European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2022.03.88

FaR 2021
International Forum "Freedom and responsibility in pivotal times"

DIGITALIZATION PROBLEMS OF THE RUSSIAN TRANSPORTATION INDUSTRY

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Abstract

The transportation industry today has become an application sector of the latest information technologies. Transport plays a leading role in the development of the economy, the development of new territories, and the maintenance of social infrastructure in a stable state. One of the main problems slowing the digitalization of the transportation industry is the imperfection of the regulatory framework. There is now a need for clear legal rules that delineate the identification of proprietary rights that govern the ownership, use and access of digital data that are used to improve transportation efficiency, reliability and security. Digitalization in the transportation sector is extremely unbalanced, and it is in this sector that digital technologies began to penetrate before anything else. Moreover, digitalization in this industry can lead to the complete automation of all technological processes. As a result of the study, the authors found an urgent and objective need of the transportation industry for new innovative developments. The economic effect that the introduction of digital technologies in the transportation sector brings is quite obvious and tangible. The economy is ensured by reducing inappropriate costs, increasing control and manageability of the system. At the moment, a lot of experience has already been gained in world practice with regard to the introduction of digital technologies in transport: remote control, full-scale automation, integrated technologies, as well as intelligent control systems. The authors presented proposals for amending the current legislation in the field of digitalization of the transportation industry.

Keywords: Digitalization, transport, transportation industry, law, legislation, legal regulation

https://doi.org/10.15405/epsbs.2022.03.88
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Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

Currently, digitalization has been chosen as the main way to increase the efficiency of the national economy and its transportation industry. It is expected that the informational integration of trade partners, as well as transport market operators, transport enterprises and other transport participants, which will result from this process, will lead to a general reduction in the transportation terms, and on the basis of the new opportunities for accounting and analysis will allow implementing effective measures for planning and operational traffic management. It seems that the digitalization of the transportation industry through the creation of unitary standards for data exchange between government agencies and organizations will become an effective tool in improving road safety, reducing costs for business, accelerating and simplifying control and supervisory procedures. Ultimately, this will create more favorable and safe conditions for citizens to use all modes of transport, as well as increase the efficiency of business and other economic activities.

2. Problem Statement

Informatization and digitalization of the transportation industry are objective processes characteristic not only for Russia, but also for the whole world. Besides, the competitiveness of domestic transportation industry in the global transport market will depend on how quickly and effectively digital technologies will be introduced into this industry. The focus of the state transportation policy in the field of the transportation industry is its digitalization. The activities of the Russian transportation industry in all segments have practical examples of the transition to digitalization, and the digitalization process is performed on a common platform.

The efficiency of recent technological developments determines the competitiveness of transport companies, and in this context, the study of the impact of digital technologies on production processes in this area presents the greatest practical interest. It is necessary to identify the best examples of the influence of digitalization on the transport sphere, as well as the trends and the nature of such influence.

3. Research Questions

The transportation industry is one of the areas of economic activity that is most affected by digitalization processes. Such influence can be divided into obvious, superficial changes in this area and those that occur in the transport infrastructure itself. At the moment, there are four key areas related to the digitalization of the transportation sector: 1) digitalization of transport infrastructure and supply chains (including warehousing and service centers); 2) robotization of production processes; 3) large-scale automation, including management processes; 4) introduction of automatic pilot systems.

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4. Purpose of the Study

The purpose of the study is to identify the best examples of the influence of digitalization on the transport sphere, the trends and nature of such influence, summarize existing views and analyze the existing experience of digitalization of transport, the consequences of this process.

5. Research Methods

The methodological basis of the study included the scientific ideas about digitalization as an economic and legal phenomenon expressed by such researchers as S.N. Dmitriev, M.Yu. Zelenkov, N.P. Ivanova, O.A. Kopylov as a conceptual basis for understanding the economic and legal foundations of the transportation sector. The concept of digitalization is quite broad, and, without going into a discussion about all the manifestations of this process, we based our assumptions on the fact that regarding the transportation sector digitalization is a large-scale penetration of digital technologies at managerial, legal and technological levels. A distinctive feature of digitalization in the transportation sector is that it is unbalanced in each of its directions, despite the fact that the potential need for digitalization is large. It is the active use of digital technologies that seems to be the most promising to increase the economic efficiency of this sphere.

6. Findings

The digitalization of the transportation industry led to the fact that the traditional transport security system faced new problems. First of all, this is due to the advent of management systems based on information and computer technologies, which often conflict with the standard methods of transport safety services (Ivanova, 2020).

The risk-oriented approach brought up the problems of forecasting and risk assessment, as well as the problems of introducing risk management into transport safety systems.

Classifying safety systems into reactive, proactive and predictive, it should be noted that the traditional transport safety system, which is currently the domineering one, belongs to reactive. It is aimed at minimizing the consequences of transport incidents and eliminating the causes of hazards and threats to transport activities. A proactive safety system, as a preventive one, is based on the analytical and information block as the basis of risk management and reactive actions to neutralize real threats. The efficiency of the system is improved by taking into account actual risks and the absence of excessive insurance. The essence of the predictive safety system is based on continuous and integrated monitoring, including the accounting of incidents, prerequisites for traffic accidents. The effectiveness of the safety system is determined by early detection of deviations in data, forecast of incidents, reduction of risks, and proactive response, including reactive actions, in the predictive safety system (Dmitriev, 2019).

The use of artificial intelligence is based on large databases, which enter the information processing centers, and as a result of analysis and predictive modeling, the results are transferred to the following subsystems:

- response to incidents (reactive actions);

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- proactive response to potential incidents disrupting transport safety (proactive actions);
- update of the map of hazards of the transport operational situation in real time using intelligent means of observation, operational communication and information exchange for interdepartmental interaction and integrated response.

The predictive transport safety management system is a new step in the use of databases. The main task of predictive analytics is to determine the probability of incidents and dangerous situations at a certain time and place, prevent negative consequences and minimize them by proactive response of security forces in the right place at the right time. Deep analysis of the database allows identifying complex and hidden relationships and obtaining new, current data, which makes it possible to increase the speed of response to incidents in the field of transport safety and reduce their number (Departmental Target Program..., 2019).

Today, cooperation is needed at all levels: federal, regional, municipal, thus fostering the promotion of intelligent transport infrastructure in the Russian Federation. An intelligent traffic system is a system that controls traffic flow through innovative technological developments and offers road users a high level of safety and awareness of the road situation. The number of connected devices in Russia in the ITS sector from 2010 to 2020 increased 10 times.

There are about one and a half million kilometers of roads in the Russian Federation. Of these, only 4% have the status of federal roads, about 34% have the status of regional and inter-municipal roads, the largest number of roads – 62% – have the status of municipal roads. According to the Roadmap, even when all federal roads are brought into regulatory condition, there will still be a critical number of unsafe regional and municipal ones. That is why it is necessary to develop a smart algorithm for choosing the best option for digital technologies at the regional level, to improve the quality of financial resources management in the road industry (Zelenkov, 2019).

Long-term development aimed at fulfilling the indicators of the Transport Strategy is impossible without the transition to digitalization. For this purpose, a unified digital platform of the transportation industry (UDPTI) is being developed.

Both the state and business will be consumers of UDPTI services. Within the framework of the UDPTI, some areas are only being developed, for others there are already concrete results. Perhaps today, the most important contribution to the digitalization of the transportation industry was made by the successfully operating ERA-GLONASS system.

2020 is a jubilee year for ERA-GLONASS system and GLONASS JSC: the system was put into industrial operation 5 years ago, in January 2015. Then, on behalf of the President of the Russian Federation, GLONASS JSC – the ERA-GLONASS system operator – was created. Over 2015-2020, the number of calls processed by the ERA-GLONASS exceeded 5 million (5,152,604), 63,756 calls required an emergency response. At the same time, 40,645 calls were made automatically, as a result of an accident with severe damage to a vehicle.

Today, ERA-GLONASS is a symbiosis of social functions of the state and advanced information technologies. It has become not only a tool that helps preserve the life and health of road users, but also the basis for building intelligent transport systems that ensure transport safety (Ivanova, 2020).

Since August 2017, the number of automatic calls exceeds the number of calls made by pressing the SOS button. It is important that it is the automatic activation of the call of emergency services when victims

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of an accident cannot determine their location or are in a state of shock that saves their lives. It is the system that gives emergency services the exact coordinates of the accident. But there are also messages when a driver or a passenger felt off in a car and asked to call an ambulance. There are also calls for technical reasons – the engine suddenly stalled, and it is not possible to start it, or a car is hopelessly stuck during the spring thaws in an unfamiliar area, when its location is not clear (Zaslonov & Golovina, 2021).

Indeed, the capabilities and potential of ERA-GLONASS are not limited to responding to emergency situations on the roads. Travels of motorists should be not only safe, but also comfortable. The ERA-GLONASS provides various information services that allow strengthening control over road safety and making the journey more comfortable. The ERA-GLONASS is in fact the environment that produces new products and services (Kopylov et al., 2019).

The implementation of a risk-oriented approach, proactive work to prevent negative scenarios instead of combating their consequences will certainly lead to a decrease in the likelihood of terrorist attacks in transport (Zaslonov & Golovina, 2021). The ability of the system to process large amounts of information allows monitoring almost the entire car fleet of the country. So, digital technologies in transport are not only modern, convenient, but also cost-effective with their maintenance and proper use.

Digitalization is gaining rapid momentum in the development of not only the economic sphere, but also the transport infrastructure, which is dictated by a number of regulatory acts of the Russian legislation. With significant investment potential, digitalization and innovative technologies in transport infrastructure serve as a source of additional revenue for commercial organizations specializing in the development and implementation of intelligent automated transport management systems.

However, at present, the lack of standards in the area under consideration and economic profitability are constraining factors in the process of digitalization of transport.

Considering the issue of economic profitability of digitalization of transport, it is necessary to pay attention to the task declared in the Order of the Government of the Russian Federation No. 1797-r “On approval of the Strategy for the Development of Services Exports until 2025” dated 14.08.2019 to ensure the growth of transport services based on the need to increase the competitiveness of Russian transport operators, as well as on ensuring their access to foreign markets (Order of the Government of the Russian Federation No. 1797-r, 2019).

The implementation of this task is carried out through the development of digitalization of the entire algorithm for document management between regulatory authorities, transport companies and FEA participants.

The Russian transport service market is quite popular on the international market. At the same time, in the conditions of digitalization, its value is leveled by the fact that Russia lags behind foreign countries in transport infrastructure. The amount of funding within the departmental target program of the Russian RF Ministry of Transportation “Digital Platform of the Transportation Industry of the Russian Federation” is about ten billion rubles.

In determining the economic profitability of digitalization of transport, it is proposed to use the following criteria for the economic efficiency of digital control systems:

- economic costs of a digital control system represent the total costs associated with its development, implementation and operation;

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- direct (real) economic effect is the savings in management activities achieved as a result of optimization of management based on the digitalization of the transport and logistics system;
- indirect economic effect is the savings in the field of logistics itself obtained as a result of digitalization of the management of the logistics system. It is expressed by the "cost of increasing the potential profit, savings in expenses, and savings due to staff reduction" (Dmitriev, 2019, p. 53). These criteria for assessing the efficiency of digitalization of transport should be applied in conjunction with the assessment of its operational, technical effectiveness. Such a comprehensive assessment will make it possible to fully assess the economic profitability of digitalization in the field of transport infrastructure.

It is necessary to pay attention to the impact of digital solutions on business processes and models, on changes in consumer behavior, availability of technologies and economic effect. Expectations from the digitalization of transport are quite positive and promising.

There is now a need for clear legal rules that delineate the identification of proprietary rights that govern the ownership, use and access of digital data that are used to improve transport efficiency, reliability and security.

It should be noted that search and map services, where one of the leaders is the American Google, occupy the leading positions in travel planning around the world. GTFS makes information on the state of transport anywhere in the world available in an expeditious manner, thus providing integration with familiar services (such as Google Maps) and the possibility to develop new specialized applications (Zaslonov & Golovina, 2021).

The Russian Ministry of Transport initiated the creation of the Digital Transport and Logistics Association, which included Russian Railways, RT-Invest Transport Systems, Avtodor, Aeroflot, Glosav, ZashchitaInfoTrans, Digital Radiotechnical Systems, one of activities of which is the assistance in the preparation of offers and in the implementation of projects on the improvement of standard legal and legal-technical regulation for the benefit of acceleration and increase in efficiency of digital transformation in transport and logistics. Accordingly, within the framework of this direction, the development of standards for the digitalization of transport will be carried out.

Summarizing the above, it should be noted that digitalization updates the issues related to the development of standards in the field of transport infrastructure, regulating the use of various innovative devices in order to increase the efficiency of digitalization of transport. Special attention is also paid to the economic profitability of this process in the Russian Federation, since the achievement of the declared goal of digitalization of various spheres of life of society, including transport, involves certain budget costs, however, the funds within the framework of the digitalization of transport are accumulated from the budget of structures included in the Digital Transport and Logistics Association.

It is important to note that digital services in the new economy serve as the elements of digital transformation. The introduction of digitalization on Russian roads is underway, there are certain results, but this process is chaotic and unsystematic. Therefore, the logical step was the unification of representatives of business, science, education, federal and regional executive and legislative authorities – everyone who seeks to develop modern information technologies in the transportation industry. The dialogue included the Ministry of Transport, Rosavtodor, the State Duma, Avtodor Group of Companies,

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network companies, and the representatives of the regions. As a result, several priority areas of work were identified. Avtodor Group is already successfully implementing digital technologies to improve the quality of passenger and freight traffic on federal roads.

The unified digital space of the transportation industry as a set of integrated systems that include platforms for planning transport using various modes of transport and infrastructure is a huge step into the future.

A unified system will be based on three levels – city, region and country. It is assumed that the region uses data obtained from cities, and the country uses data from regions. The three-tier model will allow shifting from the concept of smart cities to the concept of a smart country. This model will also help to see a reliable picture of infrastructure development, there will be no more stories about unnecessary infrastructure in some cities, and that on the contrary it is absent in others. All options for the development of transport infrastructure can be calculated in a unified digital space: this will increase transparency and consistency, allow comparing the planned and actual effects of each individual project.

7. Conclusion

One of the main changes in the legislation should be a total transition to paperless document circulation in all modes of transport through the creation of legal conditions for the issuance of trip tickets, consignment notes, payment summaries and work orders in the electronic format.

Russian legislation should provide for legal regulation of the procedure for issuing electronic transportation documents. It is assumed that such documents should be executed using information systems that meet the requirements established by the Government of the Russian Federation. Moreover, the functional characteristics of electronic computing equipment and software of such information systems should ensure their software and technical compatibility and interaction with the state information system of data from electronic transportation documents.

Since part of the information contained in transportation documents is required for control (supervisory) measures within the framework of various types of state control (supervision), the state information system of data from electronic transportation documents should become a single information platform for control and supervisory authorities, providing them with access to these data. It is also necessary to empower the Russian Ministry of Transport to form and maintain a register of operators of information systems of electronic transportation documents to reflect information about the operator of the information system.

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