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PROBLEMS AND PROSPECTS OF DEVELOPMENT OF SEAPORTS LOGISTIC INFRASTRUCTURE IN UKRAINE

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Abstract. The article is devoted to the study of the seaports of Ukraine and the identification of problems in the development of their logistics infrastructure. *The purpose* of the paper is to study the main problems of development of logistics infrastructure of seaports of Ukraine and determine the benefits of forming effective logistics centers based on them. *The methodological basis* of the study is general scientific techniques and methods. In particular, the systemic approach, method of analysis and synthesis, logical and prognostic methods. *The results of the study* allow us to determine that the degree of integration of Ukraine's port industry into the international community remains low. The productivity of transport infrastructure and logistics processes are low. Seaports, of which there have been 13 in 2019, have a high investment potential due to their specialization and geographical location of the country. Much has been done by the government to develop the port industry since independence, but today there are a number of important issues, including low levels of private investment due to instability and high risk of corruption in the domestic economy, declining seaport turnover due to unreliable maritime logistics systems, imperfect tariff policy and many others. *The results* of the paper are the study of the experience of forming logistics infrastructure abroad, in particular in Germany and the Netherlands, and the argument for the creation of multimodal logistics centers on the basis of the Ukrainian seaports. It is determined that a special role in their formation and control over their activities should belong to state and municipal authorities. When creating a multimodal logistics center, a comprehensive approach should be applied, which covers such areas of activity as: development of the logistics services market; optimization and development of transport infrastructure (ensuring the possibility of cargo handling by different modes of transport); effective investment policy; development of trade relations; environmental protection; development of territories, creation of industrial parks and social policy (location of multimodal logistics centers near large settlements, creation of additional jobs). The support for these areas will diversify the economy of those regions, in which seaports are located, and will have an overall positive impact on the country's economy as a whole, increase its logistics potential and competitiveness. *Value/originality.* A detailed analysis of the Ukrainian seaports and existing problems in the development of their logistics infrastructure provides a better understanding of the need to create powerful multimodal logistics centers and the formation of a single information space for the integration of Ukrainian and European port industry.

Key words: seaports, transport and logistics service, logistics infrastructure, multi-modal logistics center.

JEL Classification: R42, O18, L91

1. Introduction

In the current conditions of transformation of the global economic model of world economic relations, the formation of an effective logistics infrastructure of seaports is a crucial task for any country with access to the sea. Modern competition in the markets of world maritime trade tends to change in the relationship between the volume of goods and services and the place of the main export-oriented industries in the world division of labor. Maritime companies are leaders in the cargo transshipment of various types under the conditions of high-quality specification of each seaport in the world (Nikulin, Roshchina, 2015).

Seaports of Ukraine are the most important part of not only transport but also production infrastructure of the country. Their role in the domestic economy is determined by the fact that they are located in the directions of international transport corridors, as well as by the fact that

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the administrative and economic border of Ukraine passes through them. Unfortunately, the current Ukrainian realities of the functioning of commercial seaports in the direction of providing efficient transport and logistics services indicate a rather low level of development. As a result, there is low demand for services of commercial seaports of Ukraine, compared to foreign ones due to insufficient level of development of logistics infrastructure.

Competition and the transfer of a significant number of customers to the ports of neighboring countries requires early action in making decisions on the development of new technologies and improving the quality and speed of cargo handling in the Ukrainian ports (Korniiko, 2016). The formation of the principles of reforming port services, positioning the seaports of Ukraine as powerful logistics centers in the international transport corridors is becoming especially relevant today.

Theoretical and practical aspects of the functioning of seaports and ensuring the development of their logistics infrastructure in recent years have been actively covered in the scientific works of domestic and foreign scientists.. Among them there are the following: Ye. Ihnatenko, O. Karpenko, T. Lohutova, S. Nikulin, O. Poliakova, N. Roshchina, O. Tkachova, S. Sharai, O. Shramenko, T. Beierle, C. Вероувен, A. Titov, V. Shumaie, etc. However, today there are many unresolved problems of legal, administrative, economic nature regarding the formation of efficient logistics infrastructure and full use of the capacity of seaports of Ukraine.

The research of the topic has been carried out in the following logical se-quence: the activity of seaports has been studied and the state of their logistics infrastructure has been assessed, the main problems accompanying the functioning of the seaport industry at this stage have been identified and the necessity of creation the multimodal logistics centers as a resource for integration the seaport industry into the global community has been justified.

2. Evaluation of the activity of seaports of Ukraine

Effective use of the capabilities of the Ukrainian seaports is an essential prerequisite for the development of the domestic economy. Fierce competition in international markets, modern integration processes, as well as economic realities determine the need for a clear understanding of the challenges of developing, reforming and improving the efficiency of the seaport system through the establishment of logistics systems.

According to the Ukrainian Sea Ports Authority, there is a port complex, which contains 13 seaports as of 2019 (Reni, Izmail, Ust-Dunaisk, Bilhorod-Dnistrovskyi, Chornomorsk, Odesa, Yuzhnyi, Mykolaiv, Olvia, Kherson, Skadovsk, Berdiansk, Mariupol), capable of processing up to 230 million tons of cargo per year, more than 100 port operators that ensure the operation of seaports (Table 1). For comparison, in 2013, Ukraine owned 18 seaports. One third of the available capacity is state stevedoring companies, the depreciation of fixed assets of which reaches 80% (Administratsiia morskykh portiv Ukrainy, 2018).

To identify problems in the development of logistics infrastructure of seaports in Ukraine, an analysis of their activities is performed.

Table 1
Current state of seaports of Ukraine (2018)

Indicators	Units
Number of seaports, pcs.	13
Number of berths, pcs.	263
Length of berths, km.	40
Cargo processed (export, import, transit), thou-sand tons	135.171
Revenue, mln. UAH	7394

The dynamics of cargo turnover by seaports of Ukraine is shown in Figure 1.

As it is shown in Figure 1, cargo turnover of seaports for the analyzed period has a stable negative dynamics in terms of cargo transit. This may indicate customer distrust in the reliability of the logistics system for ensuring marine shipping. At the same time, according to the Ministry of Infrastructure of Ukraine for 2016-2019, the volume of cargo transshipment in seaports is growing. Therefore, in 2017, cargo turnover in the ports of Ukraine has increased by 0.6%, in 2018 – by 2%, and for 6 months of 2019, in comparison to the same period in 2018, this figure already reaches + 13%. This year the best indicators are shown by seaports Chornomorsk (121.1%), Mykolaiv (119.5%), Odesa (112.3%), Reni (110.6%), Ust-Dunaisk (218.3%), Kherson (131.2%) and Yuzhnyi (120.3%) (The cargo turnover of seaports has been growing for three years, 2019).

At the same time, the share of shipments by water transport, according to the State Statistics

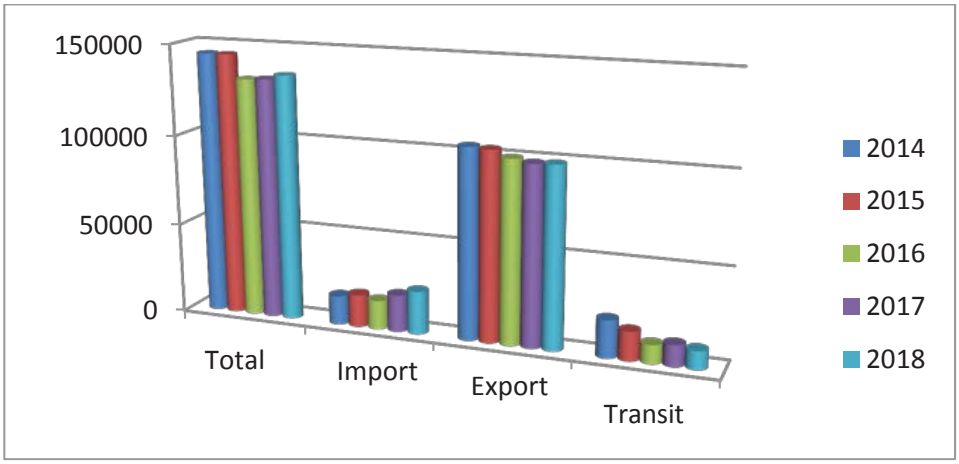

Figure 1. Dynamics of cargo turnover by seaports of Ukraine

Source: compiled according to the data (Administratsiia morskykh portiv Ukrainy, 2018)

Committee, is quite low compared to other modes of transport. To reflect the situation, the author has analyzed the volume of transportation of goods by mode of transport and determined the share of modes of transport in the transportation of goods (Table 2).

It should be noted that the level of development of the logistics infrastructure of Ukraine occupies a low position in international rankings, although in recent years there have been positive changes. Thus, Ukraine ranked 80th in the specialized international ranking of trade logistics on the general indicator LPI 2016, which represented 160 countries, which were evaluated on a five-point scale. The country's score was 2.74 points out of 5 possible, and in the international position on the sub-index of logistics competence, Ukraine had only 2.55 points. The same indicator of LPI 2018 for our country in 2018 had the following values: 66th place of the country in the international ranking, the country's assessment of 2.83 points, and positioning on the sub-index of logistics competence in 2.84 points (Global Rankings, 2019).

Ukraine's position on the International Trade Facilitation Index (TFI) is also indicative. According to the Report of the World Economic Forum, the potential of 138 countries was assessed by 56 indicators, grouped by categories: access to the domestic market; administrative management at the border; business climate; transport and communication infrastructure. In recent years, according to the TFI, Ukraine is losing ground, so if in 2012 our country had taken 86th place, in 2016 it took 95th place.

According to one of the expected quantitative results in the NTS 2030, the Ukrainian ports should enter the first hundred (Top 100) ports with the largest container traffic in the world by 2030. Certainly, this will be difficult to achieve, because, according to the rating in 2017, the 100th place is occupied by the King Abdullah Port in Saudi Arabia with a little more than 1.4 million TEU, processed in 2016. The Ukrainian seaports have the physical

Table 2

Volumes of cargo transportation and specific weight of different types of transport in cargo transportation

Mode of transport	2015		2016		2017		2018	
	Volume of cargo, million tons	Specific weight, %	Volume of cargo, million tons	Specific weight, %	Volume of cargo, million tons	Specific weight, %	Volume of cargo, million tons	Specific weight, %
Railway	350.0	58.3	344.1	55.1	339.5	53.4	322.3	51.6
Automobile	147.3	24.5	166.9	26.7	175.6	27.6	187.2	29.97
Pipeline	97.2	16.2	106.7	17.1	114.8	18.05	109.4	17.5
Water	**6.4**	**1.06**	**6.7**	**1.07**	**5.9**	**0.93**	**5.6**	**0.89**
Air	0.1	0.02	0.07	0.01	0.1	0.02	0.1	0.02

capacity to enter the Top 100, as it is estimated that the Ukrainian container terminals can process about 3 million TEUs (or about 26 million tons of containerized cargo), but only a quarter of the capacity has been used in recent years. In practice, all container traffic passes through three ports in Chornomorske, Odesa and Yuzhnyi (Sustainable logistics strategy and action plan for Ukraine, 2018).

Consequently, we consider and agree with the Ukrainian scientists (Lipskyi V.V. (2018), Kravchenko O.A., Strebko Yu.A. (2011), Hryshova I.Yu. (2019), Poliakova O.M., Shramenko O.V. (2017) that the main problems that hinder the development of logistics infrastructure of seaports of Ukraine are: lack of funds to finance all types of work; imbalance in the development of transshipment capacities and state land infrastructure; low level of coordination between modes of transport and local authorities to ensure the development of port infrastructure; low efficiency of using the potential of existing transshipment capacities; limited instruments for attracting private investment; underdeveloped transport infrastructure in seaports and water zones; insufficient level and inconsistency of depths in some seaports; slow renewal of fixed assets and non-compliance of their technical level with modern requirements; loss of transit cargo flows by domestic ports, their reorientation to the ports of the Baltic States, Poland, Romania, Germany; imperfection of customs procedures and the presence of high corruption risks; insufficient level of introduction of electronic cargo clearance systems and imperfect tariff policy in the field of service provision; insufficient level of service quality; the impossibility of full-scale optimization of the activities of state-owned enterprises in the maritime sector due to the high level of costs for the processing of social infrastructure; low level of participation of local authorities in the development of seaports in the region; excessive fiscal burden on port dues; lack of existing policy to ensure social guarantees and optimization of industry personnel against the background of increasing intensification and automation of production processes.

3. Arguments for the creation of multimodal logistics centers in Ukraine

The global experience confirms that increasing the level of logistics services in the port sector of Ukraine is best done by creating multimodal logistics centers based on them.

Hence, studying the peculiarities of the creation and operation of multimodal logistics centers in world ports, we believe that the greatest attention should be paid to the experience of Germany and the Netherlands.

The peculiarity of the creation of multimodal logistics centers at the ports of these countries is the strong promotion and control of their activities by state and municipal authorities.

In Germany, in particular, state authorities provide targeted subsidies to federal budgets, while clearly identifying sources of investment. The created logistics centers are managed through supervisory bodies created by different companies – participants of the project: investors or investment consortia; development companies; municipality; associations and unions. The state sector participates both in the planning phase and in the phase of implementation of investments in the development of logistics centers (Tityukhin, 2011). Logistics centers are located across the country in such a way that it is possible to cover almost 90% of the territory. Only more than 600 logistics companies have been set up in the port of Hamburg. Logistics infrastructure is characterized by a high level of development, multimodality and diversification of transportation.

The Netherlands is the main logistics center today. The port of Rotterdam is the largest port in Europe, which uses the most powerful logistics innovations and has a high level of security. There are about 120 terminals in the port, and the annual cargo turnover averages 450 million EUR. It is outstanding that the port is state-owned, as 70% of the port's shares belong to the city municipality, 30% of the shares belong to the state. The port serves 144 thousand vessels annually. It is planned that some of them will be controlled by artificial intelligence by 2025. The entire port area will be covered by the Internet of Things (IoT) and IBM Cloud. The efficient operation of the port of Rotterdam is a powerful source of revenue for the state, so, in 2018, the port transferred 96.5 million EUR dividends (68.3 million EUR to the municipality and 28.2 million EUR to the state).

Ukraine has a significant potential in the field of forming multimodal logistics centers in seaports, which would provide a transit logistics chain of goods traffic between Europe and Asia. Geographical location also makes it possible to involve Ukraine in the system of international transport corridors. Ukraine has five international transport corridors, but seaports still cannot be 100% classified as the powerful logistics centers.

We distinguish that in order for this to happen, it is necessary to determine the features of multimodal logistics centers that already exist abroad and the conditions of their adaptation and operation in the domestic economic conditions.

Therefore, an important condition for the creation and development of a multimodal logistics center is the presence of a single operator that must monitor the movement of goods, speed, quality of services provided, the consistency of different modes of transport. The presence of a single operator significantly simplifies the procedure of paperwork, ensures the efficiency of information flows and reduces the cost of port fees.

When creating a multimodal logistics center, a comprehensive approach should be applied, which covers such areas of activity as: development of the logistics services market; optimization and development of transport infrastructure (ensuring the possibility of cargo handling by different modes of transport); effective investment policy; development of trade relations; environmental protection; development of territories, creation of industrial parks and social policy (location of multimodal logistics centers near large settlements, creation of additional jobs).

Support for these areas will diversify the economy of those regions, in which seaports are located, and will have an overall positive impact on the country's economy as a whole, increasing its innovation potential and competitiveness.

The main principles of functioning of a multimodal logistics center should be availability, complexity, high quality of service, affordability and guarantees of proper performance of duties.

Thus, a modern multimodal logistics center is a large territorial portal, infrastructurally provided depending on the specifics of the field of activity and designed to handle large volumes of cargo through coordinated interaction of different modes of transport and all participants in the transport and logistics process. The organizational structure of the multimodal logistics center is presented in Figure 2.

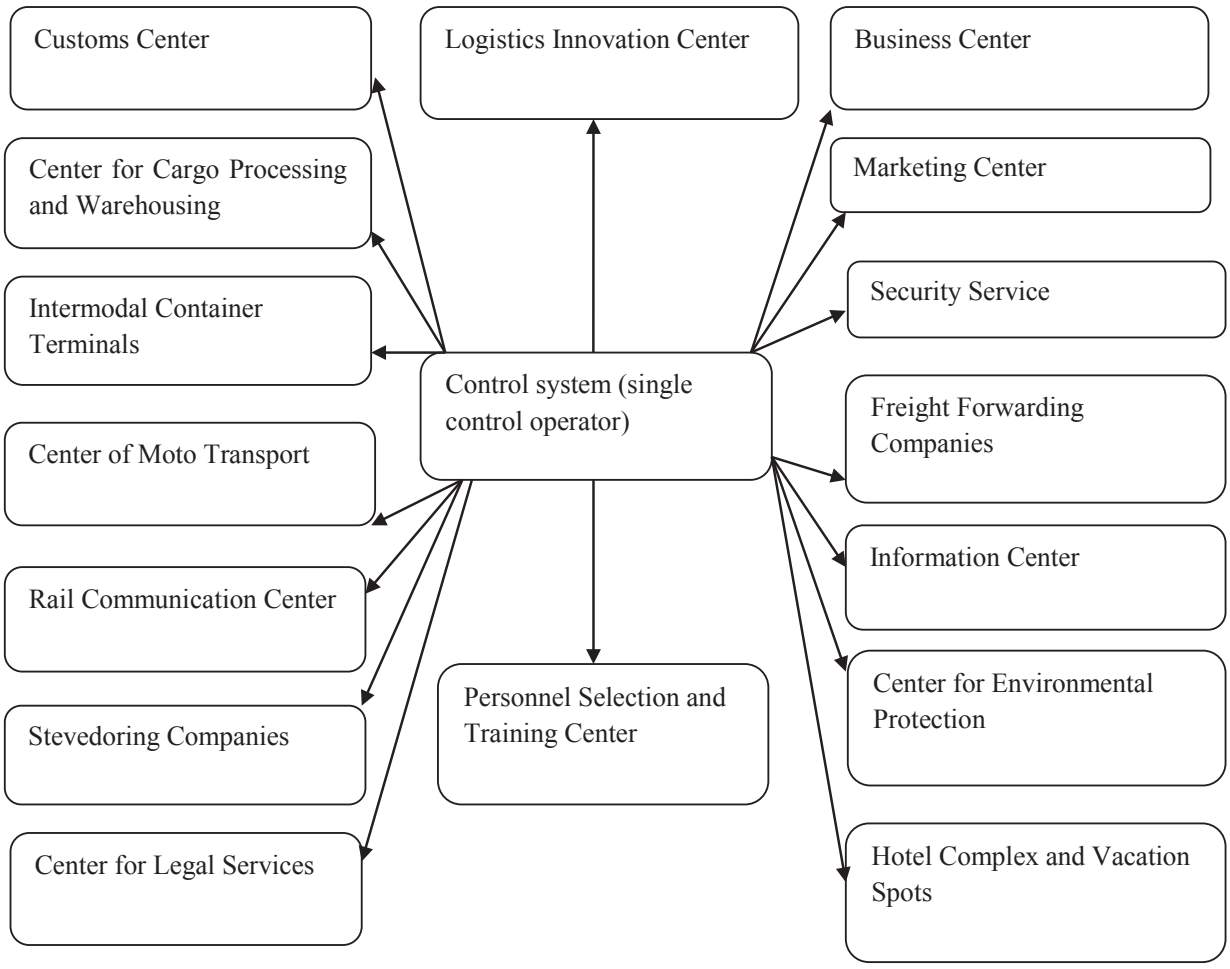

Figure 2. Organizational structure of a multimodal logistics center

Thanks to the creation of multimodal logistics centers in the ports of Ukraine, the efficiency of the transport chain will increase, document flow will be simplified due to the fact that it will not be necessary to document each cargo transportation, using different modes of transport will provide a single transport process, target pricing. In addition, the creation of a multimodal logistics center provides for a single information space not only in the port industry of Ukraine, but also at the European level.

4. Conclusions

The degree of integration of Ukraine's port industry into the international community remains low, which negatively affects the productivity of transport infrastructure and logistics processes. Seaports have a high investment potential due to their specialization and geographical location of the country. During the years of independence, the government of our state has done a lot for the development of the port industry, but today there are a number of important problems, including: low level of private investment due to instability and high risk of corruption in the domestic economy, decrease in cargo turnover of seaports due to unreliability of the logistic systems of providing maritime shipping, imperfect tariff policy and many others. Given the global experience to address these issues, we believe that it is the state that should undertake to promote the creation of powerful multimodal logistics centers and control over their operation. This will increase the competitiveness of domestic ports, the trust of the international community, the integration of the Ukrainian and European port industries and increase cargo flow, improve the quality and speed of its processing. For the country's economy, the development of logistics infrastructure through the formation of multimodal logistics centers means increasing of the budget revenues, improving of the environmental security, optimization of transport infrastructure and interaction of stakeholders in servicing the logistics process.

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