

PROBLEM STATEMENT AND PROSPECTS FOR THE DEVELOPMENT OF OVERSIZED CARGO TRANSPORTATION IN UKRAINE

СОСТОЯНИЕ ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ ПЕРЕВОЗОК НЕГАБАРИТНЫХ ГРУЗОВ В УКРАИНЕ

Oleksiy Melnyk, PhD student,
А. Н. Мельник, аспирант

Odessa National Maritime University, Ukraine
Одесский Национальный Морской Университет, Украина

РЕФЕРАТ

Транспорт як інфраструктурна галузь відіграє значну роль у розвитку національної економіки, забезпечуючи своєчасні та ефективні вантажні й пасажирські перевезення, сприяючи інтеграції економіки України у європейську та світову економічні системи та й одною з найбільш істотних умов успішного функціонування всієї економіки в цілому. Одним із суттєвих явищ впливу є розвиток і будівництво нових, а також модернізація існуючих інфраструктурних проектів які в свою чергу потребують високотехнологічне і унікальне обладнання. Таке обладнання доволі часто не передбачає розбирання або роз'єднання на складові частини і компоненти та пред'являється до перевезення як негабаритний і важковаговий вантаж перевищуючі встановлені норми за розмірами та вагою.

Таким чином до негабаритних і важковагових вантажів відносять групу вантажів, які за своїми масово-геометричними характеристиками не можуть транспортуватися у відкритому чи закритому рухомому складі або в контейнерах, при цьому об'ємні характеристики перевищують встановлені стандарти. Специфічною особливістю негабаритних вантажів є їх унікальність, яка обумовлює залучення спеціальної техніки, додаткової оптимізації маршруту, отримання спеціальних дозволів і при необхідності забезпечення супутніх послуг і підбір фахівців, які мають відповідну кваліфікацію тощо.

Основною метою даної статті є аналіз поточного стану проблеми перевезень негабаритних вантажів в Україні. В ході дослідження використовувалися такі методи, як: метод абстрагування, аналіз і синтез, індукції і дедукції та ін. У статті висвітлено стан дослідження проблеми перевезень негабаритних вантажів в Україні, зокрема проаналізовано праці деяких вчених з приводу даної проблематики та їх бачення на деякі невирішені проблеми, характерні для транспортної галузі України в цілому і процесу перевезень негабаритних вантажів зокрема. Дана характеристика особливостям перевезень негабаритних вантажів на річковому і морському транспорті. Виявлено обставинами, якими сьогодні характеризується стан справ в галузі.

Запропоновано авторське бачення вирішення виявлених проблем і подолання існуючих труднощів у галузі. Таким чином, багато вчених досліджуючи проблеми даної галузі, намагаються ідентифікувати проблеми і недоліки функціонування механізмів перевезень негабаритних вантажів в Україні, при цьому перспективами подальших досліджень є розробка сучасних моделей управління перевезеннями негабаритних вантажів в Україну з використанням річкового і морського транспорту.

Formulation of the problem in general terms and its connection with important scientific practical tasks

Transportation of oversized and heavyweight cargoes (OHC) considered as one of the most important transportation services, which is also the most profitable. It requires not only powerful equipment but also highly trained and skilled specialists. Such kind of transportation is the most complicated and requires, firstly, a large number of agreements approvals from governmental departments and transport services. Since 90-ies, Ukraine possessed material and productive resources, which in its time was an incentive for the modernization and expansion of enterprises of industrial character. Being outdated it cannot be used for innovation projects and it leads to an increase of orders for the supply of equipment for the industrial sector, particularly, energy, mining and metallurgy. Therefore, the number of intermodal carriages of oversized and heavyweight cargoes for direct international destinations involving participation of river and sea transport is increasing.

The last achievements and publications analysis, in which the solution of the problem is begun and selection of the unsolved aspects of the problem

For each type of transport, there is a particular definition what the oversized and heavyweight cargo means. The absence of the same concept is determined due to the peculiarities of the specific features of kind of transport and infrastructure capacity used for the carriage of special cargo weight and dimensions as well as the safety of the actual transportation process. Because of this, the theoretical basis of carriage on water transport and technical conditions of the loading and transportation of oversized and heavyweight cargoes are currently of high relevance. Such researches as O. Shibaev, O. Kirillova, A. Kotenko, P. Maslyak, A. Lozhachevskaya, O. Karas, R. Bugaevsky, I. Dopira, V. Lifar, P. Ovchar, O. Akimova, R. Vepritsky, G. Eitutis, S. Artemyev, V. Yanevich, A. Okorokov, O. Melnyk and many others devoted their attention to the study of this issue.

The paper purpose formulation

The main purpose of this article is to analyze the condition, development prospects and influence of transport industry on Ukrainian economy while studying the problem of oversized and heavyweight cargoes land and water transportation.

Presentation of basic research material substantiating scientific results

The global oversized cargo transportation market stood at around \$ 233 billion in 2018 and is projected to grow at a CAGR (compound annual growth rate) of over 5% to surpass \$ 318 billion by 2024, because of increasing trade and sea

transportation. [13] Oversized cargo transportation refers to moving overweight and bulky loads that exceed the authorized weight limits and dimensions from a point of origin to the desired destination. Transporting oversized cargo is not feasible through standard containers or standard road vehicles, as it involves high risks and requires efficient planning and execution. Transportation of oversized cargo is a specific branch of transportation, which requires not only great practical experience and relevant knowledge, but also equipment of a certain specialization, particularly in the loading and unloading. Oversized transportation requires unusual solutions for placing them on platforms, tracks, trailers, and ship's deck for the transportation using means, such as ships, vehicles, trains or even airplanes. The main purpose of any type of transport are the provision of transportation services, which should be considered as goods that have certain characteristics: delivery time (transportation); cargo custody; transportation safety, delivery cost (fares). The level at which these characteristics should be supported are determined by the state of the economy of the country entirely, the parameters of the transport system and the technology of its functioning. [12] The present stage of world development of transport logistics, the role and importance of regional factors of infrastructure supply of commodity flows is increasing. Since the transport network of Ukraine is also integrated into the international transport network and it is actively involved in servicing of international goods flows that is why more attention should be paid to the implementation and development of transport logistics inside the country [6]. In the course of the study on the economic and social geography of Ukraine concluded that transport has played a protective role, for the most part, for various sectors of the economy, and at the present stage, it has become one of the important prerequisites for their growth. [8] Transport is an industry that is at the junction of manufacturing and services. It does not create any material values, but provides transportation of goods and people, developing links between enterprises, industries, regions. It is also called the "circulatory system of the economy," because it is a prerequisite for the functioning of the economy. Efficient functioning of the state transport system and its inclusion in the European and world transport networks contributes to solving the most important tasks of the present and allows increasing the volumes of transportation [8].

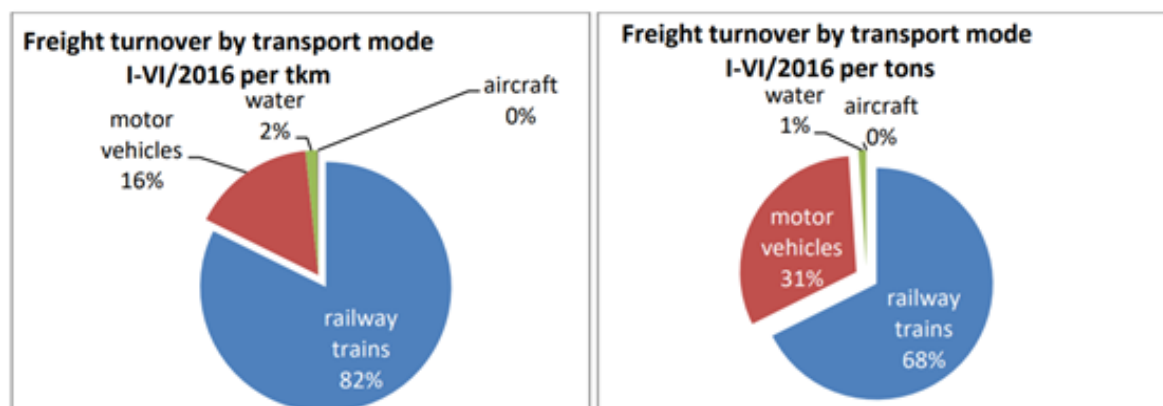
Table 1 Countries aggregated LPI rating 2018 (Logistics performance index of The world bank)

Country	LPI rank	LPI score	Customs	Infrastructure	International shipments	Logistics competence	Tracking & tracing	Timeless
<i>Ivory coast</i>	66	2.89	2.66	2.67	2.96	2.95	2.95	3.11
<i>Tanzania</i>	67	2.88	2.66	2.72	2.89	2.80	2.85	3.34
<i>Serbia</i>	68	2.83	2.53	2.59	2.89	2.78	2.86	3.32
<i>Ukraine</i>	69	2.83	2.46	2.38	2.77	2.76	3.08	3.45
<i>Ecuador</i>	70	2.82	2.69	2.62	2.82	2.70	2.87	3.22
<i>Colombia</i>	71	2.81	2.50	2.58	2.93	2.79	2.84	3.17

Describing the transport industry in Ukraine, it should be noted that most organizations in their activities need to solve problems unavoidable without transport. The transport complex is an important component in the structure of the Ukrainian

economy. Efficient management of the transport system and its inclusion in the European and global transport networks contributes to solving the most important tasks of the present and allows increasing the volume of international transportation. Transport is a factor of political development in the external and internal forms, an instrument for the realization of national interests, the provision of a decent place in the world economic system [7]. However in the study of the theoretical foundations of state regulation of vehicles transportation draws attention to the fact that under the conditions of extremely strict or very weak state regulation of transport activity a shadow economy is formed, the share of which, even for most developed countries, is significant in the overall volume of the national product. Then, as the regulator of the shadow sphere of market relations, is forming an own, illegitimate and fully self-regulated control mechanism. [10]. It requires new approaches to ensure the necessary conditions for the operation of river and sea transport in the context of the characteristics of the transportation of oversized and heavyweight cargo.

The world experience of freight forwarding companies (FFC) shows that there is a tendency towards the transformation of freight forwarding companies into logistics companies providing services for the organization of cargo transportation in intermodal communication. The role of forwarding agents in providing foreign trade is high enough. According to the estimated data, freight forwarders [1] organize 75-80% of all freight traffic in the world. Investigating the peculiarities of the operation of inland water transport in the global transport system. Analytic researches emphasizes that inland water transport is an important component in the transport infrastructure of foreign countries. [9] As opposite to, in the transport system of Ukraine, river transportation occupies a rather small share of the total freight traffic. More than 25 years ago, the volume of cargo on the Dnieper exceeded 60 million tons; however, for today only about 6 million tons are transported. The share of river transport in the whole turnover is less than 1%. This is due to the low competitiveness of river transport compared with other modes of transport. The reform of the water transport system of Ukraine should be carried out, taking into account foreign experience, on a logistic basis [9].



Picture 1. Freight turnover split of Ukraine in 2016 first half. Source State statistics service of Ukraine, www.european-waterways.eu

It is noted that the system of inland water transport in Western Europe consists mainly of the Rhine River with tributaries of the Alb, Mez, Mosel, Main, Neckar, as well as the year of the Seine and Rhône (France), connected to the Rhine Basin by small waterways. The Rhine-Main-Danube canal connects this water system with the inland waterways of Eastern Europe. The total length of the waterways is 225 thousand kilometers, including: in Germany more than 4 thousand kilometers (of which 1/3 are canals), in the Netherlands 4 thousand kilometers, in France, 6,7 thousand kilometers, in Belgium 2,0 thousand km [9]. The waterways connect the main ports of the industrial zones of Germany, France, Switzerland with Rotterdam and Antwerp, where the process of transshipment of cargoes to seagoing vessels can be carried out.



Picture 2. Inland waterways of Ukraine. Source www.european-waterways.eu

Regarding the domestic environment noticed, that over the past 7 years the total volume of freight traffic has decreased by almost 13%, including the reduction of freight volumes transported by rail by 22% and by sea and river transport by 2.5 times, with a simultaneous increase in road transport by 11% (as of 2017), which led to a new distribution of transport shares in transport [2].

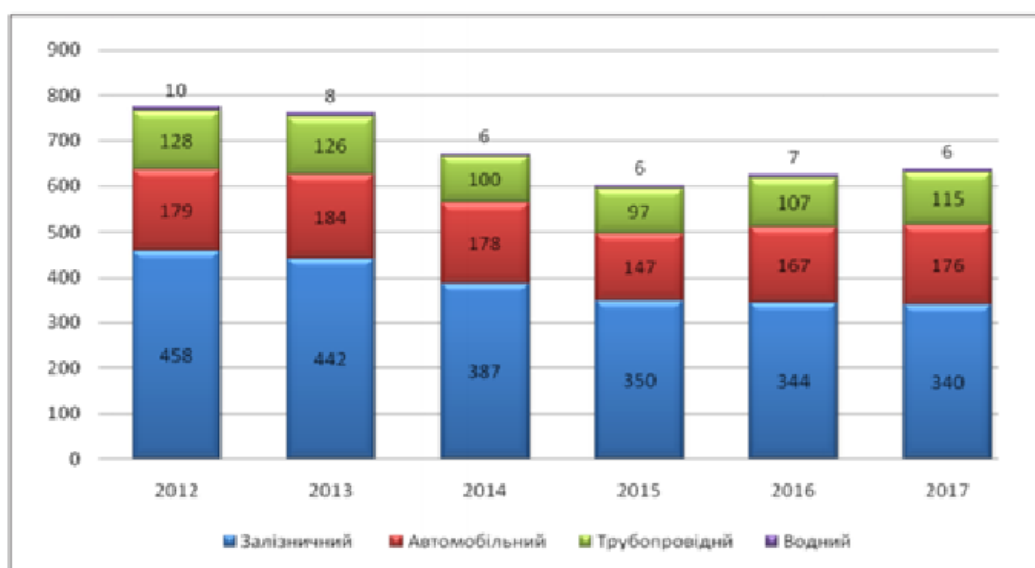
Transportation of oversized and heavyweight cargoes – firstly is the development of special conditions and an individual transportation plan for each lot of oversized cargo individually. Often, in the category of oversized cargoes, there is a variety of machinery, so the conditions of transportation must guarantee the integrity and intactness of all mechanisms in the cargo lot being transported. Generally, the following services are included in the package of oversized cargo transportation services [5]:

- calculation and drawing of the logistic transportation plan;
- evaluation of the loading plan and securing schemes on the vehicle and their approval;
- obtaining all transportation permits;

- creation and elaboration of special transport solutions for group and individually for each cargo unit;
- installation of special equipment for transportation, if necessary;
- cargo transportation escort;
- customs clearing and registration of all necessary documents when passing customs control.

In general, the interpretation of the definition oversized and heavyweight cargoes well known as project cargo for all types of transport can be described as follows: oversized and heavy goods - those are larger in sizes and loads, that having a modern rolling stock and exceeding the dimensions of existing equipment and facilities.

The importance of the regular carriage of oversized cargoes on various means of transportation has become actual when the weight and dimensions of the industrial equipment that is being produced has increased. In maritime industry, especially, on seagoing vessels, the bounding boundaries associated with the transportation of heavy and oversized cargo, allow the carriage of such equipment without implementation of particularly fundamental changes in the method of transportation and construction of cargo vessels.



Picture 3. Cargo shipments in Ukraine by types of transport (light blue – railway; red – automobile, green – pipeline, violet – water transport) Source Official site of State Statistics Service of Ukraine (2017)

Ukraine has 2240 km of inland waterway, 40% of them are falling on River Dnieper however. Unfortunately access to River Bug (Poland) is not given anymore but Ukraine has over the Black Sea and River Danube still a link to the European Inland Waterway system. Since the Ukrainian inland waterways developed in sufficient degree, the settlement of a minimal weight of transported cargoes by river transport is possible taking into account the levels of distribution of inland waterways. Each subsequent waterway corresponds to a smaller value of the navigation range than the previous one, and hence, the less possible cargo capacity on available drafts. The seventh class river connections correspond to the smallest cargo carrying capacity that can have floating platforms or barges, which is 100 tons, thus

the transportation of goods with a mass up to 100 tons on board the crafts is possible without additional investment in all internal waterways. Technologies of transporting by river transport crafts with a great rank depending of the navigational range of the internal shipping lines. Particulars of ships are also dependent of ships cruising range. Through the primary factor in the classifications of different types of cargoes for the oversized and large units is the sailing area of the vessel, but not the ship's particulars. On the river ships, the theoretical transportation of loads of any mass (in relation to the existing oversized ones) is allowed. Among the main factors limiting the transportation of oversized cargoes while using inland waterways are the dimensions of the latter.



Picture 4. Oversized units river transportation. Source www.sudohodstvo.org

It has been noted that while investigating issues of transportation of oversized and heavy goods in transport systems concluded that today the state of affairs in heavy transport in the market is characterized by the following circumstances [5]:

- there appeared a lot of (not always qualified) organizations and individuals who offer and perform services for the transportation of oversized and heavyweight cargoes;

- the legislative, normative, technical, technological, and economic basis of these types of transportation remains extremely weak, contradictory and obsolete;

- practically stopped scientific research and training of specialists in the field of heavy transport;

- the work on the creation of new specialized means of transportation has been discontinued, and those available at enterprises are extremely worn out and for a long time are not substituted;

- coordination of activity of numerous carriers of oversized cargo is absent, their low awareness, the possibility of obtaining legal, financial, technical, consultative and other assistance. At the same time, according to other scholars, the main unresolved problems characteristic of the transport industry in Ukraine are [11]:

- decline in volumes of goods production, which caused a decline in demand for freight;

- imperfection and instability of the regulatory framework for providing transport sector activities;

- significant and repeated increase in costs and tariffs for transport services, which led to a significant reduction in transport revenues;

- low competitiveness of transport and transport infrastructure on the external and internal markets;
- insufficiency of investments for modernization of rolling stock and objects of transport infrastructure.

In its turn, using SWOT-analysis in the study of the market of transport services, noted the main problems that impede the provision of increasing volumes and quality of demand for transportation services from oversized transportation, among which [4]:

- insufficient updating of fixed assets, rolling stock in all types of transport and road economy, inconsistency of their technical level with promising requirements;
- low level of inter-sectoral coordination in the development of transport infrastructure, which leads to inefficient use of resources and reduced efficiency of transport use;
- a weak degree of use of the geopolitical position of Ukraine and the possibilities of its transport communications for the international transit of goods across the territory of Ukraine;
- irregular and ineffective updating of the regulatory framework governing the transport sector's activities;
- slow improvement of transport technologies and their insufficient connection with production, trade, warehouse and customs technologies;
- the low level of information supplement of the transport process and informational interaction of transport with other branches of the economy is unacceptably low;
- insufficient efficiency of financial and economic mechanisms that stimulate investment in transport development;
- lack of implementation of state and sectorial programs in the field of certain types of activity, types of transport, transport machine building, development of the state border;
- insufficiently effective system of management and regulation of transport complex activity;
- low level of personnel policy in the industry.

Based on above suggested that the creation of a stable, cost-effective freight transport system is a means of increasing the competitiveness, quality and safety of transportation, meeting the needs of foreign trade, optimally utilizing resources in the country's economy. Goods must be transported freely, quickly, reliably and efficiently, with the least impact on the environment and other transport users. To do that, necessary to act in the following directions [3]:

- development of technical and organizational measures aimed to ensure the guaranteed storage of transported cargoes;
- improvement of the regulatory framework (transport, customs, tax legislation), control of loading and unloading operations and introduction of liability for the activities of cargo owners and forwarders;
- ensuring the rights and protection of carriers;

– effective system of admission of carriers and means of transportation to the provision of transportation services, including tariff and financial burdens for small and medium-sized businesses;

10 ports of the Dnipro River



Picture 5. Main river ports of Ukraine. Source Ukrainian Ministry of Infrastructure.

- enforcing the interaction of modes of transport through the development of multimodal transport and international transport corridors;
- shortening the processing time of cargo lots in ports and time of crossing of the state border;
- development of logistics, transport and warehouse and information infrastructure, introduction of concepts and technologies for managing supply chains and integration of transport and production processes requires:
 - attraction of investments into the development of logistics infrastructure and innovative technologies;
 - creation of integrated information management systems, telematic tools for navigation and monitoring ("intelligent transport systems", systems for the control and identification of cargoes and containers);
 - increase the throughput capacity of freight-intensive areas, development of railway accesses to ports, terminals, sorting stations and reloading equipment;
 - creation of an automated system of accounting of transit traffic flows in directions, introduction of modern information and communication technologies, arrangement of fiber-optic communication lines.

It is obvious that in order to overcome the existing problems it is necessary to pay more attention to the Ministry of Infrastructure of Ukraine for the transportation of oversized and heavyweight cargo along with development of whole water transportation sector. There was a great need in the coming years to solve the most

important problems for the transportation of certain specializations, which is possible with:

- regulation of the work by the Ministry of Infrastructure of Ukraine, since it is the competent authority in the field of transportation of oversized and heavyweight cargo type;
- creation in the Ministry of Infrastructure of the Center for the coordination of transportation of oversized and heavyweight cargoes by all types of vehicles;
- preparation of scientific and technical programs for the development of transportation of oversized cargoes; creation of a unit related to the development of transport that can be considered heavy;
- licensing activities in the field of transportation of oversized and heavyweight cargo type;
- preparation of interdepartmental norms and instructions for the transportation of oversized cargo by certain transport, first of all, in mixed combinations (including the transport expedition sphere), taking into account the interest of legislative and other documents.

Consequently, the establishment of a framework for water transport associated with the carriage of heavyweight and oversized cargoes allows the carriage of such equipment without significant changes in the method of transportation and construction of cargo ships. The technology of transportation by river transport largely depends on the of the ship's navigation range, that is, the navigable system of the internal waterways.

Conclusions

Summarizing all of the foregoing, necessary to conclude that the new conditions that cause the processes of globalization, caused difficulties in taking decisions in the field of management of a business sphere, such as transportation. Increasing the interdependence between the market for logistics services at the national and international levels is uncertain in the changes in demand and supply, the volatility of energy prices, consumables, and the like, which ultimately raises the risk of tariff policies. When making decision, it is necessary to be guided not only by certain features of the current situation, but also by weighing them through the prism of different criteria and frameworks, taking into account the tendency of constant changes. There is a correlation between decision-making processes: each of them causes a change in the decisions that depend on them. Many scientists are investigating the problems of this industry, trying to identify the problems and disadvantages of operating mechanisms for the transportation of oversized and heavyweight cargo in Ukraine, with the prospect of further research is the development of modern models of oversized cargo transportation management in Ukraine using river and sea transport.

REFERENCES

1. Akimova, O.V. (2014). Rozrobka eksportno-importnoi skhemy orhanizatsii dostavky kontejneriv transportno-ekspedytors'kymy kompaniiamy [Development of export-import scheme for the organization of container

- delivery by freight forwarding companies]. *Vostochno-Evropejskyj zhurnal peredovykh tekhnolohyj* [East-European magazine of advanced technologies], 6(3), 4-10. doi: <https://doi.org/10.18664/338.47:338.45.v0i62.133981>.
2. Vepryts'kyj, R. S. (2018.). Analiz ta otsinka obsiahiv tranzytnykh perevezen' zaliznychnym transportom Ukrainy [Analysis and estimation of volumes of transit transportations by rail of Ukraine]. *Visnyk ekonomiky transportu i promyslovosti* [Bulletin of the Economy of Transport and Industry], 62, 53-63. doi: <https://doi.org/10.18664/338.47:338.45.v0i62.133981>.
 3. Dopira, I. (2014). Transportnyj kompleks iak vazhlyva skladova ekonomiky Ukrainy [Transport complex as an important component of the Ukrainian economy], *Naukovyj visnyk Odes'koho natsional'noho ekonomichnoho universytetu* [Scientific herald of National Economic University], 9, 86-89.
 4. Karas', O. O. (2013). Zastosuvannia SVOT-analizu pry doslidzhenni rynku transportnykh posluh [Application of SWOT-analysis in the study of the market of transport services], *Zbirnyk naukovykh prats' Derzhavnoho ekonomiko-tekhnolohichnoho universytetu transportu. Ser.: Ekonomika i upravlinnia* [Collection of scientific works of the State Economic-Technological University of Transport. Series: Economics and Management], 23-24, 30-37.
 5. Kotenko, A. M. (2014). Perevezennia nehabarytnykh i velykovahovykh vantazhiv v transportnykh systemakh [Transportation of oversized and heavy goods in transport systems], *Zbirnyk naukovykh prats' Ukrain'skoi derzhavnoi akademii zaliznychnoho transport* [Collection of scientific works of the Ukrainian State Academy of Railway Transport], 145, 50.
 6. Lyfar, V.V. (2017). Rozvytok transportnoi lohistyky v rehional'nij systemi obsluhovuvannia tovarnykh potokiv [Development of transport logistics in the regional system of service flow of goods], 4, 176-187. doi: 10.21272/mmi.2017.4-15.
 7. Lozhachevs'ka, O.M. (2002). Kharakterystyka transportnoi haluzi Ukrainy [Characteristics of the transport industry of Ukraine], *Ekonomist*, 10, 40-44.
 8. Masliak, P.O. (2006). *Ekonomichna i sotsial'na heohrafiia Ukrainy* [Economic and social geography of Ukraine], Kyiv, Ukraine, Zodiak-EKO.
 9. Mel'nyk, O. V. (2015). Vnutrishnij vodnyj transport u svitovij systemi perevezen [Inland water transport in the world transport system], *Vodnyj transport* [Water transport] 2, pp.141-147.
 10. Ovchar, P. A. (2017). Teoretychni osnovy derzhavnoho rehuliuвання avtotransportnoi diial'nost [Theoretical Basis of State Regulation of Motor Transport Activity], *Visnyk Natsional'noho universytetu tsyvil'noho zakhystu Ukrainy. Serii: Derzhavne upravlinnia* [Bulletin of the National University of Civil Protection of Ukraine. Series: Public Administration], 2, doi: 10.5281/zenodo.1038890.

11. Materialy nauk.-prakt. Konf [Materials of sciences-practice. Conf (2008.) Suchasni problemy ekonomichnoi bezpeky v rynkovykh umovakh [Modern problems of economic security in market conditions: materials of sciences-practice. conf.], Kyiv, Ukraine, NAU.
12. Yanevych, V. Z. (2014). Doslidzhennia ta optymizatsiia protsesu perevezennia vantazhiv zaliznychnym transportom [Research and optimization of the process of transportation of goods by rail], Zbirnyk naukovykh prats' Dnipropetrovs'koho natsional'noho universytetu zaliznychnoho transportu imeni akademika V. Lazariana [Collection of scientific works of Dnipropetrovsk National Lazaryan University of Railway Transport of Ukraine], 7, 73-79. doi: <https://doi.org/10.15802/tstt2014/35999>.
13. Research and markets www.researchandmarkets.com