контейнерних ліній, що проходять через порти України. Відзначено умови досягнення адекватності техніко-економічного рівня національних морських торговельних портів вимогам зовнішньої системи. Таким чином, представлено інформаційно-логістичну модель, яка відображає взаємозв'язок системних параметрів, які впливають на сталий розвиток морського бізнесу у сфері контейнерних технологій. У результаті обґрунтовано умови ухвалення раціональних рішень інвестиційної діяльності підприємств морського транспорту.

Ключові слова: контейнерні технології, вплив консолідації, монополія в торговельним судноплаванні, якість інвестицій, морські транспортні підприємства, світові контейнерні перевізники, Чорноморсько-Азовський регіон, контейнерообіг України.

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ПАРАМЕТРИЧЕСКИЕ ОСОБЕННОСТИ И КРИТЕРИАЛЬНЫЕ УСЛОВИЯ РАЗВИТИЯ РЫНКА ЛИНЕЙНЫХ ПЕРЕВОЗОК

Аннотация. Необходимость разработки научных положений диктуется основными условиями и новыми тенденциями в системе глобального рынка линейных технологий, проблемами функционирования морских транспортных предприятий на рынке транспортных услуг.

Опыт развития мирового рынка морской торговли подтверждает закономерность влияния числа операторов на экономическую сбалансированность подсистемы. При возрастании числа судоходных и операторских компаний возрастает степень удовлетворения потребности в перевозках грузов по критериям срочности. Вместе с тем с увеличением числа судоходных компаний усиливается конкуренция в основных сегментах фрахтового рынка, что ведет, в конечном счете, к замедлению роста тарифных и чартерных ставок на этапах развития. Поэтому остается сравнительно низкая норма прибыли на капитал, особенно у судов с высоким уровнем инновационных технологий. Ключевыми игроками контейнерного рынка являются государство и диверсифицированный бизнес.

Представлена информационно-логистическая модель, которая отражает взаимосвязь системных параметров, влияющих на устойчивое развитие морского бизнеса в сфере контейнерных технологий. В результате обоснованы условия принятия рациональных решений в области инвестиционной деятельности предприятий морского транспорта.

Ключевые слова: контейнерные технологии, влияние консолидации, монополія в торговом судоходстве, качество инвестиций, морские транспортные предприятия, мировые контейнерные перевозчики, Черноморско-Азовский регион, контейнерооборот Украины.

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Introduction. Containerization in the global maritime trade market holds a ponderable position and is of strategic importance for the global economy. Nowadays, the global market of liner transportation has a low rate of return, the value of shares has decreased by \$ 100 billion over the past 20 years [1]. For the past five years, the average return on invested capital is lower than the weighted average cost of capital, which leads to a reduction and restriction of investment flows [2].

Negative factors affecting container shipping include:

- slow growth of global trade;
- the excess of supply over demand, which leads to an excess of carrying capacity and subsequent losses;
- the economic crisis in several countries with transition economies, which reduces the purchasing power of the population;
- an optimistic forecast of global GDP growth of 4—5% per year and a pessimistic 2—3% per year [3]. For sustainable global economic growth, GDP should be at least 7%. One of the main problems is the inability of many developed countries to ensure normal growth dynamics due to the unstable economic development and low global economic activity.

At the beginning of 2018 the consolidation process intensified. In conditions of growth rate of trade in goods lagging behind the growth rate of global GDP and the emergence of ultra-compact container ships and mega-maxes on the market for linear transportation, as well as the oversupply of container tonnage facilities, the container sector is to use consolidation as one of the tools to reduce shipping costs and traffic. Monopolies in merchant shipping use the exclusive right to realize the carrying capacity under the conditions chosen by them. By their nature, monopoly in shipping is the exact opposite to the free competition in the freight market [4].

It is worth emphasizing that the national container market is attractive for world liner carriers. Many large World shipping companies participate in linear transportations through the ports of Ukraine. The beginning of 2018 was characterized by revitalization at the national container market. The positive trends include the reduction of time for processing container ships.

Analysis of research and problem statement. The results of research conducted by domestic and foreign scientists in the field of transport economics, and the legislative, normative and regulatory provisions are also taken into account form the theoretical and methodological basis of the study.

The following tasks are set: competitive functioning of enterprises in the conditions of uncertainty and risk, of competitive positioning of marine transport enterprises in the globalization and integration market system, the selection of criteria-based approaches that ensure scale effect and substantiate the quality of investment in the maritime trade market system. A lot of attention is paid to the development of these problems in foreign and domestic scientific research:

- sustainable functioning and development of the global economy — Atkinson A. [5], C. Ilchenko [6];
- effective management of investment flows — Body Z. [7];
- competitive positioning of enterprises in the conditions of the global trade market — Huley Gley, Saunders John, Piercy Nigel [8];
- building an optimal pricing system for transport — Borger B. Coureelle C., Swysen D. [9];
- the quality of information flow management in transport [10];
- ensuring the economic sustainability of shipping companies in the maritime trade market system — M. V. Miyusov, L. V. Mezin, N. T. Primachev, N. N. Primacheva, I. N. Parkhomenko [11; 12].

Unsolved aspect of the problem. In order to ensure the competitive development of maritime transport enterprises in the system of the global maritime trade market, it is necessary to substantiate scientific provisions that take into account the peculiarities and patterns of development of shipping companies in the specific conditions of the container shipping market.

However, in the conditions of uncontrolled cyclical nature of the maritime trade market and taking into account the specifics of national economy, the new trends do not allow to make complete recommendations.

The article used methods: grouping and economic analysis — in the study of the dynamics and factors causing the development of the market for linear transportation; system analysis and logistics — to systematize the parameters affecting the competitive positioning of maritime transport enterprises in the system of container technologies; expert evaluation and forecasting — to justify the criteria for the development of linear companies.

The purpose of the article is to analyze and to clarify the new trends in the linear

transportation market system, to justify the criteria of the functioning of shipping companies in the structure of the container transportation market, to systematize the parameters and factors affecting the competitive positioning of the maritime trade market in the sector of container technologies.

Research results. The profit of container shipping lines depends not only on increase in price, but also on the economy of expenditures that is achieved both via rationalizing container routes and using integrated container carriers [13]. Oligopolistic tariffs of some sectors of the linear transportation market are characterized by evident inflexibility. Their change is determined by both external parameters and the internal strategy of shipping companies [11]. The barrier to entry into the oligopolistic sector of the market of linear transportation is the effect of scale. It is determined by such parameters of production potential and sales volume, at which a stable financial result is achieved. If prices rise for any reason, the number of shipping companies wishing to increase profits is expanding. At the same time, the expansion of supply leads to a subsequent decrease in prices if the market of maritime trade is competitive [14].

The last five years, there has been a slowdown in the growth rate of the global fleet, but nevertheless, the growth rate of supply is 2.6% higher than the growth rate of demand, which preserves an excess of world tonnage. In 2017 the share of the world fleet of container ships in the structure of the world fleet amounted to 13.5% and reached 245,609 thousand deadweights, which is 1,270 thousand tons more than in 2016. In 2017, the deadweight of the world fleet reached 1,861,852 thousand tons of deadweight [15].

Germany, Greece and China own about 39% of the global container fleet. In 2017, 21.46% of the global container fleet belonged to the Germans, the size of the largest vessel was 14,036 TEU, the average size of the vessel was 2,277 TEU, the total number of vessels was 2106. China owns 9.39% of the container market, the size of the largest vessel is 19,224 TEU, and the average size of the vessel is 2,409 TEU, the total number is 871. In third place Greece, it covers 8.13% of the container market.

Achieving economy of scale by increasing the productivity of container carriers has led to the emergence of ultra-large container ships (vessels over 10,000 TEU) and mega-cam (over 18,000 TEU). At the beginning of 2018, there were 451 ultra-large container carriers in the world container fleet [16]. *Fig. 1* presents the largest owners of u ultra-large container carriers as at the beginning of 2018.

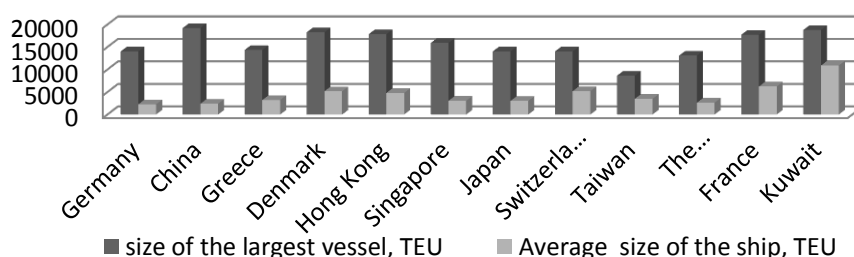


Fig. 1. Belonging to the world container fleet as at the beginning of 2018

Megamax is owned by China, Denmark, Hong Kong, Kuwait. ULCS ultra-large container robots are owned by container carriers such as:

- the Swiss company MSC with a total fleet of container carriers — 469 ships, of which 90 are ULCS (data as on the end of 2017). This company covers 14.6% of the container shipping market;

- Maersk Line — the largest liner carrier, which occupied 16% of market in 2017, the total fleet of container carriers consisted of 621 vessels and 86 of them ULCS;

- CMA CGM French container carrier owned 441 vessels in 2017, of which 74 are ultra-large, the share of the container market of this company is 11.1%;

- The state-owned Chinese container carrier Cosco Shipping Line consisted of 277 vessels in 2017, 67 of them ULCS and additional 29 ULCS are planned for 2020, this company's market share — 8%.

Fig. 2 shows the number of fleets of the world's largest linear carriers.

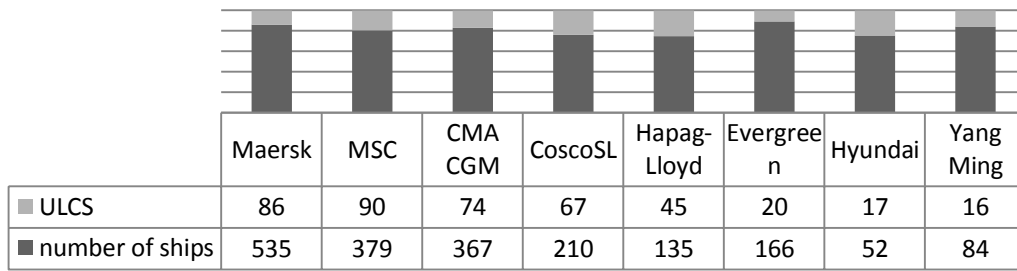


Fig. 2. The world's largest container carriers, 2017

The emergence of ultra-large container carriers and mega-maxs, as well as an increase in the share of vessels not equipped with cargo devices, dictate new conditions for the port infrastructure for receiving and processing container flows. The scale effect for the container sector leads to additional costs for the sea trading ports; it is necessary to adapt the technical and economic level to the requirements of the external system.

The age structure of the container fleet reflects the dynamics of growth in the size of ships. Container fleet is ahead of other groups of ships in terms of the average size of the ship-on. In 2017 the average age of container ships was 11.55 years (0.45% higher than in 2016) (Fig. 3). The youngest fleet is a group of bulk carrier ships; their average age was 8.8 years, respectively. The oldest fleet of container carriers belongs to countries with economies in transition [17]. Global linear companies supplement their fleets unevenly: two main factors have a significant impact on this process: the growth rate of the world economy and the cyclical nature of production development by region.

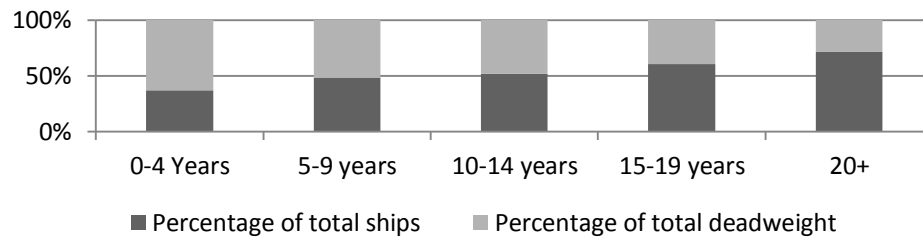


Fig. 3. Age structure of the world container fleet, 2017

Almost half of the global container turnover of the largest container ports falls on the ports of China. Over the past three years, container ports of North America have shown stable growth of container processing [18]. Fig. 4 presents the dynamics of container turnover of the largest container ports in the World.

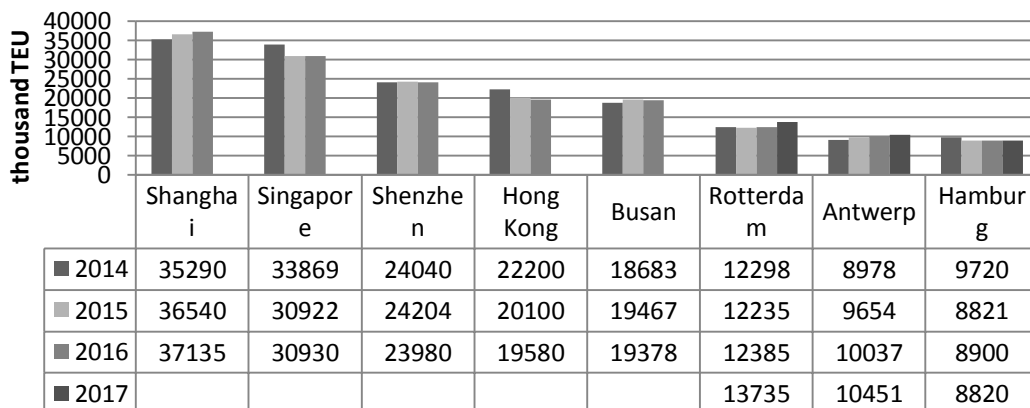


Fig. 4. The largest container ports of the World and their cargo turnover (2014—2017)

In 2017, container transportation in the Black Sea-Azov region grew up and reached 2,859.8 thousand TEU, which is 12% more than in 2016 [19]. Over the past 5 years, container turnover in this region exceeded the maximum of 2013 (*Fig. 5*) by 4.99%.

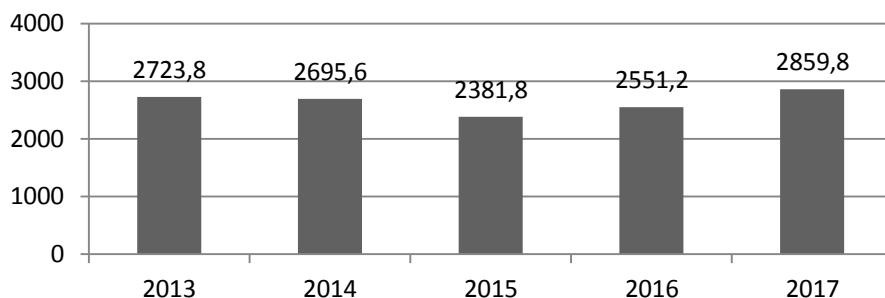


Fig. 5. Dynamics of containers processing in the ports of the Black Sea-Azov region (2013—2017, thousands TEU)

Only Moldova reduced container recycling in 2017 compared to 2016 by 18.62%. Ukraine occupies a leading position among the ports of the Black Sea-Azov region in processing containers with container turnover of 723.7 thousand TEU in 2017, which is 6.43% more than in 2016 [20]. Although it should be noted that Ukraine, unfortunately, has not yet reached the 2013 figures. In *Fig. 6* the dynamics of container processing at the container terminals of the Black Sea-Azov region is represented.

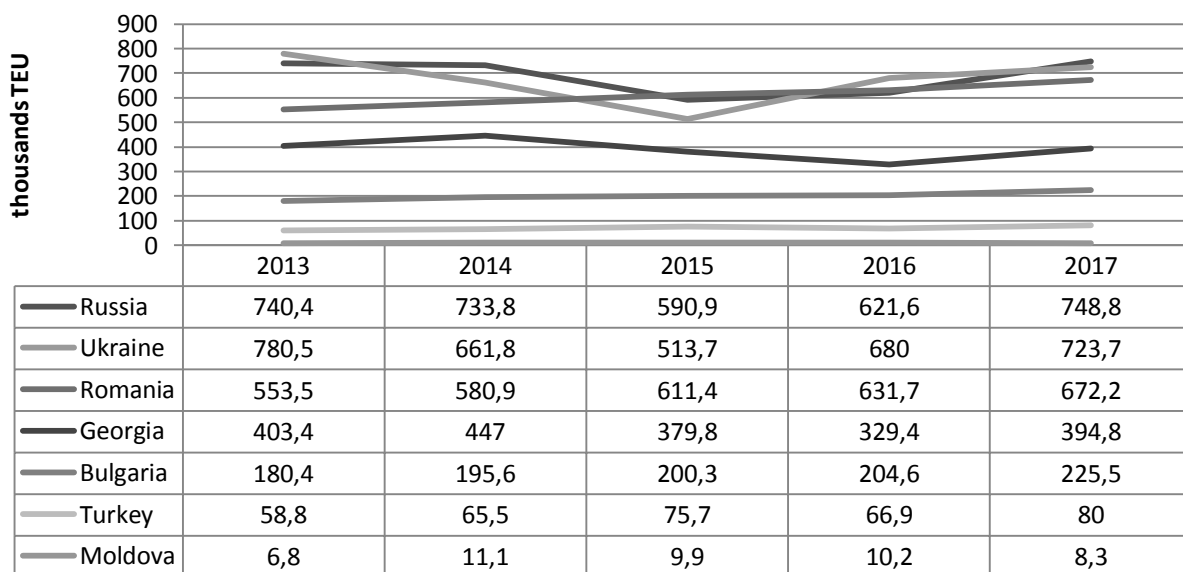


Fig. 6. Dynamics of container processing at container terminals of the Black Sea-Azov region (2013—2016, thousands TEU)

A positive trend is observed in the ports of Romania (6.41% growth in 2017 compared to 2016 and 21.44% growth as compared to 2013), Bulgaria (10.21% growth in 2017 compared to 2016 and 25% growth as compared to 2013), Turkey (19.58% growth in 2017 compared to 2016 and 36.05% growth as compared to 2013) [21].

Fig. 7 presents the dynamics of container handling in the ports of the Black Sea-Azov basin [22].

An analysis of the dynamics of container turnover at individual container terminals in the Black Sea-Azov region shows that the port of Novorossiysk has showed the greatest growth (20% to 2016). This is the largest port in Russia, which in 2017 occupied the first position among the seaports of Russia, and the share of cargo handling at this port is about 57% of the total cargo turnover of all ports of Russia [23].

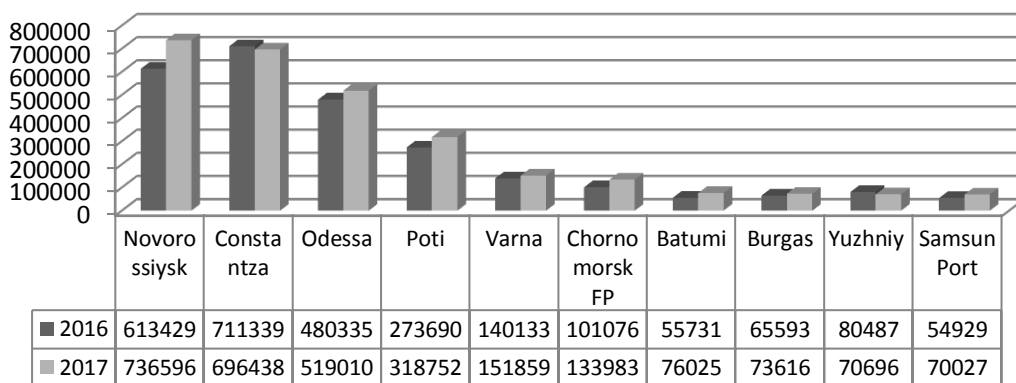


Fig. 7. The dynamics of container handling in the ports of the Black Sea-Azov region (2016—2017, TEU)

The second position is occupied by the Romanian port of Constanta, although it should be noted that the container turnover at this port decreased by 2.09% in 2017 compared to 2016.

Among the Ukrainian sea trading ports, a worthy third position in the ranking is occupied by Odessa Commercial Sea Port, which increased container processing at its terminals by 8.05% in 2017 [24].

In the Ukrainian sea trading ports, container cargo handling is carried out by private stevedoring companies at four terminals: “Container Terminal Odessa” (“KTO”), “Brooklyn — Kiev Port”, “TIS-KT” and at the terminal of the Black Sea Fishing Port (Fig. 8) [25].

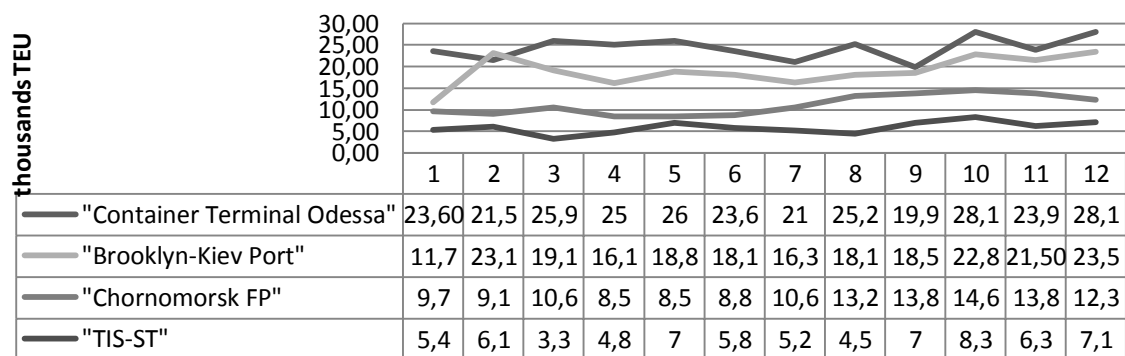


Fig. 8. The dynamics of container turnover in the seaports of Ukraine in 2017

The largest national stevedoring operator is KTO, with a share of 40.4% at the national container market in 2017; container recycling amounted to 291.8 thousand TEU in 2017, which is 9.872 thousands TEU more than in 2016 (+3.5%). Another stevedoring container operator of the Odessa Commercial Sea Port, Brooklyn — Kiev Port, is at the second place with a market share of 31.3% and a container recycling volume of 227.6 thousand TEU (an increase of 29.193 thousands TEU).

In 2017, the Black Sea Fishing Port reached the volume of container processing of 133.5 thousand TEU, which is 32.424 thousands TEU more than the same period. In 2017 the container market coverage was 18.5%.

The stevedore operator of the South Sea Trade Port TIS-KT occupies 9.8% of the market share with container recycling of 70.8 thousands TEU in 2017 (an increase of 13.68% compared to 2016).

It should be noted that there is an excess of container capacities in the national sea trade ports, which gives linear operators a possibility to choose the best option in terms of technical and economic level and operating conditions of the terminals. For example, since April 2018, Maersk Line decided to transfer ship calls from the Odessa Container Terminal to TIS-KT, operating in the South Port and Railway Infrastructure [25].

The Danish company Maersk Line, the French company CMA CGM and the Swiss company MSC cover almost 60% of the Ukrainian container market (*Fig. 9*). From 2011 to 2017, the workload of the Maersk company increased by 72% and in 2017 it amounted to 201,752 TEU (-5.4% as compared to 2016). In 2017, Maersk controlled 27.2% of the national linear market and the largest volumes were processed at the Black Sea Fishing Port (in 2017, the transshipment volume was 88,056 TEU, which is 14.49% more than in 2016).

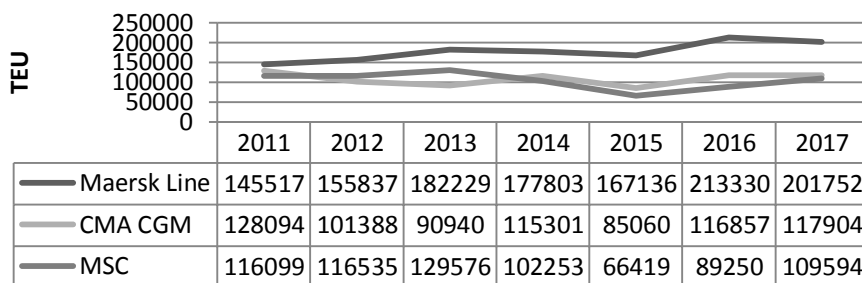


Fig. 9. Dynamics of container turnover of the largest container lines passing through the ports of Ukraine, 2017

The second position in the Ukrainian container market in terms of transshipment volume is taken by CMA CGM and is processing in the Odessa Commercial Sea Port at the Brooklyn Kiev terminal — in 2017 the national market share was 15.7% with a container turnover of 117,904 TEU (0.9% higher than in 2016).

In 2017, MSC reached 109,594 TEU with a 22.8% increase in container processing compared to 2016, with a share of national linear market coverage of 14.6%.

With a severe shortage of investment resources needed for the development of national maritime transport enterprises, the maximization of the final parameters of functioning should be considered as a positioning criterion.

Conclusions. In the commercial shipping, its linear segment, three sources of market power are manifested: differentiation of fleet quality parameters, barriers to entry into the segment of specialization, and the share of the freight market segment. At the same time, the principle of alliance is used to strengthen the barriers to entering the segment of specialization, especially of container technologies. This makes it possible, with a relatively soft differentiation of technologies, to maintain positions in the system of tariff rate regulation above marginal costs. Cost savings are one of the most important factors driving the creation of alliances of container carriers [11; 26; 27]. It is necessary to distinguish factors that in certain spheres do not contribute to cartel-pricing agreements:

- the difference in demand and costs. In this case, each marine transport enterprise has individual tariffs, on the basis of which it is possible to maximize profit. Therefore, a single price does not ensure the achievement of equal efficiency;

- the number of shipping companies. A large number of ship owners in the market of transport services with a significant concentration of capital, which limits the possibility of total tariff agreements;

- the tendency to implement a hidden tariff reduction. Beneficiation provides attraction of additional freight traffic. The main concern is possible opposition from the side of other cargo owners;

- economic recession. The reduction in the sales of bandwidth or carrying capacity leads to an increase in costs. Therefore, the way out is to expand operator activity on the basis of reducing tariffs and crowding out competitors.

In *Fig. 10* the information and logistic model are presented that determines the interrelation of factors and parameters affecting the competitive development of maritime transport enterprises in the linear transportation market system.

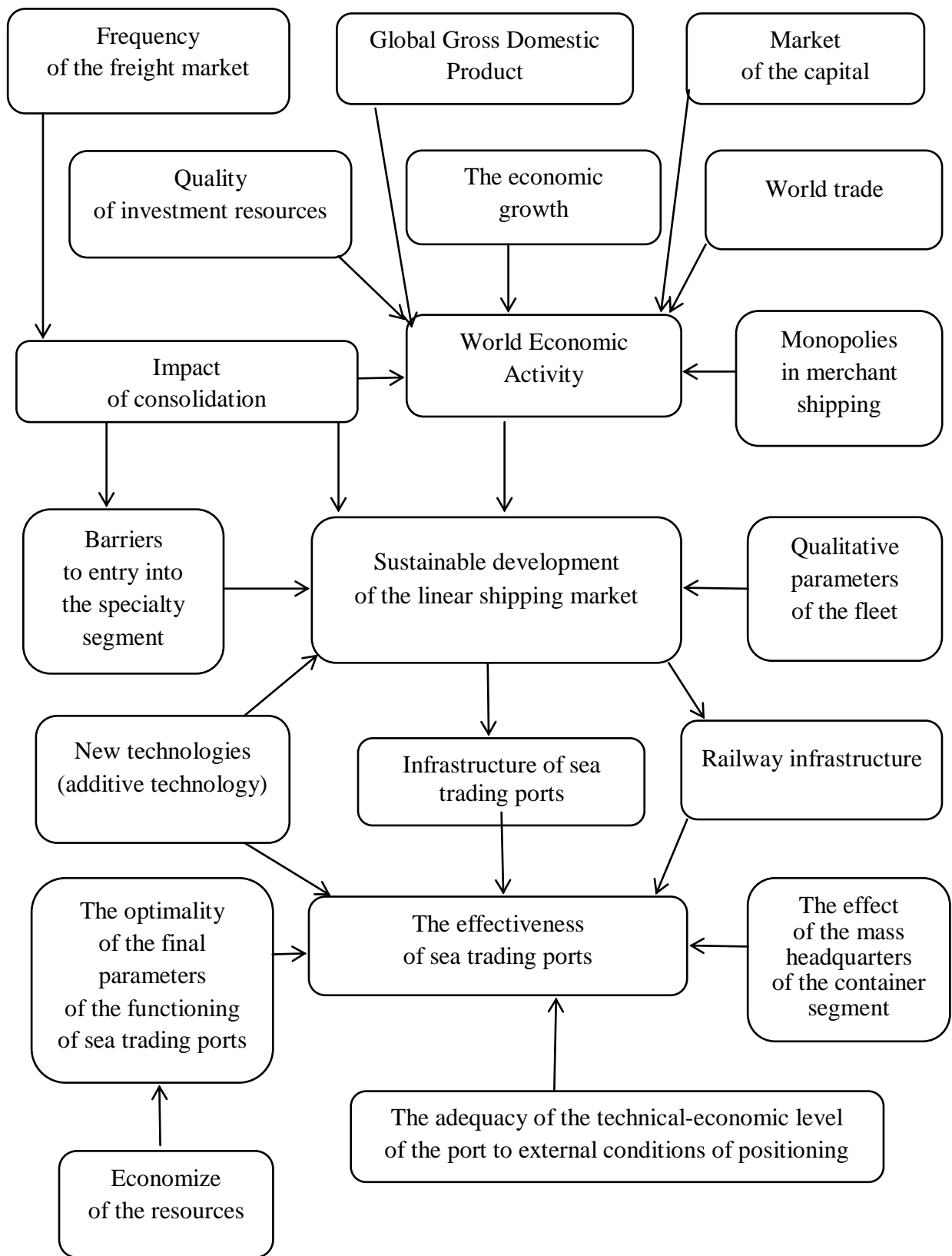


Fig. 10. Factors and parameters contributing to the sustainable development of the market of linear transportation

In the current conditions of development of the most important factors and conditions for optimizing the parameters of the functional activity of a company are the processes associated with structuring, integration, pricing and globalization. Therefore, predictive forecasting should be based on information, commodity and cash flows. In this respect, functional activity and development should be considered in the system of continuity of changes in material goods, labor, capital assets, production relations and final results and costs.

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