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## ANALYSIS OF THE FREIGHT TRANSPORTATION MARKET OF UKRAINE

In conditions of the transport and logistics infrastructure development, as well as the formation of a rational structure of the car fleet and freight car fleet, it is necessary to analyze and take into account the actual demand for freight. Analysis of the dynamics of the volume of transported goods for 2015-2020 shows the stable position of different modes of transport in the freight market. According to the analysis of statistical data for 2016-2019, it was found out that road and rail transport is carried out mainly in domestic traffic. It is noted that in 2020 there is a certain decline in freight traffic for each mode of transport, because of the global pandemic COVID-19. It is determined that the low efficiency of the organization of cargo transportation from suppliers to consumers is associated with insufficient number and irrational use of rolling stock, insufficient development of the infrastructure of cargo terminals, irrational organization of the cargo transportation process. The interaction of modes of transport determines the possibility of forming optimal supply chains in both domestic and international traffic. On the ground of logistic principles the efficiency improvement of the organization of cargo transportation from suppliers to consumers is achieved by optimizing the movement of freight flows. The conducted research will contribute to the development of directions for optimizing the distribution and movement of cargo flows in the planning and organization of cargo transportation both domestically and internationally. At the same time, the formation of supply chains based on the interaction of road and rail transport minimizes transport costs and creates conditions for further development of supply chains and transport technology systems.

**Keywords:** freight transportation market, supply chains, types of transport, statistical data, volume of transportations, cargo flow.

### INTRODUCTION

Production and agricultural enterprises, storage and terminal complexes (for example, elevators, seaports) are characterized by geographical disunity and are interconnected by transport. The final cost of the transported products, and hence its competitiveness in the commodity market, have an impact on the efficiency of the organization of freight transportation.

In the freight transportation market, it is necessary to create conditions for effective interaction of modes of transport in order to reduce logistics costs for the delivery of goods both domestically and internationally.

One of the ways to increase the efficiency of transportation is the rational distribution of cargo flows in the formation of supply chains from producers to consumers, taking into account the benefits of certain modes of transport.

### ANALYSIS OF LITERATURE DATA AND FORMULATION OF THE PROBLEM

The market of transport services has a tendency to develop with an objective decrease in growth [1]. A significant factor influencing the development of transportation is the state of transport infrastructure [2] and the dynamics of investment in this field [3], which primarily depend on the volume of cargo transportation and the organization of cargo flows. Logistics connections, which are an important element of transport services [4], can reduce the cost of loading-unloading and warehousing operations, speed up the movement of material resources and optimize the use of transport and warehousing resources.

In modern conditions, insufficient attention is paid to the rational distribution of cargo flows in accordance with the capacity and discharge capabilities of loading and unloading points [5], which leads to significant costs of time and money, and thus affects the quality [6] and reliability of cargo flows.

The vast majority of cargo destined for the foreign market is transported through seaports [7, 8] and delivered to port terminals by rail and road.

One of the most important areas of improvement of the system of car flows organization is the dispatch routing [9]. However, the existing system of substantiation of routing does not fully take into account the peculiarities of cargo formation at loading points [10].

Therefore, it is advisable to analyse the dynamics of the volume of goods transported by mode of transport in Ukraine to determine areas for improving the efficiency of supply chains.

## PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study is to analyse the freight transportation market in Ukraine in order to determine areas for improving the efficiency of supply chains.

Research objectives:

- analysis of the dynamics of the volume of transported goods by mode of transport;
- analysis of the dynamics of freight traffic by land modes of transport by types of connections;
- identification of prerequisites for low efficiency of cargo transportation from suppliers to consumers;
- development of recommendations for improving the efficiency of cargo transportation.

## RESEARCH RESULT

The research is based on statistical information, which contains data without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and part of the temporarily occupied territories in Donetsk and Luhansk regions [11].

Statistics on the volume of transported goods by mode of transport for 2015-2020 show that each of the modes of transport, taking into account the relevant competitive advantages, maintains its position in the freight transportation market during 2015-2020 (Fig. 1). It should be noted that in 2020 there is a certain decline in freight traffic for each type of transport, which may be due to the global pandemic COVID-19.

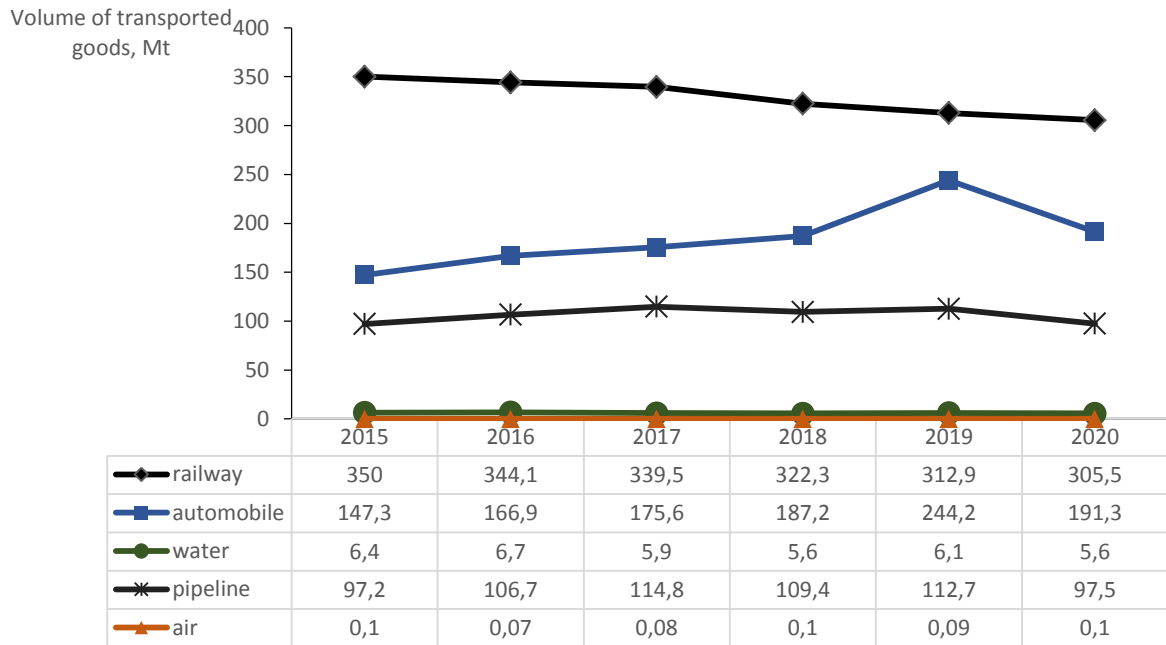


Fig. 1. Dynamics of volumes of transported cargoes by types of transport for 2015-2020

Source: authors-based [11]

The largest volume of cargo in Ukraine is transported by rail (50.92%) and road (31.88%) transport (Fig. 2).

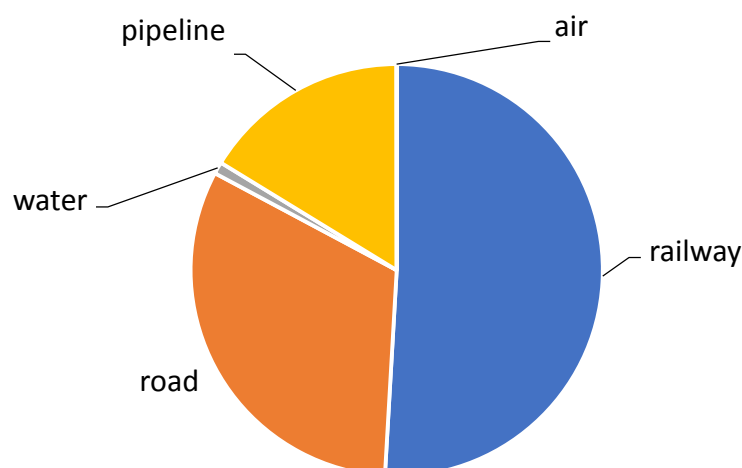


Fig. 2. Structure of cargo transportation volumes in Ukraine by types of transport in 2020, %  
Source: authors-based [11]

As a result of the analysis of statistical data [11], it was determined that mainly mass cargo is transported by rail, and containerized cargo is transported by road.

Taking into account the freight turnover of railway transport for 2015-2020 [11], the average distance of transportation by rail is determined (Table 1). The obtained values of the average distance of transportation (540 – 580 km) indicate that freight transportation by rail in Ukraine is carried out mainly in domestic traffic. The vast majority of goods are transported by rail from large cargo-forming points (terminals, elevators, mining enterprises, mining and processing plants, metallurgical enterprises, etc.) to processing enterprises [9, 10], as well as to river and seaports with subsequent transshipment to ships [12].

**Table 1.** Technical and operational performance of railway transport for 2015-2020

Indicator	Freight turnover, million tkm	Volume of transported cargo, million tons	The average distance of transportation, km
2015	194321,6	350	555,2
2016	187215,6	344,1	544,1
2017	191914,1	339,5	565,3
2018	186344,1	322,3	578,2
2019	181844,7	312,9	581,2
2020	175587,2	305,5	574,8

Source: authors-based [11]

Analysis of freight traffic by road in Ukraine (excluding freight traffic by physical persons-enterprisers) for 2016-2019 [11] shows that international road freight has a negligible share in total road transport (Fig. 3).

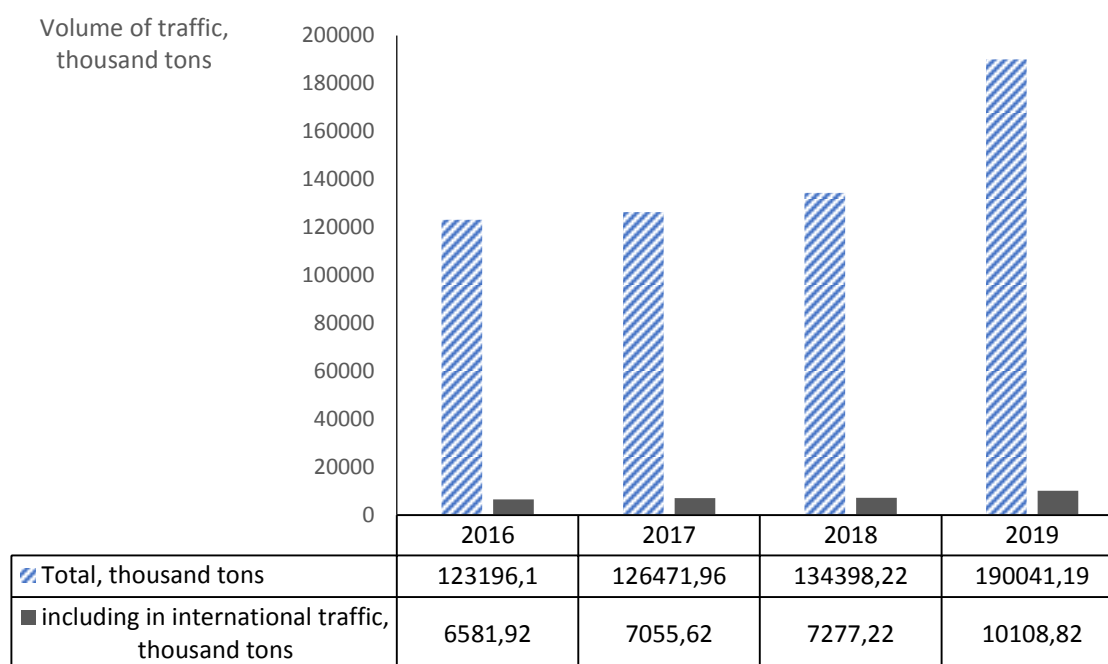


Fig. 3. Dynamics of cargo transportation by road for 2016-2019

Source: authors-based [11]

### DISCUSSION OF THE RESULTS OF THE STUDY

The analysis of the conducted researches and practical experience testifies to low efficiency of the organization of transportations of cargoes from suppliers to consumers that is caused, first of all:

- insufficient number and irrational use of rolling stock of railway and road transport [13, 14];
- insufficient development of the infrastructure of cargo terminals and transshipment complexes at the junctions of different modes of transport [15, 16];

- irrational organization of the freight process.

–Existing problems of inefficient organization of cargo transportation can be partially eliminated by optimizing the movement of freight flows in the organization of transportation from suppliers to consumers:

- formation of rational transport-technological schemes of cargo delivery both in the international, and in domestic communication;

- formation of supply chains based on the interaction of modes of transport, which will help minimize the cost of delivery of goods;

- implementation of the choice of rational technological parameters in the organization of cargo flows in the logistics supply chain, including the formation of shipping routes.

- Therefore, the issue of effective organization of cargo flows in the supply of goods by any mode of transport on the basis of logistical principles needs special attention.

### CONCLUSIONS

The analysis of the dynamics of the volume of transported goods by mode of transport shows that each of the modes of transport maintains its position in the freight market during 2015-2020 and is characterized by almost stable volumes of traffic. At the same time, the global pandemic COVID-19 has affected the reduction of freight traffic in 2020 for each mode of transport.

Analysis of the dynamics of freight traffic by land in Ukraine in 2015-2020 shows that road and rail transport is carried out mainly in domestic traffic, and international transport has a small share in the total traffic of these modes of transport.

It is determined that the low efficiency of the organization of cargo transportation from suppliers to consumers is associated with insufficient number and irrational use of rolling stock, insufficient development of the infrastructure of cargo terminals, irrational organization of the cargo transportation process.

The directions of optimization of traffic flow in the organization of transportation from supplier to consumer, which are aimed at forming supply chains based on the interaction of modes of transport and optimization of technological processes in planning and organizing transportation of goods in both international and domestic traffic.

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*Шраменко Н., Шраменко В., Соларьов О. Аналіз ринку вантажних перевезень в Україні. В умовах розвитку транспортно-логістичної інфраструктури, а також формування раціональної структури парку автомобілів і парку вантажних вагонів необхідно аналізувати і враховувати фактичний попит на перевезення вантажів. Аналіз динаміки обсягу перевезених вантажів за 2015-*

2020 роки показує стійкі позиції різних видів транспорту на ринку вантажних перевезень. На основі аналізу статистичних даних за 2016-2019 роки було встановлено, що автомобільні та залізничні перевезення здійснюються переважно у внутрішньому сполученні. Відзначено, що у 2020 році спостерігається певний спад обсягів вантажних перевезень за кожним з видів транспорту, що може бути обумовлено світовою пандемією COVID-19. Визначено, що низька ефективності організації перевезень вантажів від постачальників до споживачів пов'язана з недостатньою кількістю та нераціональним використанням рухомого складу, недостатнім розвитком інфраструктури вантажних терміналів, нераціональною організацією процесу вантажних перевезень. Взаємодія видів транспорту обумовлює можливість формування оптимальних ланцюгів постачань як у внутрішньому, так і в міжнародному сполученнях. Підвищення ефективності організації перевезень вантажів від постачальників до споживачів досягається шляхом оптимізації руху вантажопотоків на основі логістичних принципів. Проведені дослідження сприятимуть розробці напрямків оптимізації розподілу та руху вантажопотоків при плануванні та організації перевезень вантажів як у внутрішньому, так і у міжнародному сполученні. При цьому, формування ланцюгів постачання на основі взаємодії автомобільного та залізничного транспорту дозволяє мінімізувати транспортні витрати та створює передумови для подальшого розвитку ланцюгів постачання та транспортно-технологічних систем.

**Ключові слова:** ринок вантажних перевезень, ланцюги постачань, види транспорту, статистичні дані, обсяг перевезень, вантажопотік.

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