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INVESTIGATION OF STRATEGIC PERSPECTIVES OF DEVELOPMENT OF RIVER PORTS IN UKRAINE

Досліджено річковий порт з позицій одного з вузлових об'єктів логістичної системи країни національного та регіонального рівня. Обґрунтовано доцільність розширення комплексу логістичних послуг, які мають надаватися річковими портами та виконувати стандартні функції типового логістичного центру. Зумовлено такими рішеннями інвестиційну привабливість річкових портів та попит на їх послуги. Встановлено динаміку та тренди розвитку потенціалу річкових портів та його використання.

Ключові слова: *логістичні послуги річкових портів, еволюція розвитку річкових портів, логістичні технології.*

1. Introduction

River transport is the most economical and environmentally friendly mode of transport, which has significant untapped development potential in Ukraine. In conditions of low efficiency of state regulation and imperfect management, the decline of its infrastructure forming strategic development prospects and the implementation of competitive advantages by river transport is limited.

The application of the logistics approach in the operation of river transport makes it possible to identify the river port as the central element in the commodity movement and to identify it as an element of the country's logistics system. Its purpose is contribution to the improvement of ways of organizing the logistic activity of economic entities, functioning on the basis of innovative development, mobility and environmental protection. The geographical location of river ports at the intersection of transport corridors in the context of developing globalized environment, internationalization of trade and individualization of demand, on the one hand, makes applications of the provisions of international and environmental logistics, innovation, logistics and socially responsible management and marketing. On the other hand, unrealized shipping potential, the potential for cargo transportation by river transport, the potential for river fleet operation, the capacity of river berths and ports, etc., the reduction of investments in fixed assets is accompanied by the functioning of river ports in a fuzzy legal field. So, unlike maritime transport, which activity is regulated by the Law of Ukraine «On Sea Ports», the Code of Merchant Shipping of Ukraine, the Water Code of Ukraine, there is legal uncertainty in the sphere of river transport. In particular, the current legislation does not define the concept of «river port» (in contrast to the concept of «sea port»). Accordingly, there is no concept of the territory and water area of the river port, there are no requirements for the port logistics infrastructure, including the mobile points of cargo reception, environmental protection. There are no regulations on the management of river ports, including the organization of coastal shipping by river transport.

The river port should be considered as a geographical object, as a business entity (according to the draft Law of Ukraine «On Inland Water Transport») and as an important node of the logistics system of a country of national importance. This will allow to initiate demand for logistic services of river ports due to their functions as a typical logistics center, to develop river terminal terminals and invest in river infrastructure facilities [1].

Considering the foregoing, the search for ways to develop river ports as infrastructural elements of the logistics complex and the realization of their potentials in the context of applying the principles of logistics to them is very relevant.

2. The object of research and its technological audit

The object of research is the process of transformation of river ports into nodal objects of the country's logistics system.

River ports, which are delivery/freight forwarding points, should be presented as functional nodes of logistics chains through which cargo flows are directed to other modes of transport, as energy efficient and environmentally friendly forms of transportation.

Given the global trends towards globalization and the informatization of business, there are five factors that affect the level of port attraction in the context of the global economy (as defined by the World Bank experts) [2]:

– spread of global competition;
– development of new technologies;
– pollution of the environment and attention to environmental problems;
– safety and toughening of requirements to safety standards;
– transfer of trading capacity through refurbishment or consolidation.

The formation of the country's logistics system in the context of intensifying the use of river transport is aimed at identifying the unused opportunities and disproportions of economic growth and their elimination. This is possible due to the balanced involvement of various transport sectors, which are considered in [2, 3] as energy efficient and environmentally friendly forms of transportation (EECTM 2007).

Implementation of the state policy in the field of river transport (on redirecting the flow of goods to river transport, including thanks to the appropriate tariff setting), the development of the country's economy, expectations for growth in the 2018 conjuncture of foreign markets in connection with:

a) acceleration of global trade growth, although there are risks due to factors such as political uncertainty in some regions of the world and the continuation of the policy of trade protectionism;

b) ousting of intermediaries from the market of logistics services due to the growth of competition in favor of small, but technologically more developed companies;

c) spread of regionalization processes against the backdrop of structural problems and large technological demands that increase profitability. Examples of such know-how are real-time sea tracking, offered by DHL based on the Ocean View online platform; the DP World solution (UK), which facilitates the tracking of container shipments; Pilot Marine Transportation Management System of Panalpina (Germany));

d) development of modern logistics technologies, which together form the demand for river transport. One of these is digitalization. It is connected with the evolution and «digitization» of the logistics chains. Thanks to it, the conditions and rules of the «game» for both small and medium-sized players in the logistics services market and for large logistics companies are equalized, processes are accelerated and competition becomes more intense (however, the risk of cyber attacks is present). The growth in demand for river transport contributes to an increase in the number of cargo handling, which, as a highly profitable component of the port development program, will contribute to the formation of specialized logistics companies operating on the basis of logistics outsourcing and, accordingly, the development of logistics centers. Thus, employment growth and concentration of producers, suppliers, exporters, freight forwarders, carriers, customs officers and other participants of the logistics services market are expected. The intensification of logistics activities will lead to an improvement in the quality of logistics services, the expansion of the range of logistics services and specialization, together with increasing value for customers. So, the activation of attraction of river ports to the country's logistics system will contribute to better organization and rationalization of business, economic development and environmental policy of the state.

Also, due to the influence of external factors, it becomes possible to consider river ports as key assets for regional economic development of the territories in the context of the formation of a strategy for supporting the economic development of the industry of local territories and their connection with global markets.

3. The aim and objectives of research

The aim of research is development of theoretical and methodological provisions and practical recommendations on the directions of strategic development of river ports in the context of increasing the efficiency of their functioning on the basis of logistics by using the system approach and its methodology of system analysis.

To achieve this aim, the following tasks are defined:

1. To identify the river transport complex of Ukraine in the segment of river freight traffic and identify the place of river ports in the structure of the river transport complex of Ukraine.

2. To analyze the dynamics of cargo processing in river ports (berths) and in the nomenclature of goods.

3. To present the prospects for the development of river ports and bring their interpretation.

4. To represent river ports as key points of the country's logistics system and reflect the direction of development of their logistics activities.

4. Research of existing solutions of the problem

The state and prospects for development of river transport in Ukraine are considered by various scientists and institutions. In particular, the functioning of river transport under conditions of European integration is being investigated by the National Institute for Strategic Studies. In work [4], a study is made of the formation of a logistics strategy for development of river ports in Ukraine. The work [5] is devoted to the study of the prospects for development of container transportation in Ukraine. The author [6] examines the factors of competitiveness of Ukrainian ports in the conditions of globalization. In work [7] the evolutionary role of rural river ports as subjects of strategic economic development is investigated. In work [8] author's vision of the development of the container port system is given on the example of the Yangtze River. In work [2] the Croatian transport system and ways of integration of river and sea ports with the analysis of factors of their development are analyzed.

The authors [3] investigate the role and significance of inland waterway transport in logistics chains using the example of the river and sea ports in Szczecin. In work [9] the determinants of transformation of river ports into3-modular logistics nodes are presented on the example of the ports of the Lower Vistula. The work [10] shows the evolution of ports in a competitive market environment presented by the International Bank for Reconstruction and Development.

In a significant part of the publications, in which the term «transport-logistic system» is used, the leading role is assigned to the transport component as the main one, which determines that in a certain way it reduces the logistic component to a secondary importance, for which some consider the storage subsystem. Such approach can lead to suboptimal decisions on the development of the country's logistics system [11]. Therefore, the authors set out to evaluate the strategic prospects for the development of the river ports of Ukraine, taking the defining logistic paradigm.

The issue of comprehensive analysis and research of the prospects for the development of ports as a central infrastructure element in the structure of logistics systems has not been sufficiently studied, and therefore require in-depth studies and research.

5. Methods of research

During the execution of the work general scientific and special research methods are applied:

– economic analysis – in determining the relevance of the research topic;

– statistical analysis – to identify and summarize the trends of changes in the operation of river ports on the basis of world experience in their operation;

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– analysis and synthesis of results and retrospective – to study the features, the state of development of river ports and the conditions of their functioning as part of the river transport complex of Ukraine;
– historical, evolutionary and logical – for the implementation of theoretical generalizations of scientific approaches to the use of logistic principles for the development of water transport and river ports;
– system theory and system analysis – to identify strategic prospects for the development of river ports and exit them into unoccupied niches of functioning.

6. Research results

6.1. Operation of river transport. Identification of the river ports of Ukraine in the structure of the river transport complex (Table 1) makes it possible to isolate the river port and present it as a key element of the national/regional logistic system. Along with other key elements (air terminals, warehouse terminals, railway stations, logistics and distribution centers of the ground part of territories, etc.), the river port becomes investment attractive in the conditions of initiating the demand for river transportations in order to realize the conditions for its long-term development.

As evidenced by the dynamics of indicators of the functioning of river transport in Ukraine (Table 2), there is no objective capacity to increase the volume of cargo transportation with the involvement of river transport due to the decline of river infrastructure elements.

In particular, the analysis of the dynamics of indicators of the functioning of river transport in Ukraine for 2010–2016 found a fall in freight turnover by 60.6 %, both foreign (by 62.4 %) and coastal (by 58.1 %) types of communication; a decrease in the volume of cargo transportation by 57.1 %. In the context of a decrease in the average distance of transportation of 1 ton of cargo in the period under review, the freight traffic by 50 % and the volume of processing of goods by river ports by 33.3 % decreased by 26.8 %. In the period from 2010–2016, infrastructure indicators of river transport deteriorated: the rolling stock – by 36.4 % and the operational length of river shipping routes – by 27.3 %.

For example, for the inadequate development of navigable waterways, Polish water transport plays (as in Ukraine) a secondary role in the Polish transport system. The share of inland water transport in the transportation of goods decreased from 0.8 % in 2000 up to 0.3 % in 2016. The length of the network of navigable waterways in Poland is 3655 thousand km (unlike in Ukraine, the length of the water network is 1613 thousand km), it has only 5.9 % (214 km) of waterways of international importance (class IV and V).

Table 1

The location of river ports in the structure of the river transport complex of Ukraine by features

Feature	Components
Elements of the transport complex	Cargo, internal waterways; river fleet; a system of navigation and monitoring of compliance with security conditions; objects of service infrastructure, other subjects of the industry
River fleet	Cargo ships of various types, technical and specialized fleet
Inland waterways	Rivers, lakes, reservoirs, canals and other water bodies suitable for navigation
Infrastructure objects of river navigation ways	– river ports of general use, cargo terminals and stations, locks with all technical facilities and equipment serving river transport; – navigable canals, navigable, power and hydraulic engineering structures, service buildings; – bank protection structures; – nodes of information communication; – buildings, coastal navigation signs; – warehouses, engineering networks for maintenance of waterways; – adjacent land; – shipbuilding and ship-repairing plants; – navigation and control system for the safety of navigation and other facilities, directly ensure the operation of river transport
Other subjects of river infrastructure	Enterprises of the road economy, communication enterprises, industrial, trade, construction and supply enterprises, educational institutions, health care institutions, physical culture, research and development organizations and other enterprises, institutions and organizations, regardless of the form of ownership, indirectly ensure the operation of river transport
Contact audiences	Territorial administrative bodies, tax administrations, customs authorities, embassies and consulates, certification and certification bodies, sanitary and epidemiological and phytosanitary control agencies, brokerage companies, insurance companies, consulting companies, advertising agencies, recruitment agencies, security organizations, etc.
Transport partners and subjects of the river transportation market	– shipping companies; – stevedoring companies (enterprises operating the terminal, carry out loading and unloading operations, maintenance and storage of cargo, servicing of ships, etc.); – tallyman company (organizations providing cargo counting services); – geodesic companies (enterprises performing independent valuation of cargo or vehicle); – shipchandler companies (enterprises for providing foreign ships with food and technical supplies); – enterprises of related modes of transport (rail, road, in the future - air transport); – cargo owners; – freight carriers; – logistics companies; – transport and intermediary companies, etc.
Subordination to the central executive authorities	Most river transport enterprises report to the Ministry of Infrastructure of Ukraine. The shipbuilding and ship repair industries are in the system of the Ministry of Economic Development and Trade of Ukraine. Naval activities are in the system of the Ministry of Infrastructure of Ukraine and the Ministry of Defense of Ukraine. Scientific research in the river sector, management and protection of water resources under the auspices of the Ministry of Ecology and Natural Resources of Ukraine. Training in the specialty «River and sea transport» is in the system of the Ministry of Education and Science of Ukraine. Regional development of riverine areas is in the system of the Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine, etc.

Note: author's development.

Table 2

Analysis of the dynamics of indicators of the functioning of river transport in Ukraine for 2010–2016

Year	2010	2011	2012	2013	2014	2015	2016	2016/2010
Cargo turnover, billion t km, including by type of service:	3.8	2.2	1.7	1.4	1.3	1.6	1.5	0.394
foreign	3294.2	2010.1	1436.6	1171.4	1100.6	1287.4	1237.6	0.376
cabotage	542.5	207.9	311.8	215.8	257.5	284.3	227.4	0.419
Freight transportation volume, million *t*	7	6	4	3	3	3	3	0.429
Index of cargo transportation, in % to the previous year	136	82	75	66	111	100	115	–
The average distance of transportation is 1 ton of cargo, km, in tons	549	388	407	488	432	498	402	0.732
international	991	965	1169	1021	955	1083	885	0.893
Intensity of cargo transportation, million *t* km per 1 km of track length	1.8	1.0	0.8	0.7	0.8	1.0	0.9	0.5
Rolling stock, units	2064	2040	2040	2040	1261	1321	1312	0.636
Volume of cargo handling by river ports, million *t*	6.205	6.616	6.675	4.112	5.170	4	4	0.667
Operating length of river navigation ways, thousand km	2.2	2.1	2.1	2.1	1.6	1.6	1.6	0.727

Note: according to [12–14].

In 2016, 6209.7 thousand tons of goods were transported by Poland's inland waterways and 832.4 million tons km were carried out. The volume of goods transportation, by 47.9 % and 61.9 %, respectively, is less compared to 2015. For the carriage of goods by inland waterways in 2016, the average transportation distance of 1 ton was: 233.8 km in international traffic (264.8 km in 2015), 24.8 km in inland transport (11.6 km in 2015), overall – 134 km (in Ukraine – 402 km) [15].

In 2016, 3245.1 thousand tons of cargo were transported in international transportation (59.9 % less than in 2015), which share is 52.3 % of all cargo transported by Polish ship-owners. The decrease in the volume of traffic between foreign ports (by 66.0 %), their share in the total volume of international transport in 2016, was 73.6 %. In addition, a decrease in imports (17.2 %) and exports (20.4 %) of goods is recorded. The main direction of export of goods on inland waterways (which is 23.1 % of the total volume of international traffic) is recognized by Germany. In Poland, water continental transport could play an important role in servicing selected market segments and be used for servicing seaports, in the process of developing foreign trade, in particular with Germany. In addition, the continental transport, like in the EU countries and Ukraine, could more adapt to the service of combined transport, participating in solving the problems of redirecting freight flows from road and rail transport [15].

6.2. Use of river ports. Now a standard list of services is provided by river ports (berths), including for processing of bulk, packaged cargoes, goods in containers (Table 4).

Analysis of Table 4 points out that in the cargo handling structure in ports, loose and packaged goods are distributed almost equally (55.87 % and 44.13 % respectively). The bulk cargo handling in the ports is dominated by the cargo of domestic traffic 1885.8 thousand tons, in the processing of container-piece – export cargo in the amount of 1358.4 thousand tons (or 74.29 % and 67.76 % respectively). The processing of highly profitable large-tonnage cargoes at the berths of other enterprises is only 32.7 thousand tons (or 5.22 % of the processing of all cargo at the berths). This indicates a low level of demand for river port (berth) services, especially with high added value.

The decommissioning of the domestic fleet is gradually replaced by a foreign fleet, as evidenced by the approximation of the processing of cargo in river ports (berths) delivered by the foreign fleet and fleet of Ukraine (Table 5).

Table 4

Analysis of cargo handling in river ports (piers) in 2014 by nomenclature, thousand tons

Indicator	All cargoes	Structure, %	Including			
			Export	Import	Transit	Internal
River ports						
Total	4543.0	100.00	1921.4	138.1	11.5	2472.0
bulk goods	2538.3	55.87	563.0	78.0	11.5	1885.8
piece cargoes	2004.7	44.13	1358.4	60.1	–	586.2
Berths of other companies						
Total	626.9	100.00	339.4	182.1	1.7	103.7
bulk goods	429.1	68.45	270.0	55.4	–	103.7
piece cargoes	162.6	25.94	63.2	97.7	1.7	–
goods in containers (gross)	35.2	5.61	6.2	29.0	–	–
of them in large-tonnage	32.7	5.22	5.8	26.9	–	–
of which containers (weight)	4.7	0.75	1.2	3.5	–	–

Note: according to the data of [14].

Table 5

Processing of cargoes in river ports (berths) of Ukraine, delivered (sent) by the Ukrainian fleet and foreign fleet in the first half of 2015, thousand tons

Indicator	All cargoes	Including			
		Export	Import	Transit	Internal
Delivery by the fleet of Ukraine					
River ports (berths)	1004.8	541.1	75.3	–	388.4
River ports	906.3	465.0	61.3	–	380.0
Berths of other companies	98.5	76.1	14.0	–	8.4
Delivery by foreign fleet					
River ports (berths)	800.4	657.0	109.5	6.0	27.9
River ports	594.7	497.9	62.9	6.0	27.9
Berths of other companies	205.7	159.1	46.6	–	–
Total	1805.2	1198.1	184.8	6	416.3

Note: according to the data of [16].

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In particular, in the first half of the year 2015, in the structure of cargo handling by river ports (dominated by goods delivered by the Ukrainian fleet (1004.8 thousand tons or 55.66 % of the total number of processed goods), among the cargoes delivered by the Ukrainian fleet dominated by exports (541.1 thousand tons or 53.85 %) and cargo of internal communication (388.4 thousand tons, 38.65 %). But the cargo processing, delivered to ports by foreign fleet, amounted to 800.4 thousand tons or 44.34 % of the total volume of processing of goods, of which exports dominated (82.08 %), more than a third (35.7 %) of cargo handling in river mouths (berths) are in the Kherson region (Kherson port) This allows to identify it as a promising local node according to parameters of the country logistics system is:

– logistical attractiveness of the port;
– port capacity;
– level of utilization of the port's throughput.

Assessment of the level of involvement of the river ports of Ukraine in international logistics supply chains can be done on the basis of analysis of exports, imports and transit of goods through the river ports of Ukraine by destination countries (Table 6).

Table 6

Export, import and transit of goods through river ports (berths) of Ukraine by destination countries in the first half of 2015, thousand tons

Country	Export			Import			Transit
	Total	Including		Total	Including		
		Ports	Berths		Ports	Berths	Ports
Total	1198.1	962.9	235.2	10051.8	124.2	9927.6	6.0
EU countries	457.5	366.7	90.8	858.1	6.3	851.8	0
Europe	6.6	6.6	0	121.4	6.0	115.4	6.0
Asia	716.2	576.4	139.8	1899.9	39.3	1860.6	0
Africa	17.8	13.2	4.6	3108.5	6.5	3102.0	0
America	0	0	0	3474.9	45.5	3429.4	0
Australia and Oceania	0	0	0	589	20.6	568.4	0

Note: according to the data of [16].

Analysis of Table 6 allows to state that import cargo dominates among the export, import and transit of cargo through river ports, in the first half of the year 2015 it was 10051.8 thousand tons. The volume of the latter is 8.38 times higher than the export volume and 1675.3 times the volume of transit cargo. The main destination countries for the export of goods are Asia (716.2 thousand tons or 59.77 % of the total exports) and the EU countries (457.5 thousand tons or 38.19 % of total exports). The main destination countries for importing goods are the United States (3474.9 thousand tons or 34.60 % of the total volume of imports) and Africa 3108.5 thousand tons or 30.92 % of total imports). This demonstrates the extremely low involvement of the river ports of Ukraine in the international logistics supply chain of products that are formed around the territory of Ukraine, the low involvement of river ports in the processes of creating added value. And this in turn is due to the lack of appropriate high-tech infrastructure and low interest of foreign counterparts in cooperation because of established business relationships and high barriers to entry into the cargo handling industry. That is, market conditions of management put on the agenda the identification of competitive advantages by river ports, using which river ports have the opportunity to develop in the context of developing appropriate state policies, activating the interests of interested groups of stakeholders, and implementing the objectives of the country's logistics system.

6.3. Perspectives of development of river ports. An analysis of the features of the functioning of river ports in the structure of the river transport complex in Ukraine and the identification of the location of river ports in the system of inland waterways of Ukraine made it possible to draw the following conclusions.

1. The presence of 12 river ports with 60 million tons of capacity per year. Transportation of cargoes along the Dnieper (P40), the Danube (P80), the Dniester (P90), the Southern Bug, the Black and Mediterranean seas from the west to the river ports of Romania, Germany, Bulgaria, Hungary, Austria, the seaports of Turkey, Greece, Israel, France, Italy, which requires taking into account the transit potential of the state in the process of forming a logistical system of the country with the participation of river ports. Ukraine ranks eighth in the rating of the EU and Ukraine in terms of the length of navigable waterways (1613 thousand km) [17]. The rating is headed by Finland and Germany (8052 thousand km and 7675 thousand km respectively) [17].

2. High logistical attractiveness of ports (Kyiv, Dnipro, Zaporizhzhia, Kherson, Mykolaiv). High capacity of ports (Kherson, Dnipro, Zaporizhzhia, Kyiv, Mykolaiv). High level of utilization of the capacity of ports (Dnipro and Zaporizhzhia). Low level of use of the capacity of ports (Cherkasy, Chernihiv) [4].

3. The significant potential for attracting river ports due to the high density of accommodation along the Dnipro reservoirs of manufacturing enterprises generates more than 60 % of Ukraine's GDP (26 million tons of cargo per year). This requires support/modernization of infrastructure and the development of cooperation with potential consumers of river port services.

4. Presence of river information services of RIS «Dnipro» and RIS »Danube» and their interaction with the monitoring system of the surface situation. RIS »Dnipro» and RIS »Danube» comply with the European standards and directives of the United Nations Economic Commission for Europe (UNECE) (since 2012). In the future, they are expected to be coordinated with the «Information system of the port community» in the seaports of Odesa as components of the system for integrating information exchange and accelerating transactions in the river transport complex.

5. Lack of guaranteed depths for loading and passage of large ships (which increases the cost of delivery of products). Moral and physical depreciation of fixed assets: rolling stock and port facilities (excluding grain terminals) and the lock infrastructure (high level of depreciation of the infrastructure of the river fleet, lag in the development of the infrastructure of the port stations). Deficiency of specialized container terminals and large-capacity ships for domestic bulk transportation. The lack of demand for the export of container shipments, which requires the search for business partners who are interested in the development of river transport and, accordingly, the elements of the river infrastructure.

6. Unreasonably high rates of port dues, their number (channel fee for bridging, fee for gating, fee for pilotage of the ship, port fees, obtaining one-time permits) and the mandatory of some of them (pilotage). Freight tariffs for domestic container transportations (small consignments) are uncompetitive with regard to rail and road transport (for the high cost of loading and unloading operations). Higher freight tariffs in comparison with the railway (almost twice) and motor transport for river-sea class ships carrying out export-import operations (higher freight, fleet leasing, infrastructure usage). This requires a strategic vision by the state of river ports as an integral element of the country's logistics system and professional state regulation and support of their functioning.

7. The need for the potential involvement of river ports in the system of the trans-European transport network TEN-T and accession to external river communication routes – the E-40 water route. It is expected that the transit potential of the Dnipro in Ukraine, Belarus and Poland will be promoted to expand the multimodal transportation network, including «river – sea» type ships.

6.4. River ports as key points of the country's logistics system. On the basis of the analysis and conclusions presented, the authors see that the future development of the logistics activities of river ports and access to unoccupied niches can be represented by the following:

1. Development of feeder container lines in the context of coordinated development of various modes of transport.

2. Increase in the volume of cargo handling in container terminals in the context of ensuring the growth of added value of goods on the territory of Ukraine.

3. Expansion of the complex of logistics services by river ports using standard functions of a typical logistics center. For this purpose it is necessary to attribute first of all expansion of the nomenclature of cargo handling (including dangerous and hi-tech), and also growth of port capacity due to automation of technological processes of the port.

4. Development of infrastructure support for river ports as a necessary component of the perspective transformation of river ports into multifunctional logistics centers.

5. Innovative development of logistics systems/river clusters on the basis of the development of new river routes of cargo transportation and the central place of river ports in them; implementation of competitive advantages by river ports, activated by logistics of cluster entities.

Let's make a detailed analysis of the above sentences:

1. Feeder container transportation along the Dnipro with the participation of container lines, sea container terminals, Dnipro, Zaporizhzhia, Kyiv river ports. These shipments provide for the import of imported containers to/from Odessa, their reloading to road/rail transport and further transportation to highly developed regions of the country (Kyiv, Dnipro, Zaporizhzhia, Poltava, etc.).

Advantages. The use of such scheme will increase the inflow of consumers served by seaports and will facilitate the unloading of road and rail transportation routes. According to the calculations of the Ministry of Infrastructure of Ukraine, the potential volume of bringing traffic to the river (metal products of various nomenclature, consumer goods (in the long run), ores of non-ferrous metals, oil, etc.) is 40 million tons, one additional million tons of cargo transported along the river , gives a budget saving of 750 million UAH. The development of navigation will give impetus to the development of the shipbuilding industry and other related industries (one workstation at the shipyard provides work for five more in related industries).

Disadvantages. Among the cargoes that are formed in Ukraine for export, a very low percentage can be containerized (since low-technology commodities are exported). Disadvantages include:

– low speed of container cargo handling in ports;
– disparities between levels of development of capacities of ports for cargo processing and railway infrastructure, are adjacent to them;
– high risks of multimodal operators in the organization of transport;
– absence in Ukraine of a developed network of logistics centers and the institution of multimodal (logistic) operators.

It is established that container transportations on the Danube River are not practiced. It is noted that among the most important inland waterways of international importance (the Danube (P80), the Dnieper (P40), the Dniester (P90)), the Danube belongs to the river navigation routes of the highest category E, class VII (according to the UNECE classification). This indicates the belonging parameters of inland waterways for the transport of containerized goods (COM 2013) along the Danube River.

In contrast to the Ukrainian practice of the decline of container traffic, for example, in the territory of the European Union there are currently about 750 domestic ports, more than 100 of which operate container terminals and the total number of which is constantly growing. The annual volume of cargo handling in 50 of the largest ports is more than 1 million tons of cargo, almost 40 ports are both inland and sea ports [3]. USA has approximately 360 public and private commercial river and sea ports [7]. The US inland waterway system includes more than 200 ports and 12,000 miles of navigable waterways. The use of inland waterways helps to reduce transportation costs by about 12.5 billion UAH annually and creates more than 250.000 jobs. More than 28.74 million containers are shipped annually in the US sea ports [18], and river ports, which are considered to be nationally significant, are used for the development of agricultural enterprises in the US areas and their connection with global markets. As the researchers note, the majority of US river ports do not meet the definition of the internal port, which are in small interaction with seaports, carry out relatively small volumes of container transportation of goods relative to seaports. This allows to assert the concept of logistic regionalization about the weak level of suitability for US river ports [7]. During 2016, China noted a low level of growth in water transport relative to air transportation.

2 and 3. The development of Ukrainian river ports is possible due to the expansion of the range of logistics services provided, namely:

– handling of goods, including hazardous (bulk, oil products, chemicals, etc.) without negative environmental load due to their transportation by containers, which ensures the physical and commercial safety of cargo;
– preparation of customs documentation;
– provision of technical services;
– packing and labeling;
– certification;

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– technological refinement of the goods;
– disposal and the like.

4. Infrastructural support for the development of river ports, which is recognized as an essential component of the initiation of demand for river port services, is associated with:
– dredging operations on waterways;
– modernization of roads and railways;
– expansion of warehouse infrastructure;
– development of container terminal capacities, which should be considered as an integrator of all types of transports;
– automation of management processes;
– concentration of industrial and industrial objects as cluster formations;
– formation of logistics information centers in the territory of river ports, etc. Infrastructure provision of ports should be considered as an important component of implementing structural and strategic changes in the management of supply chains [19] with the prospect of converting river ports into distribution/logistics regional centers – coastal nodes of the country's logistics system.

5. Dissemination of innovations that represent integrated structures in the form of clusters (logistics, trade and logistics, etc.) with the involvement of a river port. The goal of the cluster is union of the subjects of the cargo transportation segment, science, politics and administration into a network structure on the basis of common ideas, needs and interests, starting with the exchange of information for long-term cooperation. Cluster education should combine business and economic activities in various sectors. Among them: shipbuilding and offshore structures, cargo river transportation, port activities, ship and port equipment production, obtaining environmentally friendly types of energy, information technologies, research and development bureaus, educational institutions for training specialists in specialty 271 «River and sea transport», business consultants, agents for providing services in the field of finance and insurance. All of them differ in the location of participants in the transport and distribution process in the international transport corridors.

The implementation of these approaches in the areas of long-term development of logistics activities by river ports will increase the investment attractiveness of river ports, initiated by the growing demand for river port services by expanding the range of logistics services and increasing their value for consumers. In the long term, this will make it possible to present the river port as a cluster of cluster entities in the structure of the country's logistics system, fulfilling the functions of the usual logistic center of the ground part of the country. It must undergo an evolutionary path of development and, in conditions of a developed logistics environment, acquire signs of a fifth generation port. The fifth generation port is considered as the central hub of regional/international logistics systems for servicing container and multimodal transportation of goods on a world scale based on developed logistics platforms. The fifth generation port among the ports of other generations distinguishes the following features:
– coordinated activity of the objects of the logistics infrastructure with the centers of management and distribution of cargo flows, customs, insurance companies, etc. was also agreed;
– high level of automation of order processing processes (for example, due to the action of Kiva or Robo-Stow robots), recognition systems, etc.;
– developed information support (thanks to digitalization and «digitization» of logistics chains).

Provision of expanded (due to implemented information platforms) complex of highly specialized client-oriented services distribution functions on a global scale, open access to information for transport market actors makes such ports an active participant in the country's logistics system. Thus, it creates additional levers of its development potential and investment attractiveness, perceived value for customers.

The policy of Ukrainian ports (including through tariffs, high collection, one-off permits) does not help attract international carriers who avoid Ukraine's inclusion in their regular transit routes. This did not allow Ukraine to occupy a segment corresponding to its geographical opportunities in the world market for processing cargo in river trade ports.

The development of infrastructure facilities with the involvement of river transport is possible if an internal transshipment is used in the distribution system of container flows between ships operating on the main-feeder lines and in the transshipment mode.

The main-feeder system of cargo transportation provides for the transportation of containers between the base hub-ports in containerized containers of increased capacity with the subsequent delivery of containerized cargo in smaller lots to the nearest small and medium ports on small ships. Transportation takes place according to the scheme: feeder terminals with the participation of river transport → container terminal of transshipment → main transport direction → container terminal of transshipment → feeder terminals with the participation of river transport. This scheme assumes an increase in the frequency of feeder ships during the transit of large ships between hub ports. Integration into the single logistics chain of the linear service is ensured and the alternatives of election by the participating operators between the hub ports and terminals are chosen. It becomes possible to take advantage of the scale effect from the operation of large-capacity ships. There is ability for linear companies to expand the scope of application of logistics strategies to optimize the movement of containers. As disadvantages of using transshipment should be distinguished:
– the derivative nature of the demand for services of line companies that operate with small container carriers;
– dependence on operating modes of hub ports, especially in the context of economic crises;
– the need for significant investment in modern equipment for terminals and transshipment ports;
– deficiency of professional logistics management to ensure high performance in ports. Despite the tariff preferences and the ability of Ukrainian ports to provide about 60 million dollars of additional annual revenue, the share of transshipment in ports is less than 1.5 % of the total container turnover of ports [5].

7. SWOT analysis of research results

Strengths. The strengths of research are:
– analysis of the dynamics of the development of river ports, which relies on the logistic paradigm of their development;

– approach to consideration of river ports as an infrastructural element of the country's logistics system was proposed;
– the author's position on the river port as the central hub of regional/international transport and distribution systems for the maintenance of container and multimodal transport of goods on a global scale is presented on the basis of logistic platforms;
– strategic directions of development of river ports are formed on the basis of world experience on the basis of the logistical approach.

Weaknesses. The weak side is that access to information on the dynamics of river port development, the specifics of the provision of services and their structure is limited in structure and period of research (at the time of the research – data for the first half of 2015). In contrast to seaports, data on the functioning of which are regularly published by the Administration of Seaports.

Opportunities. Opportunities for further research are:
– identification and implementation of analysis of competitive forces in the segment of river freight traffic;
– establishment of factors for the formation of competitive advantages and analysis of the competitiveness of river ports in the freight segment in Ukraine, using the logistic paradigm of considering river ports in the structure of the country's logistics system.

Threats. Among the threats to the results of the conducted studies, it should be noted the high dependence of the functioning of river ports on macro-environment factors, which are characterized by instability and low volatility over time. This requires a strategic approach by the state to the consideration of river ports as an integral element of the country's logistics system and professional state regulation in order to maintain their functioning.

8. Conclusions

1. The place of the domestic river ports of Ukraine in the structure of the river transport complex has been determined. The prospects of representing the river port as a key element of the country's national/regional logistics system are revealed. The river port in the conditions of initiating the demand for river transport becomes an investment attractive for the purpose of realizing the conditions of its strategic development.

The study of indicators of functioning of river transport of Ukraine for 2010–2016 is conducted. The negative dynamics was revealed in all indicators of its functioning. It is concluded that, at low costs for transporting goods and insignificant emissions into the atmosphere, objective opportunities for the growth of freight transport by river transport are not available due to the decay of elements of the river infrastructure.

2. Dynamics of decrease in imports (by 71 %) and exports (by 58.83 %) of river transport services are observed while maintaining a positive balance of foreign trade for the period 2010–2016. Analysis of the level of added value of imported goods, pointed to a high degree of processing of finished products. In the structure of exported goods, the prevailing part of raw low-technology goods with low added value was revealed. This allows to affirm the transformation of Ukraine into a raw material appendage and create prerequisites for mass emigration of the working population of the country. It is noted that these trends are typical for all developing countries.

The standard list of services provided by river ports (berths), including railways, is identified for processing of loose, packaged cargoes, goods in containers. Analysis of cargo handling in river ports (berths) in 2014 by nomenclature, thousand tons indicated that in the cargo handling structure in ports, bulk and packaged cargo is distributed almost equally (55.87 % and 44.13 % respectively). The bulk cargo handling in the ports is dominated by the cargo of domestic traffic 1885.8 thousand tons, in the processing of container-piece – export cargo in the amount of 1358.4 thousand tons (or 74.29 % and 67.76 % respectively). The processing of highly profitable large-tonnage cargoes at the berths of other enterprises is only 32.7 thousand tons (or 5.22 % of the processing of all cargoes at the berths), which indicates a low level of demand for river port (berth) services, especially with high added value.

3. The conclusion is made about the decommissioning of the Ukrainian fleet and its gradual replacement by a foreign fleet, as evidenced by the approaching indicators of cargo processing in river ports (berths) delivered by the foreign fleet and fleet of Ukraine.

The analysis of export, import and transit of goods through river ports (piers) of Ukraine by destination countries (I half-year 2015) is carried out. The extremely low involvement of the river ports of Ukraine in the international logistics chains of products, which are formed bypassing the territory of Ukraine and their low involvement in the processes of creating added value, is evidenced. It is argued that the reasons for the formation of such trends are: the deficit of the corresponding high-tech infrastructure; low level of interest of foreign counterparts in cooperation because of established business relationships; high barriers to entry into the cargo handling industry.

It is concluded that market conditions of management put on the agenda the identification of competitive advantages by river ports. River ports, using competitive advantages, have the opportunity to develop in the context of developing appropriate state policies, activating the interests of interested stakeholder groups, realizing the objectives of the country's logistics system.

4. An assessment of the prospects for the development of river ports in Ukraine has been made, which include the following:
– development of feeder container lines as a component of coordinated development of various modes of transport;
– increase in the volume of cargo handling in container terminals in the context of ensuring the growth of added value of goods on the territory of Ukraine;
– expansion of the complex of logistic services of river ports using standard functions of a typical logistics center. The standard functions include the expansion of the nomenclature of cargo handling, as well as the increase in the capacity of ports due to the automation and informatization of the technological processes of the port;
– development of infrastructure support for river ports as a necessary component of the perspective transformation of river ports into multifunctional logistics centers;
– innovative development of logistics systems/river clusters on the basis of the development of new river routes for the transport of goods and the central place of river ports in them;

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– implementation of competitive ports by competitive ports is activated by the logistics of cluster entities.

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References

1. Taslitskyi, H. Zakonodavcha nevyznachenist richkovykh portiv [Electronic resource] / H. Taslitskyi // Yurydychna hazeta. – September 16, 2015. – Available at: \www/URL: http://yurgazeta.com/publications/practice/morske-pravo/zakonodavcha-neviznachenist-richkovih-portiv.html
2. Krcum, M. Integration Sea and River Ports – the Challenge of the Croatian Transport System for the 21st Century [Text] / M. Krcum, V. Plazibat, G. Jelic Mrcelic // Nase More. – 2015. – Vol. 62, No. 4. – P. 247–255. doi:10.17818/nm/2015/4.2
3. Strulak-Wojcikiewicza, R. Role and significance of inland waterway transport in container logistic chains, based on example of river-sea port in Szczecin [Text] / R. Strulak-Wojcikiewicza, M. Kaupb // World Scientific News. – 2016. – Vol. 48. – P. 24–31. – Available at: \www/URL: http://www.worldscientificnews.com/wp-content/uploads/2015/10/WSN-48-2016-24-31-1.pdf
4. Mel'nik, O. V. Formuvannya logistichnoi strategii rozvitku richkovikh portiv Ukraini [Text]: Abstract's Thesis of the Doctor of Economic Sciences / O. V. Mel'nik. – Kyiv, 2013. – 20 p.
5. Evsiukov, Yu. V. Perspektyvi razvytyia konteinernikh perevozok v Ukrayne [Text] / Yu. V. Evsiukov // Visnyk SNU im. Volodymyra Dalia. – 2011. – No. 6 (160). – P. 38–42.
6. Cherednychenko, V. V. Osnovni chynnyky konkurentospromozhnosti ukrainskykh portiv v umovakh hlobalizatsii [Electronic resource] / V. V. Cherednychenko // Efektyvna ekonomika. – 2013. – No. 10. – Available at: \www/URL: http://www.economy.nayka.com.ua/?op=1&z=2427/
7. Miller, C. R. The evolving role of rural river ports as strategic economic development actors [Text] / C. R. Miller // Water Resources and Rural Development. – 2017. – Vol. 9. – P. 28–38. doi:10.1016/j.wrr.2017.02.001
8. Veenstra, A. The development of the Yangtze River container port system [Text] / A. Veenstra, T. Notteboom // Journal of Transport Geography. – 2011. – Vol. 19, No. 4. – P. 772–781. doi:10.1016/j.jtrangeo.2010.09.006
9. Wisnicki, B. Determinants of River Ports Development Into Logistics Trimodal Nodes, Illustrated by the Ports of the Lower Vistula River [Text] / B. Wisnicki // Transportation Research Procedia. – 2016. – Vol. 16. – P. 576–586. doi:10.1016/j.trpro.2016.11.054
10. The Evolution of ports in a competitive world [Electronic resource] // The International Bank for Reconstruction and Development. The World Bank. – 2007. – Available at: \www/URL: https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Portoolkit/Toolkit/pdf/modules/02_TOOLKIT_Module2.pdf
11. Krykavskyi, Ye. V. Lohistyka ta upravlinnia lantsiuhamy postavok [Text]: Handbook / Ye. V. Krykavskyi, O. A. Pokhylchenko, M. Fertch. – Lviv: Vydavnytstvo Natsionalnoho universytetu «Lvivskoi politekhniky», 2017. – 804 p.
12. Transport i zviazok Ukrainy – 2016 [Text]. – Kyiv: TOV Vydavnytstvo »Konsultant», 2017. – 185 p. – Available at: \www/URL: http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ8_u.htm
13. Zhuk, I. M. Ukraina v tsyfrakh [Text] / ed. by I. M. Zhuk. – Kyiv, 2016. – 239 p. – Available at: \www/URL: http://istmat.info/files/uploads/53010/ukraina_v_cifrah_2015.pdf
14. Pererobka vantazhiv u morskykh (richkovykh) portakh (prychalakh) Ukrainy u 2014 rotsi [Text]. – Kyiv, 2015. – 70 p. – Available at: \www/URL: http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ8_u.htm
15. Transport wodny srodladowy w Polsce w 2016 r. [Electronic resource]. – August 25, 2017. – Available at: \www/URL: https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5511/4/7/1/transport_wodny_srodladowy_w_polsce_w_2016_roku.pdf
16. Pererobka vantazhiv u morskykh (richkovykh) portakh (prychalakh) Ukrainy I pivrichchia 2015 roku [Electronic resource]. – Available at: \www/URL: http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ8_u.htm
17. Po Dnipru, po Buhu: problemy i perspektyvy rozvytku vodnoho transportu [Electronic resource] // Agravery. – Available at: \www/URL: http://agravery.com/uk/posts/show/po-dnipru-po-bugu-problemi-i-perspektivi-rozvitku-vodnogo-transportu
18. Samye bol'shie porty v SSHA [Electronic resource] // Vse o SSHA. – Available at: \www/URL: http://usa-info.com.ua/ports-usa/symbol/ports
19. Borysova, I. D. Kontseptualnyi pidkhid do rozvytku lohistychnoho tsentru [Text] / I. D. Borysova // Naukoiemni tekhnolohii. – 2013. – No. 4 (20). – P. 436–440. – Available at: \www/URL: http://www.icit.nau.edu.ua/files/sbt/20/15.pdf

ИССЛЕДОВАНИЕ СТРАТЕГИЧЕСКИХ ПЕРСПЕКТИВ РАЗВИТИЯ РЕЧНЫХ ПОРТОВ УКРАИНЫ

Исследован речной порт с позиции одного из узловых объектов логистической системы страны национального и регионального уровня. Обоснована целесообразность расширения комплекса логистических услуг, которые должны предоставляться речными портами и выполнять стандартные функции обычного логистического центра. Обусловлена такими решениями инвестиционная привлекательность речных портов и спрос на их услуги. Установлены динамика и тренды развития потенциала речных портов и его использования.

Ключевые слова: логистические услуги речных портов, эволюция развития речных портов, логистические технологии.

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