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Development of the Russian trucking industry in the context of the COVID-19 pandemic

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Abstract

The article is devoted to issues related to the development of road transport in the Russian Federation. The important parameters and main indicators of the Transport Strategy of Russia until 2035 are considered. The article notes that the general goals of the transport strategy are aimed at the formation of a single transport space in Russia, at ensuring the availability and quality of transport and logistics services in freight traffic, sufficient to meet the needs of the country's economic development. Two scenarios of the development of the transport strategy of Russia are considered - the basic and innovative scenarios. The transport strategy of Russia presupposes the stages of its implementation in accordance with the vector of development of the country's economy, which adopted based on the general development of the Russian Federation in the long term. A certain place in the Transport Strategy occupied by the development of such a direction as road transport and road facilities. Taking into account the peculiarities of the territorial space of Russia, the strengthening of global competition, interaction with neighboring states, the state of industry, agriculture, trade and other industries, the Transport Strategy presents the cost characteristics of transportation of various products, including cargo transportation by road. Taking into account the fact that road transport accounts for a significant part of the total volume of freight traffic, the Transport Strategy provides for the redistribution of freight traffic volumes between modes of transport.

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Keywords: Trucking; global competition; investments; road transport and road facilities; modernization; transport strategy; growth rates; value.

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1. Introduction

Transport has been and remains an integral part of the economy of any state and plays a special role in the life of society. Transport cannot be compared with other spheres of the economy, since it has certain features that seriously distinguish it from different sectors of the national economy. No products are produced in transport, and this means that in this area there are no raw materials for processing, finalization, processing, and the funds involved in the turnover of trucks are not comparable in volume to the volumes, for example, in industry, agriculture, and trade. However, there is one more feature - the degree of development of transport, which is directly proportional to the level of development of society. At the same time, it is impossible to imagine that the spheres of the economy could exist without transport. From this point of view, the role of transport and transport cargo transportation in the modern world is very important. The most important factor influencing the transport industry was the pandemic of the new viral infection COVID-19, which led to a shock compression of demand in some market segments (passenger transportation) and contributed to the development of others (transit container transportation, air cargo transportation, online commerce).

In the Russian Federation, due to geographical and climatic features, the level of coverage of the territory with a network of highways (taking into account population density) is two to four times lower than abroad. The network of high-speed highways in Russia does not meet the demand for high-quality transport services on the part of the population and contributes to an increase in the connectivity of the country's space.

In the largest Russian agglomerations, motor transport accounts for 17-25% (depending on the city) of all trips, for comparison: public buses - 12-17% of trips, off-street transport - 3-26%, walking 29-40%. The share of trips by personal transport in the Russian Federation is higher than in other countries, which explained, among other things, by the lower cost of car ownership. At the same time, motor transport accounts for about 95 percent of the urban space occupied by passenger transport, 80-95 percent of emissions and more than 75 percent of road traffic accidents with victims.

Regional and local highways are experiencing significant problems due to lack of funding, of which 53.6% do not correspond to the normative state. At the same time, insufficient rates of development of the road network are observe in the agricultural regions, as well as in the regions of the Far North and the subjects of the Far Eastern Federal District. More than 40,000 settlements, of which 190 settlements with a population of over 1000 people, have no connection with the network of highways on hard-surface roads.

The development of transport mobility and the reduction of travel time for passengers and goods are also hamper by the high load on federal highways and the low level of development of high-speed roads. About 21% of federal highways operate in overload mode. The share of express roads and highways is less than 0.5% of the total length of the road network in the Russian Federation. This is three to seven times lower than in the advanced countries of the European Union, the United States of America, Canada, and the People's Republic of China.

At the same time, road transport is one of the main air pollutants; the problem is increasing due to increased emissions from low-emission vehicles. Currently, 55 percent of the Russian Federation's vehicle fleet does not meet the Euro-3 emission standard.

2. Study methodology

Many works have been devoted to the development and assessment of transport and logistics infrastructure, including the work of the following scientists: Goncharenko S., Kurenkov P., Majercak J., Mańkowski C., Kudlac S., Zmeškal.

The works of such authors as Bachurin A., Gorin V., Gudkov V., Mirotin L., Stepanov A.

The study of the theory and practice of the Russian market of road freight are devoted to the works of such authors as A. Bachurin, V. Gorin, V. Gudkov, L. Mirotin, A. Stepanov.

The purpose of the publication is to develop a forecast of the volume of the commercial road freight market in Russia.

The study used the following methods: systematic approach, factor analysis, comparative analysis, retrospective analysis, scenario method, analysis of official statistics, document analysis method.
Currently, much attention paid to the carriage of goods by road, which is one of the most mobile modes of transport in the modern world. The article analyzes the progress of the implementation of the Transport Strategy of the Russian Federation for the period up to 2030 in terms of the development of cargo transportation by road.

3. Assessment and results

Russian transport infrastructure includes road, rail, sea and air transport. It is important to note that the market share of road freight transportation in the total volume of the Russian market remains quite high, and therefore it is important to pay great attention to the development of freight transportation by road in the future. The basic (conservative) option assumes the accelerated development of the transport infrastructure, mainly for transport support in the development of new mineral deposits and the increase in fuel and raw materials exports, the realization of Russia's competitive potential in the field of transport and the growth of export of transport services.

The innovative option presupposes the accelerated and balanced development of the country's transport complex, which, when the basic (conservative) option is implement, will provide the appropriate conditions for the development of the innovative component of the economy, improving the quality of life of the population, and the transition to a polycentric model of spatial development of Russia.

Therefore, it is important to assess the effectiveness of the implementation of the Transport Strategy of the Russian Federation in terms of road freight transport, what volume of investments is expect to be make within the framework of this program, and what are the prospects for the future.

The main categories of goods transported by road are construction goods, agricultural products, oil products, fertilizers and consumer goods.

Cargo transportation by road has the following main indicators:

- traffic volume;
- cargo turnover.

Both parameters depend on the type of product, the terms of the contract, the transport shoulder, the condition of the vehicle, etc. The «freight traffic» indicator characterizes the volume and direction of cargo transportation by road.

According to the Transport Strategy of the Russian Federation until 2030 (hereinafter referred to as the Transport Strategy), the planned investments in the development of transport infrastructure in Russia until 2030 look quite impressive (Table 1).

| Type of transport      | Period (years) | 2013-2020 | 2021-2030 | In total |
|------------------------|----------------|-----------|-----------|---------|
| Automobile transport   | 220            | 865       | 1085      |
| Railway transport      | 235            | 692       | 927       |
| Sea transport          | 51             | 284       | 335       |
| Air Transport          | 53             | 250       | 303       |

According to Decree of the Government of the Russian Federation “On approval of the Transport Strategy of the Russian Federation for the period up to 2030” (November 22, 2008, No. 1734r), the table 1 shows that in the next ten years the largest volume of investments is expected to be made in road and rail transport, since the share of these types of transport in the volume of the Russian transport market is the highest. Thus, for the period from 2021 to 2030, compared with the previous seven-year period, the volume of investments in road transport should increase by 3.9 times, in railway transport - by 2.9 times, in sea transport - by 5.6 times, in air transport, transport - 4.7 times.
At the same time, it is necessary to consider the indicators of the forecast of cargo transportation and freight turnover within the framework of the basic and innovative scenarios for the development of the transport system of Russia until 2030 (Tables 2 and 3).

Table 2. Forecast of cargo transportation and cargo turnover in the framework of the baseline scenario of the development of the transport system of Russia until 2030.

| Indicators | Years          | 2011    | 2012    | 2015    | 2018    | 2020    | 2024    | 2030    |
|------------|----------------|---------|---------|---------|---------|---------|---------|---------|
| 1. Cargo transportation - total, million, incl. by mode of transport: |              |         |         |         |         |         |         |         |
| - car      | 5663.1         | 5829.3  | 6663.3  | 7306.5  | 7769.4  | 8446.1  | 9568.7  |         |
| - railway industrial transport | 1382.0  | 1271.9  | 1380.0  | 1484.4  | 1558.3  | 1632.6  | 1750.6  |         |
| - other    | 3338.1         | 3418.2  | 3757.1  | 4105.4  | 4355.5  | 4902.1  | 5574.7  |         |
| 1. Freight turnover - total, billion tons km, incl. by mode of transport: |              |         |         |         |         |         |         |         |
| - car      | 222.8          | 247.1   | 264.9   | 301.6   | 328.8   | 360.7   | 411.5   |         |
| - railway industrial transport | 2127.2  | 2222.0  | 2357.2  | 2545.9  | 2680.0  | 2811.0  | 3020.6  |         |
| - other    | 141.5          | 131.0   | 146.3   | 149.4   | 152.0   | 171.6   | 202.9   |         |

According to Decree of the Government of the Russian Federation “On approval of the Transport Strategy of the Russian Federation for the period up to 2030” (November 22, 2008, No. 1734r), the table 2 shows forecast of cargo transportation and cargo turnover in the framework of the baseline scenario of the development of the transport system of Russia until 2030.

Table 3. Forecast of cargo transportation and cargo turnover in the framework of the innovative scenario of the development of the transport system of Russia until 2030.

| Indicators | Years          | 2011    | 2012    | 2015    | 2018    | 2020    | 2024    | 2030    |
|------------|----------------|---------|---------|---------|---------|---------|---------|---------|
| 1. Cargo transportation - total, million, incl. by mode of transport: |              |         |         |         |         |         |         |         |
| - car      | 5663.1         | 5829.3  | 7139.7  | 8141.1  | 8822.3  | 10247.6 | 12594.1 |         |
| - railway industrial transport | 1380.0  | 1271.9  | 1447.0  | 1621.4  | 1737.7  | 1846.6  | 2011 0  |         |
| - other    | 3338.1         | 3418.2  | 3862.9  | 4270.4  | 4565.7  | 4902.1  | 5574.7  |         |
| 1. Freight turnover - total, billion tons km, incl. by mode of transport: |              |         |         |         |         |         |         |         |
| - car      | 222.8          | 247.1   | 292.2   | 329.6   | 355.4   | 411.1   | 509.6   |         |
| - railway industrial transport | 2127.2  | 2222.0  | 2507.0  | 2779.8  | 2978.0  | 3102.9  | 3300.0  |         |
| - other    | 141.5          | 131.0   | 142.9   | 157.7   | 170.0   | 202.0   | 258.8   |         |
According to Decree of the Government of the Russian Federation “On approval of the Transport Strategy of the Russian Federation for the period up to 2030” (November 22, 2008, No. 1734r) table. 3 shows forecast of cargo transportation and cargo turnover in the framework of the innovative scenario of the development of the transport system of Russia until 2030.

According to Ministry of Transport of the Russian Federation. Report "On the implementation of the transport strategy of the Russian Federation for the period up to 2030" (November 22, 2008, No. 1734r) it is advisable to consider how effectively the Transport Strategy of the Russian Federation was implement in 2015-2017 in terms of meeting the indicators for the basic and innovative options (Table 4 and Table 5). The data in the table’s show that the indicators were not achieve for either of the two options.

Table 4. Dynamics of achieving the expected values of the indicator of the Transport Strategy in terms of the volume of cargo transportation in 2015-2017.

| №  | Indicator                  | Type   | Years         |          |          |          |
|----|---------------------------|--------|---------------|----------|----------|----------|
|    |                           |        |               | 2015     | 2016     | 2017     |
| 1  | Cargo transportation - total, million tons | Fact   | 9763.3        | 9776.7   | 9928.5   |
|    |                           | Basic plan | 11973.3      | 12343.5  | 12713.4  |
|    |                           | % completed | 81.6        | 79.2     | 78.1     |
|    |                           | Innovative plan | 12629.1    | 13163.1  | 13697.2  |
|    |                           | % completed | 77.3        | 74.3     | 72.5     |
| 2  | Public road transport     | Fact   | 5356.7        | 5430.6   | 5447.0   |
|    |                           | Basic plan | 6663.3      | 6877.7   | 7092.1   |
|    |                           | % completed | 80.4        | 79.0     | 76.8     |
|    |                           | Innovative plan | 7139.7    | 7473.5   | 7807.3   |
|    |                           | % completed | 75.0        | 72.7     | 69.8     |
| 3  | Public rail transport     | Fact   | 1218.0        | 1277.0   | 1266.5   |
|    |                           | Basic plan | 1380.0      | 1414.8   | 1449.6   |
|    |                           | % completed | 88.3        | 86.7     | 87.4     |
|    |                           | Innovative plan | 1447.0    | 1505.1   | 1563.3   |
|    |                           | % completed | 84.2        | 81.5     | 81.0     |
| 4  | Other                     | Fact   | 3188.6        | 3069.1   | 3213.0   |
|    |                           | Basic plan | 3930.0      | 4051.0   | 4171.7   |
|    |                           | % completed | 81.1        | 75.8     | 79.4     |
|    |                           | Innovative plan | 4042.4    | 4780.3   | 4326.6   |
|    |                           | % completed | 78.9        | 64.2     | 67.3     |

According to Ministry of Transport of the Russian Federation. Report "On the implementation of the transport strategy of the Russian Federation for the period up to 2030" (November 22, 2008, No. 1734r), the data in Table 4 show that for the analyzed period (2015-2017), the actual volumes of cargo transportation by road are far from the indicators planned for the baseline and innovative scenarios: according to the baseline, it was 80.4% in 2015, 79.0% in 2016, in 2017 – 76.8%. The situation was not the best in the framework of the innovative scenario: in 2015, the indicator of the actual volume of cargo transportation by road was even lower, and amounted to 75.0% in 2015, 72.7% in 2016, and 69.0% in 2017- 69.8%.
According to Ministry of Transport of the Russian Federation. Report "On the implementation of the transport strategy of the Russian Federation for the period up to 2030" (November 22, 2008, No. 1734r), in the data of Table 5, the actual volume of cargo transportation by road in Russia in 2018 and 2019 amounted to 5544.5 million tons and 5726.6 million tons, respectively, and this is lower than the indicators provided for by the baseline (75.9% and 76% respectively) and innovative scenarios (68.1% and 67.5%, respectively). One of the factors that influenced such results is still the fact that the Russian freight road transport has not yet coped with the most important problem - the deterioration of the vehicle fleet:

- the average age of vehicles in the Russian cargo fleet is 19-20 years, in Europe and the USA - 5-7 years;
- the number of vehicles operated for 15 years or more is 66%. In addition, the rise in prices for cargo transportation by road leads to the fact that a number of goods (primarily inert building materials and other low-income goods) transferred to the railroad. Changes were imposed on 2019 in terms of growth in the value of the freight road transport market in Russia. Thus, it assumed that despite the decrease in freight traffic, the value of the Russian market of road freight transportation would approach a high level by the end of 2019 - 872.0 billion rubles.

For the Russian transport industry, 2019 was a rather difficult year, since the slowdown in economic growth turned out to be obvious, and the sharply changing environment in world markets provoked a failure in the cargo turnover system of Russian transport for the first time since 2015. However, the growth rates of the volume of cargo transportation by road in 2018 and 2019 turned out to be more significant compared to 2016 and 2017. It should be note that the share of commercial traffic accounts for approximately 27% of the total market volume, and if in the period from 2016 to 2018 their dynamics was positive, then in 2019 there was a decline of 6%.

Federal State Statistics Service of the Russian Federation in Table 6, how the dynamics of the annual growth rate of the volume of total freight traffic by road looked for the period 2016-2019. (Table 6).
Despite this, according to the analysts of the ATI.SU Exchange, in 2019 the volume of road cargo transportation in Russia increased. The recovery in road transport was drive by growth in retail trade (1.6% in 2019 versus 2018 at comparable prices) and e-commerce (+25% in 2019), for which road transport is the main method of delivery of goods. Among other factors that have a positive effect on the road freight market, one can name the active development of transport infrastructure, including the construction and commissioning of new high-speed roads, as well as the reconstruction and repair of old facilities. In particular, in 2019, the length of toll roads under the management of the state-owned company Avtodor increased by 200 km; over the next six years, it is planned to further increase them by 1,700 km (for comparison, 1,000 km were built in the previous 10 years). Market experts note that part of the funds for the creation and modernization of road infrastructure was allocated from budget revenues within the framework of the Platon system (in total, the system has already brought the state 90 billion rubles).

In addition, a tendency has emerged to reduce the cost of road transportation to the Republic of Crimea from the southern and central regions of the country (by an average of 30%). The number of FMCG goods transported also increased foodstuffs, clothes, toys, shoes, cosmetics and perfumes. In 2019, cargo transportation within the Moscow region showed significant growth - their volume increased by 21%. There is a sharp increase in road transport from Novosibirsk to Omsk (46%), from Chelyabinsk to Yekaterinburg (26%), as well as from Rostov to Krasnodar (23%). The horizons of new logistics routes within the country are expanding, for example, transportation from Sakhalin to the Republic of Tatarstan and from Ingushetia to Bashkortostan.

In 2019, no one could suggest that a coronavirus infection will appear in 2020, which will make its own adjustments to the development of the economies of states, incl. and in the Russian Federation.

According to forecast of the dynamics of the value of the commercial road freight market in Russia for 2017-2023 is show in Fig. 1

![Fig. 1 Forecast of commercial road freight transportation market value dynamics Commercial Road Freight Transportation Market in Russia in 2017-2023, bln. rubles and %](image)

| Years | Cargo transportation | General | Commercial |
|-------|-----------------------|---------|------------|
| 2016  | 0.7                   | 2.0     |            |
| 2017  | 0.9                   | 2.0     |            |
| 2018  | 1.8                   | 1.0     | -6.0       |
| 2019  | 3.5                   |         |            |

Table 6. Dynamics of the annual growth rates of the volume of freight traffic by road transport for the period 2016-2020, %.
4. Discussion

In the second quarter of 2020, it became clear that the OPEC+ crisis, falling oil prices and the sudden “arrival” of coronavirus infection would significantly affect the development of the Russian economy. Today, this is perceived as new challenges to the Russian society, and to the whole world, which will force market participants to find new growth drivers for their business and transform existing supply chains. But until now, these problems remain one of the main ones, and will not be resolved for a long time.

In Russia, traditionally, the largest share of cargo transportation was accounted for by rail, this is due to the large distances between the points of departure and destination and the tariff policy. In the face of new challenges associated with the prolonged COVID-19 pandemic, this trend will increase. Another significant factor is environmental. Rail transport has environmental advantages over road transport for both passenger and freight transport. Despite the fact that road transport is less environmentally friendly, it can provide increased transport accessibility for individuals and cargo, and is more economical and flexible when transporting small-volume cargo. It can provide first and last mile delivery of goods. In this regard, the balanced development of both the entire road transport industry and the commercial road freight market is of great importance.

5. Conclusions

The globalization of the economy presupposes the strengthening of economic ties between countries, using modern opportunities for high speed of movement of goods, expanding the range of services, technologies and capital across state borders, this has acquired particular importance in the context of the prolonged COVID-19 pandemic.

Based on the results of the study, the following main directions for the development of the road transport industry can be propose:
- to continue the introduction of unmanned vehicles into Russian practice, which could in the future minimize the number of road accidents, reduce the cost of using labor and fuel materials, and also ensure an increase in the distance of transportation. For example, in the Russian market, developments in the field of unmanned freight transport are carried out by the KAMAZ enterprise;
- to ensure an increase in operational efficiency through automation and robotization of processes, taking into account that some companies are actively implementing software and hardware projects to support the automation of processes, for example, bot-chats, which reduce the number of hours of work of operators. Continue the process of automation in the field of transition of enterprises to electronic document management, which allows you to save time on performing many of the same operations, eliminating the duplication system;
- to support the processes of investing in big data and IT infrastructure of shipping companies. Currently, some major players in the transport and logistics services market are investing in IT solutions for big data analytics and digitalization of processes. Big data helps companies to simulate cargo transportation scenarios in a timely manner and generate a list of relevant options;
- to provide priority in the selection of group age cargo (LTL), i.e. to form a market of group age cargo transported by road, which will have a higher growth rate compared to the growth rate of the market as a whole. Since the growth in the volume of group age cargo is considered one of the main drivers for the development of the industry as a whole and is directly related to the growth of the e-commerce market, it is necessary to create all conditions for road transport to obtain some protection for the development of this direction.

Reference

Babin, M., Buda, M. et al, 2012. Railway Companies and Legislation Scheme Transportation of Dangerous Goods in Transport Means. Proceedings of the International Conference, 37-41.
Gorin, V., Stepanov, A., 2020. The philosophy of digital transport and logistics. Lecture Notes in Networks and Systems 115, 91-99.
Kudlac, S., Stefancova, V. et al, 2017. Using the Saaty Method and the FMEA Method for Evaluation of Constraints in Logistics Chain. 10th International Scientific Conference on Transportation Science and Technology, 749-755.
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Kudlac, S., Stefancova, V. et al, 2017. Using the Saaty Method and the FMEA Method for Evaluation of Constraints in Logistics Chain. 10th
Babin, M., Buda, M. et al, 2012. Railway Companies and Legislation Scheme Transportation of Dangerous Goods in Transport Means.
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Kurbatova, A., Kurenkov, P. et al, 2019. Selection of optimal supply schemes. XII International Scientific Conference on Agricultural Machinery Industry, 012231.
Kurenkov, P., Astafiev, A. et al, 2016. Different exegesis of the concepts related to mixed transport in Komunikacie 2(18), 148-152.
Lyovin, B., Davydov, A. et al, 2017. The development of criteria for evaluating energy efficiency and the choice of the optimal composition of
the subsystems in the Russian integral transit transport system. 11th International Symposium on LDIA, 8097237.
Majercak, J., Kudlac, S. et al, 2019. Sustainable and economically efficient five-point supply chain management. Transportation Research Procedia 40, 65-70.
Majercak, J., Majercak, P., 2017. Logistics Assessment of Functional Performance of Material Flows in Railway Transport. 18th International Scientific Conference on LOGI Location: Ceske Budejovice, 00035.
Majercak, P., Majercak, J., 2019. Synchromodal, co-modal, a-modal and trimodal logistics in the global world in Transport Means. Proceedings of the International Conference, 1392-1396.
Majercakova, E., Majercak, P. et al, 2015. Logistics and New Trends in Supply Chain Management in Times of Economic Crisis. 3rd International Conference on ERMI 78, 166-170.
Mejokh, Z., Kapustina, N. et al, 2019. Urban Transport and Logistics Infrastructure as an Element of Economic Security in the Region. Advances in Intelligent Systems and Computing 2(1116), 589-597.
Pokrovskaya, O., Kurenkov, P. et al, 2020. Evolutionary and functional development of transport nodes. IOP Conf. Series: Materials Science and Engineering 918(1), 012033.
Romanova, N., Kakhrimanova, D., 2020. Development of artificial intelligence as a modern business technology using the transport industry as an example. IOP Conference Series: Materials Science and Engineering 918, 012065.
Safronova, A., Reshetko, N. et al, 2021. Choosing a scheme for the delivery of foreign trade cargo. Transportation Research Procedia 53, 314-320.
Zmeškal, E., Majercák, J., et al, 2021. Software for the Application of the Restriction Assessment Methodology in Logistics Chains in Transportation Research Procedia 54, 69-75.