

## ROLE OF TRANSPORT IN THE FORMATION OF THE LOGISTICS SYSTEM OF THE REPUBLIC OF BELARUS

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*In the article, based on empirical research, the problems of transport development are identified, prospective modes of transport are identified for the development of the logistical system of the Republic and the scientific problem of indirect consideration of the problems of the development of transport modes by scientists is revealed.*

The goal of the formation of a perfect logistic structure in the Republic of Belarus is not only the rational placement of logistics facilities and their differentiation in terms of the level of servicing of goods flows, but also the increase in the efficiency of transport systems in the country [1, c. 3]. Without the efficient operation of transport, the formation of transport and logistics centers in the Republic will not yield a tangible positive result, and it will not be possible to optimize internal and external material flows in order to minimize common logistics costs. Also, within the transport system it is necessary to develop various types of transport ensuring the delivery of goods and raw materials from suppliers to the final consumer in the shortest possible time.

At the same time, conducted empirical studies based on official statistical data of the National Statistical Committee of the Republic of Belarus [2], the contents of two program documents (the Program for the Development of the Logistics System of the Republic of Belarus for the Period until 2015 [1] and the Concept of the State Program for the Development of the Logistics System of the Republic of Belarus for 2016-2020 [3]), and the results of the exchange of experience of scientists and practitioners at the events held in Minsk in 2016 and 2017 scientific forums within the framework of the Belarusian Transport Week indicate that today in the transport system of the Republic of Belarus there are a number of problems, without eliminating which the formation and development of the logistics system can be considered impossible.

The analysis of cargo transportation by mode of transport in the Republic of Belarus in the course of 2011-2016 makes it possible to distinguish the following problems (Table 1): - throughout the period of 5 years for all types of transport there is an annual reduction in the transportation of goods, which decreased in 2016 year by 18% compared with 2011; - for the same period, the transportation of goods by rail decreased by 20% and in 2016 amounted to a minimum value; - approximately in the same volumes (by 17%) there was a reduction in the transportation of goods and road transport, where the same value of 2016 was minimal for the analyzed period; - Even greater rates of cargo transportation by inland waterway transport - almost 3 times, and in 2016 also amounted to the minimum value.

Positive dynamics was noted for 2011-2016 only in the transportation of goods by air, which increased over a period of more than 6 times, and in 2016 amounted to the maximum volume.

Table 1 – Transport of goods by mode of transport in the Republic of Belarus for 2011 - 2016 (thousand tons)

Type of transport	Year (percentage of previous year)					
	2011	2012	2013	2014	2015	2016
All types of transport	493 275	484 371 (98%)	471 210 (97%)	467 486 (99%)	447 212 (95%)	417 643 (93%)
Railway	152 775	153 673 (101%)	140 040 (90%)	141 437 (101%)	131 439 (92%)	126 758 (96%)
Automotive	190 989	189 302 (99%)	192 475 (102%)	191 660 (99%)	180 226 (94%)	162 579 (90%)
Inland waterway	6711	4 023 (60%)	4 486 (112%)	3 758(84%)	2 960(79%)	2 144(72%)
Air	9	14 (156%)	11 (79%)	41 (373%)	39(95%)	57 (146%)

Note: compiled on the basis of official data of Belstat [2]; pipeline transport was not analyzed.

However, the share of transportation of goods by this type of transport is insignificant in the total volume of goods, and was from 0.002% in 2011 to 0.01% in 2016 in the total volume of transported goods in the Republic.

Analyzing the dynamics of another indicator ("cargo turnover") in tonne-kilometers, one can find some differences in the dynamics of the previous one (Table 1) for the same period, as evidenced by the data in Table 2.

Table 2 – Freight turnover by mode of transport in the Republic of Belarus for 2011 – 2016 (million ton-kilometers)

Type of transport	Year (percentage of previous year)					
	2011	2012	2013	2014	2015	2016
All types of transport	134 269	131 684(98%)	130 752(99%)	131 402(100,4%)	125 957(96%)	125 820(99%)
Railway	49 406	48 351(98%)	43 818(90%)	44 997(103%)	40 785(90%)	41 107(101%)
Automotive	19 436	22 031(113%)	25 603(116%)	26 587(104%)	24 523(92%)	25 239(103%)
Inland waterway	143	134(94%)	84(63%)	49(58%)	21(43%)	21(100%)
Air	27	34(126%)	27(79%)	65(240%)	77(118%)	108(140%)

Note: compiled on the basis of official data of Belstat [2]; pipeline transport was not analyzed.

So, despite the fact that the freight turnover for all modes of transport from 2011 to 2016 decreased by 6%, it was not so constant for the period, although it amounted to a minimum volume in 2016. With a decrease in freight turnover in rail transport in 2016 compared to 2011 by 20%, in 2016 there was a slight increase (by 0.8%) compared to the worst (2015). The most problematic situation with cargo turnover occurred on inland waterway transport, where its deterioration was the largest (a fall for a period of almost 7 times), and the value is the lowest for the analyzed period.

Unlike the dynamics of the indicator "Freight", cargo turnover has improved not only by air transport, but also by road transport. Thus, the freight turnover of road transport for the analyzed period increased by 29% in comparison with 2011 in 2016 and slightly lost only in 2013 and 2014.

In air transport, freight turnover had a steady growth trend throughout the period, and increased 4 times, although its share in total freight turnover by all types of transport was also not significant, as well as cargo transportation, and amounted in 2011 to only 0, 02%, and in 2016 it is 0.09%.

Analysis of the dynamics of the analyzed indicators (Tables 1 and 2) characterizes the development of the transport system in the Republic of Belarus as a whole problematic, and at the same time - heterogeneous. At the same time, this heterogeneity has not received due attention either in the development of state-level program documents or in the scientific research of scientists dealing with problems of transport development in the Republic of Belarus.

Thus, in the Program for the Development of the Logistics System of the Republic of Belarus for the period until 2015 [1], the problems of transport development are not considered at all, either by its types or in general. The same goes for the content of the Concept of the State Program for the Development of the Logistics System of the Republic of Belarus for 2016-2020 [3]. At the same time, the same Program highlighted the acute problem of the development of the logistics system, which can not be resolved without the development of the transport system and the improvement of the work of transport, namely: not strong enough links between producers, suppliers and consumers, which must be integrated into one system [1, p. 1].

The majority of economists in the Republic of Belarus distinguish the problems of development of transport in general, without detailing its separate types, namely:

- large economic costs for the creation and maintenance of existing transport systems [5, p. 11];
- a large number of rules, regulations and features in the transport sector that do not allow to automate the process of concluding and executing a contract and the complexity of the work of the supernumerary situation of freight forwarders, the distrust of cargo owners [6, p. 7];
- low level of comfort and ecological compatibility [7, p. 15];
- inefficiencies in the use of integrated mechanization and the lack of new generation machinery and equipment [8, p. 25].

The same deficiency, respectively, exists in the state-level program document, which focuses on transport in general in the context of the development of transport and logistics centers, the purpose of which is defined as the need to "provide a full cycle of services for delivering goods to the client" from door to door, "integration into international transport and logistics networks" [3, p. 4]. At the same time, the priorities of the same document are determined in the same document, the solution of which will contribute to the development of

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the logistics system of the Republic of Belarus by 2020, namely: the need to improve conditions and implement measures to facilitate the provision of logistics services and ensure the development of the logistics system of the Republic of Belarus; creation of conditions and implementation of measures ensuring the development and effective use of transit potential; development of information and communication support of logistics activities; expansion of international cooperation in the field of logistics, maximum integration into the international logistics system; providing reconstruction and upgrading of infrastructure necessary for transit through the territory of the Republic [3, p. 2–5]. It is not possible to solve these problems without a formed transport system.

At the same time, some Belarusian economists singled out solutions to certain problems in the transport system of the Republic of Belarus, which relate to certain modes of transport. So, to solve the problems of transport development as a whole - as a component of the logistics system, scientists offer the following activities:

- introduction of technological changes, stimulating the transition to digital workflow [9, p. 9];
- creation of the system of electronic certification of the transport corridors of the EAES [9, p. 10];
- logistics verification (use of a digital platform by the business to create additional value of the service by combining consumers and service providers without involvement of intermediaries) [6, p. 5];
- use of modern virtual modeling tools [10, p. 13];
- the creation of an intelligent multimodal transport system [11, p. 21];
- creation of a new scheme for the formation of a fleet of vehicles using the system of industrial leasing and partnership with manufacturers of modern vehicles [4, p. 28].

To solve the problems of the development of motor transport, the most interesting are such activities as:

- the use of hydrogen as an alternative fuel [7, p. 16];
- development of the world segment of electric vehicles [7, p. 18];
- the introduction of a new bulldozer-loader with transforming working equipment [8, p. 26];
- the implementation of the intellectual transport system "E-Trak" [9, p. 10].

For the solution of the problems of the development of inland water transport, such activities as: - the introduction of information support systems in the Republic of Belarus on the basis of modern means of communication and information technologies - river information systems [12, p. 37, 40].

To solve the problems of air transport development, it is of interest to introduce automatic dependent surveillance (the method of observation, according to which the aircraft automatically provides information to the specific or any consumer from the airborne flight control systems of an aircraft) [13, p. 32].

Obviously, most of the activities relate to technological innovations that need to be implemented on all types of transport to solve the problems of the development of the transport system in the Republic of Belarus. At the same time, the negative fact of the results obtained in Minsk in 2016 and 2017 attracts attention. scientific forums within the framework of the Belarusian Transport Week that they were not offered effective measures to eliminate the problems of railway transport development in the Republic of Belarus with the fact that it is precisely this type of transport that significantly reduces both the volumes of cargo transported during recent years and the freight turnover (tables 1 and 2).

Thus, the result of the conducted scientific researches makes it possible to draw the following conclusions: the program documents aimed at the development of the logistics system in the Republic of Belarus do not take into account the development of certain modes of transport, which requires their refinement; economists offer effective technological innovations that will solve the problems of the development of certain modes of transport and increase the volume of transported goods and freight turnover in the logistics system of the Republic of Belarus; The most dynamically developing types of transport in the Republic of Belarus can be considered automobile and air.

A promising direction of further scientific research can be considered the forecasting of the development of one type of transport in the Republic of Belarus in the context of the development of the logistics system until 2020.

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