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Problems of the digital economy development in the transport industry

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Abstract. In the conditions of the modern world and its constant changes, it is just necessary to correspond and develop together with it. Progress does not stand still and without digital technology it is already difficult to imagine almost any of the spheres of everyday life. The article deals with the topic of digitalization and development of the Russian agroindustrial economy in this area, as well as problematic aspects of the transition to the described area of life. The role of digital technologies in the agro-industrial complex, the level of use of special software and Internet technologies in the transport sector has been investigated. The prospects for the development of the digital economy in the field of railway transport and transportation are considered. The article describes the problems of the industry in the areas of B2B and B2C, as well as current solutions through the use of digitalization. Despite the fact that the transition to a digital economy is the most optimal, appropriate and modern solution, there are a number of problems that appear to be barriers to the digitalization of rail transport. One of these problems can be called the lack of properly trained personnel who are able to work in the conditions of the technologies being introduced. Considered the necessary for the introduction in the described industry trends and digital platforms.

1. Introduction

In modern society, more and more questions arise about the prospects for the development of the digital economy and affecting the interests of both economic actors and ordinary people.

Modernization is the process of changing a social or government structure, which involves finding new properties that correspond to the current level and nature of technology development. In varying degrees, modernization is an integral part of the development process of any state. Currently, we are witnessing not only the evolution of technical means, but also the emergence of a new configuration of the economic system - the digital economy, which, in turn, is an important condition for the country's economic well-being and national security.

The digital economy is a rapidly growing area of life that, according to experts, completely reformats the usual economic ties and existing business models. The tools that the digital economy offers allow you to fully meet customer needs and increase productivity. According to the estimates of financiers, in the near future all participants in this sector will face considerable "digital dividends", among them - a decrease in the level of unemployment and costs in the production of goods.

Such countries as the Netherlands, Great Britain, South Korea, the Scandinavian trio - Norway, Denmark, and Sweden - have achieved the greatest success in this direction. Moving toward the digital economy is a global trend. Within the framework of this paradigm, a model of Russia's development is being built. This is confirmed by the words in support of the digitalization of the domestic economy, which recently are increasingly heard from the leadership of our country, representatives of big business and top managers of system-forming banking institutions. The intensive development and introduction of new technologies sets fundamentally different tasks for education.

The Strategy for the Development of the Information Society in the Russian Federation for 2017–2030 defines the digital economy as an economic activity in which the key factor in production is digital data, processing large volumes and using the results of the analysis of which in comparison with traditional forms of management, it can significantly improve the efficiency of various types of production, technologies, equipment, storage, sales, delivery of goods and services [1 -4].

In modern economics, information plays a dual role: it is both a resource (production factor) and a final good (product) [5, 6]. At the same time, a product in an information society can be represented both as data that is the result of analysis, and as an information digital product and as a knowledge base. Information as the final product has two features:

- Presence of the law of increasing marginal utility, due to the effect of the direct network effect.
- Negligibly small marginal costs that trigger the effect of increasing profitability.

All the above indicates that the implementation of the information product is limited only by the capacity of the market.

At the same time, the synthesis of the information and real sectors of the economy is reflected in the new development strategy. This feature was most pronounced in connection with the introduction of the term "digital economy". The importance of this approach has been repeatedly emphasized by the President of the Russian Federation V.V. Putin. Thus, at the plenary meeting of the St. Petersburg International Economic Forum 2017, the president noted the need to develop the Digital Economy program. in October 2017 at the Russia Calling Investment Forum, he said: "I am confident that the development of the digital economy, the launch of new business models will allow Russian companies to become more competitive and generally diversify the economy, give impetus to the development of industries and markets based on breakthrough technological solutions to ensure higher standards of living for the citizens of Russia" [1].

2. Railway Transportation in Russian Federation

Rail transportation in Russia today is characterized by a number of pain points.

Common to the Business-to-business (B2B) and Business-to-client (B2C) markets are:

- Absence or limited functionality of digital channels for interaction between carriers, shippers and passengers [7].
- Limited capacity to forecast demand for freight and passenger traffic [8, 9].
- Low efficiency and high cost of repairs, lack of repairs [10 - 12].

In the field of B2B - limited access to freight for small and medium-sized businesses, mainly due to the lack of digital channels of interaction [13]. In the field of B2C - the need to improve customer experience: improve the convenience of multimodal transportation, including not only the ability to plan a route, but also the acquisition of door-to-door tickets; providing access to communications during transportation; simplify ticket booking system through websites and mobile apps. [13, 14]

Digitalization provides solutions for all these issues. Currently, despite the progress, there are a number of problems that are obstacles to the digitalization of rail transport [14]. A common problem for B2B and B2C, both in Russia and in countries with a higher degree of digitalization of rail traffic, is the fragmentation of the IT infrastructure, which is often supported by various departments of the company

without the necessary coordination. For example, Deutsche Bahn AG (DB) recently allocated 120 million euros to harmonize the IT landscape. In B2B there are restrictions related to the legislation: today it does not allow for repairs as it is. In countries such as Germany, Denmark, Austria, Switzerland, the use of repairs as already allowed to reduce costs.

B2C passengers have limited access to communications during transportation today. Telecom infrastructure designed to support this access, especially for long-haul traffic, often works intermittently. The solution to this problem is made difficult by the high length and low density of cellular coverage of remote sections of the route network.

Although Russian freight and passenger carriers are already present in the Internet space, the possibility of buying passenger services and especially freight through the website and mobile applications is still limited [15, 16].

At the same time, for example, Deutsche Bahn's B2C-application DB Navigator allows you not only to purchase a ticket, but also to plan a detailed route from the initial to the final point, including a segment from home to the railway station, search and pay for a parking space.

In this perspective, the developments of specialists in the field of railway transport are of particular relevance. Currently, Russian Railways is implementing the Digital Railroad project, which includes a set of technologies aimed at improving the quality of services in the field of passenger and freight traffic. The Digital Railway project is a comprehensive program covering the most modern and promising areas and technologies, such as the "Internet of Things", processing of big data datasets, and others. Special attention is paid to the cyber security and information security of the IT infrastructure of the company as a whole. [17]

On the Krasnoyarsk railway, special attention is paid to the digitization of passenger service. In addition to what has already been introduced: a site that allows you to purchase, hand over, exchange tickets, inform passengers, study consumer opinions about the quality of services provided (conducting surveys, studying online assessments) and many other necessary and important functions on the railway the possibilities of using payment terminals are currently being considered, namely, the possibility for passengers to pay for goods and services by bank cards on route. A survey of passengers conducted in the framework of marketing research showed that it is a very popular service and it has long been necessary to introduce it, since very often on the way there are problems with cash bills from both passengers and conductors.

3. Digital Trends in B2B and B2C

So, today in Russia the use of digital trends in B2B and B2C rail transportation is very limited.

Depending on the stage of development and relevance for Russia, digital trends are divided into three groups (figure 1).

Experts believe that the first priority are:

- Continuous connection for B2C.
- Big data for B2B and B2C.
- Digital platforms for B2B.

In the short term, big data is needed to improve the accuracy of passenger and freight demand forecasts, as well as a better understanding of customer needs. Imperfect forecasts today lead to both lost income and an increase in transportation costs. Big data is already widely used for these purposes by such foreign players as DB, SBB, SNCF, etc.

Digital platforms allow you to change the current operating and/or business model of the market and the way that counterparties interact. In particular, they allow providing access to cargo transportation for small and medium-sized businesses (SMEs) through an electronic exchange. Today, despite the more favorable cost of rail transportation over long distances (more than 1000–1500 km) compared to cars, SMEs choose the latter due to the difficulty of booking and purchasing railway freight.

In the world, digital B2B platforms are divided into brokerage (Cargoclix. Com, DBSchenker, Cargomatic), freight forwarders platforms (UPS, MyDHL) and information platforms (Xeneta, Inttra). Most of them are multimodal and have global coverage, which greatly simplifies the process of acquiring logistics services and increases the efficiency of the park.
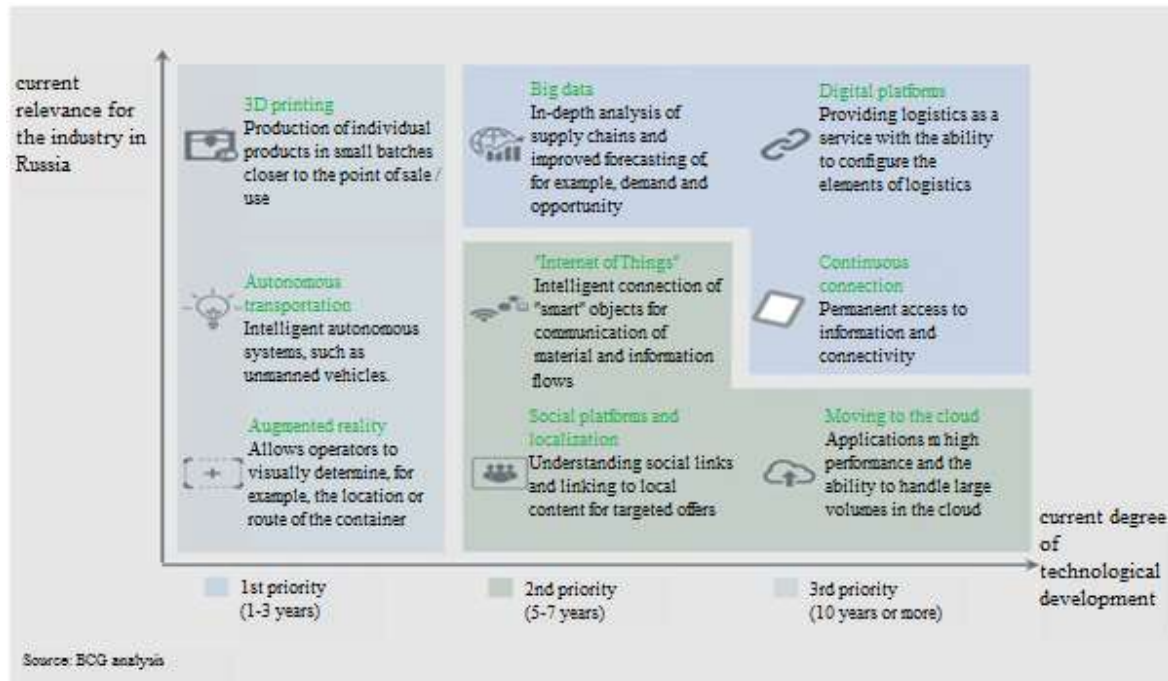

Figure 1. Digital trends in railway transportation, depending on the stage of development and relevance for Russia.

One of the most prominent examples of B2B digitalization in the transport industry is the BCG-developed X-Change platform for optimizing container shipping [18].

In this area, the cumulative costs of the largest players associated with empty mileage are estimated at 15–20 billion dollars a year. Our analysis showed that having a platform that allows players to use assets together can reduce more than 30% of these costs, not to mention the favourable environmental consequences of such a decision.

Today, the X-Change platform is successfully implemented.

The following priority tasks can be defined:

- Move to the cloud to optimize work in B2B and B2C.
- Development of the "Internet of Things" to improve the efficiency of B2B and B2C infrastructure.
- Social platforms and localization of supply in B2C.

Processing of large amounts of data in the medium term will require moving to the cloud, since it is this technology that has the required level of performance without the need for significant costs for server capacity. [19]

The "Internet of Things" in conjunction with big data (and changes in current legislation) will allow for repairs as follows [20]:

- Sensors will transmit all relevant information about the train and infrastructure.
- Big data analysis will allow to compare this information with known emergency data patterns.

- Maintenance plan will be updated immediately, which will prevent major damage.

As a result, there will be a significant reduction in costs (estimated at 17-18%), increasing the availability of trains and customer satisfaction.

Social platforms will allow you to personalize the offer to customers based on their location, frequency of use of services, preferences and interests.

The third long-term priority is the following trends:

- 3D printing.
- Autonomous shipments.
- Augmented reality.

3D printing will allow you to create spare parts there and when they are needed, which will significantly reduce the duration and cost of repairs.

The future of autonomous transportation is uncertain, but they create opportunities to reduce labour costs, reduce electricity consumption and improve reliability.

4. Conclusion

Digitization has become a global process that has covered in one way or another almost all countries, almost all industries, including rail transport. We believe that the introduction of the above trends is significant not only for the railway industry in Russia, but will also have a multiplicative effect on the development of other industries. The enormous potential of digital technologies in organizing the transportation process, maintaining the infrastructure, and increasing the attractiveness of services for passengers and cargo owners is obvious.

The Russian president compared the global program for the development of a digital economy in importance with the country's general electrification in the early twentieth century. Unprecedented in its influence on economic progress, the state project can be realized thanks to the enormous accumulated intellectual potential, while the country's universities plan to increase the number of graduates in the field of computer technology.

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