

Artículo de investigación

Digitalization of the transport and logistics market: integration of information systems. Russian experience in introducing digital technologies in the organization of logistics processes

Дигитализация рынка транспорта и логистики: интеграция информационных систем. Российский опыт внедрения цифровых технологий в организации логистических процессов

Digitalización del mercado del transporte y la logística: integración de sistemas de información. Experiencia rusa en la introducción de tecnologías digitales en la organización de procesos logísticos

Recibido: 08 de julio del 2019 Aceptado: 15 de agosto del 2019

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Abstract

The paper summarizes the experience of using information systems in transport and logistics companies in Russia, their typologization and functionality. The definition of "smart logistics" is formulated; it contains a description of the essence of the term characterizing its specific features and effects that are achieved as a result of processes of the same name. Based on the study of the trans-logistics platforms functional structure and the "single window" evolutionary development levels, the industry and departmental participants of the logistics market, which information systems can potentially be integrated into a single information space, are identified. The relevance of the information systems integration for providing synchromodal transportation is underlined. Expert opinions on practices in the digitalization of transport and logistics processes in Russia are highlighted and summarized. Opinions on the uneven development of digitalization in the constituent entities of the Russian Federation, and also on the conditions and trends in digital logistics development are highlighted.

Key Words: Digital logistics, digitalization of transport, corporate information processes, logistics companies, trans-logistics platform.

Аннотация

В статье обобщен опыт использования информационных систем в транспортных и логистических компаниях России, их типологизация и функциональность. Сформулировано определение «умная логистика»; он содержит описание сущности термина, характеризующего его специфические особенности и эффекты, которые достигаются в результате одноименных процессов. На основе изучения функциональной структуры транс-логистических платформ и уровней эволюционного развития «единого окна» определены отраслевые и ведомственные участники рынка логистики, информационные системы которых потенциально могут быть интегрированы в единое информационное пространство. Подчеркивается актуальность интеграции информационных систем для обеспечения синхромодальных перевозок. Экспертные заключения о практике оцифровки транспортных и логистических процессов в России выделены и обобщены. Выделяются мнения о неравномерном развитии цифровизации в субъектах Российской Федерации, а также об условиях и тенденциях развития цифровой логистики.

Ключевые слова: цифровая логистика, цифровизация транспорта, корпоративные информационные процессы, логистические компании, транс-логистическая платформа.

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Resumen

El documento resume la experiencia del uso de sistemas de información en empresas de transporte y logística en Rusia, su tipología y funcionalidad. Se formula la definición de "logística inteligente"; contiene una descripción de la esencia del término que caracteriza sus características y efectos específicos que se logran como resultado de procesos del mismo nombre. Con base en el estudio de la estructura funcional de las plataformas trans-logísticas y los niveles de desarrollo evolutivo de "ventana única", se identifican la industria y los participantes departamentales del mercado logístico, cuyos sistemas de información se pueden integrar potencialmente en un solo espacio de información. Se subraya la relevancia de la integración de los sistemas de información para proporcionar transporte sincromodal. Se destacan y resumen las opiniones de expertos sobre prácticas en la digitalización de los procesos de transporte y logística en Rusia. Se destacan las opiniones sobre el desarrollo desigual de la digitalización en las entidades constitutivas de la Federación de Rusia, y también sobre las condiciones y tendencias en el desarrollo de la logística digital.

Palabras clave: Logística digital, digitalización del transporte, procesos de información corporativa, empresas de logística, plataforma translogística.

Introduction

Currently, active automatization and digitalization of the economy take place in the world; as a result, traditional business models are being transformed. The variety of concepts, such as the Internet of Things or Industry 4.0, as well as approaches to their definition, lead to errors in the introduction of new technologies by enterprises and the launch of government digital programs and initiatives. Besides, many scientific and analytical studies focus on the description of the architecture, design, and practical applications of digital technologies, losing sight of the perception of these technologies by consumers and the need to create certain institutional conditions for digital transformation. Despite the rapid deployment and improvement of information and communication technologies supported by the governments of the countries, and also the scientific and business community, in Russia the digitalization of transport and logistics is fragmented, and the level of investment in this area remains low. The development of "smart logistics" in the future can significantly optimize many business processes since information resources are the key to the successful functioning of individual enterprises and the economy as a whole.

The originality of the research results presented in this paper consists in summarizing and systematizing the main trends in the development of smart logistics, as well as the Russian experience of introducing digital technologies in the organization of logistics processes. The high interest of potential domestic and foreign investors, researchers and practitioners to the transformation of processes in this industry, as well as a wide range of government programs

and development programs of large companies in the field of transportation suggest that the results of the study can be used in the work of regional government bodies, as well as participants in the transportation process (port authorities, transport companies, logistics providers) as a justification for the projects on digitalization of business processes.

The work aims to clarify the definition of transport logistics digitalization and to summarize the practice of digitalization of the transport and logistics market in the Russian Federation based on industry and expert data.

Scope of Theoretical Research

Scientists have addressed to the study of the nature and concepts of the digital economy starting with N. Negroponte, American informatics scientist and founder of the media laboratory at the Massachusetts Institute of Technology. It is believed that Don Tapscott was the first to use the term "digital economy" (Negroponte, 1995). In the 2000s, the development of the digital economy concepts was continued by such scientists as E. Briernolfsson, B. Kakhin, B. Johansson, C. Karlsson, and R. Stowe. Kling and Lamb distinguish four broad categories, such as digital products and services, mixed digital products and services, services and the production of IT-dependent goods, and the IT industry (Kling & Lamb, 1999). Proponents of the technocentric approach primarily focused on what changes information and communication technologies can bring to already established industries, while American economist Sushil K. Sharma moved one step higher, defining the digital economy as

a "convergence of communications, computer technologies and information" (Kehal & Singh, 2005). Unlike the above-mentioned researchers, Mark Skilton, an English economist and author of several books on the development of digital technologies and their introduction by the business community, considers the digital economy not as part of an industrial economy, but as an element of the new ecosystem (Skilton, 2016). Some Russian scientists are investigating the profound changes in the transformation of economic relations with the introduction of digital technologies. (Yudina, 2017; Lapidus, 2017; Kulkov, 2017; Kupchishina, 2018). Issues of digitalization are discussed in professional communities and are reflected in scientific conferences and government programs. In particular, they include the UN Conference on Trade and Development (UNCTAD) and the Program for the Development of the Digital Economy in the Russian Federation (The program for the development of the digital economy in the Russian Federation until 2035, 2017).

Research Tools and Methods

In the course of the study, the following methods were used: content analysis, systematization, grouping in chronological, logical, and thematic order for processing bibliographic sources in the field of determining the digitalization of transport logistics. At this stage, the authors selected papers published in scientific journals or placed in international databases for 1990 - 2018, proceeding from the keywords indicated in the paper. This made it possible to form a chronology of definitions and concepts of the digital economy, the Internet of things, to classify and apply digital technologies for companies. The analysis of the literature allowed us to assess the current state of research regarding the digitalization of business and formulate an industry-specific definition of smart logistics. To study the Russian experience of introducing digital technologies into the organization of transport and logistics processes, we used separate elements of the theory of innovation adoption at the organization level: Technology Acceptance Model by F. Davis, 1986, an extended version of this model from his followers in TAM2, tools and methods of the unified theory of acceptance and use of technology (UTAUT), the theory TOE of introducing information and communication technologies in business processes (Technology-Organization-Environment framework) by Thornacki and Fleischer from 1990 (Lai, 2017; Oliveira & Martins, 2011).

Results of the study

Integration of information systems and smart logistics

Accounting for interconnected, differentiated in space and time management decisions determine the relevance of the development of integrated and spatial logistics, based on a systems approach to the organization of transport and logistics operations and the widespread use of digital technologies. The study of the experience of using corporate information processes in logistics companies has shown that logistics companies in Russia occupy a large share in the market of ERP systems. The cost of ERP-systems varies considerably depending on their capabilities, recruitment and wide range of functions performed. The modularity of ERP-systems allows us to develop software solutions based on the specifics of the economic and financial activities of the enterprise. Small and medium businesses often use only individual modules, such as CRM and SCM systems. Transport and logistics companies are actively using the following IS:

- Warehousing Management Systems (WMS) provide automated control over all operations carried out during storage (acceptance, shipment, sorting, packing and warehousing of goods, estimation of area occupancy and inventory status in real-time);
- Transportation Management Systems (TMS) are designed to develop an optimal transportation plan, taking into account the set parameters, calculating the cost of transportation, preparing the scheme of loading and unloading operations, monitoring cargo and delivery dates;
- Fleet Management Systems (FMS) are used to control their own vehicles involved in the carriage of goods;
- Order Management Systems (OMS) are designed to create an order based on the individual preferences of buyers, to assess the possibility of its implementation and, if necessary, to offer alternative options based on data on available products and planned receipts.

State structures (FCS, FTS, Russian Railways, etc.) create departmental information systems to simplify the process of control and supervisory activities. These systems allow us to transfer the

interaction at the B2G and G2B levels into digital form.

Currently, integration and synchronization of information systems, the creation of unified information platforms and the construction of "seamless" logistics systems are becoming widespread. National and regional systems combine individual corporate and departmental information systems of a country or several countries to achieve more effective interaction between various participants in the transportation process and control over the movement of cargoes. Such systems are also called trans-logistic platforms, that is, "a space of network cooperation between organizations for creating customer value for a client based on coordinated logistic interactions on supply chain management at the regional, national and international levels" (Dunaev & Kulakova, 2016). Relying on the above provisions, we made the following conclusions in the study. Although the terms "logistics systems", "trans-logistics platforms", "digital logistics" and "smart logistics" are widely used in the scientific literature and the media, their authors do not pay proper attention to the definitions. As a rule, the subject matter in these cases is the content and structure of the processes taking place. Within the framework of our study, we formulated the following definition. *Smart logistics is a logistics based on corporate and departmental information systems*

integrated through a centralized national platform, thereby achieving optimization of transport and logistics processes and ensuring transparency of operations throughout the supply chain. This definition contains a description of the essence of the term, describing its specific features and effects that are achieved as a result of processes of the same name. Smart logistics reflects the degree of penetration of information systems into the organization of business processes of transport and logistics companies.

Smart logistics is a continuation of information logistics which studies and solves intra-organizational problems, but unlike the latter, it focuses on the convergence of logistics and technology, external interactions and integration through the formation of a single information space, which directly depends on the level of digitalization of the economy.

Based on the study of the trans-logistic platform functional structure and levels of the "single window" evolutionary development, sectoral and departmental participants of the logistic process which information systems can potentially be integrated into a single information space (Fig.1) are identified. The relevance of the integration of information systems for providing synchromodal transportation is underlined.

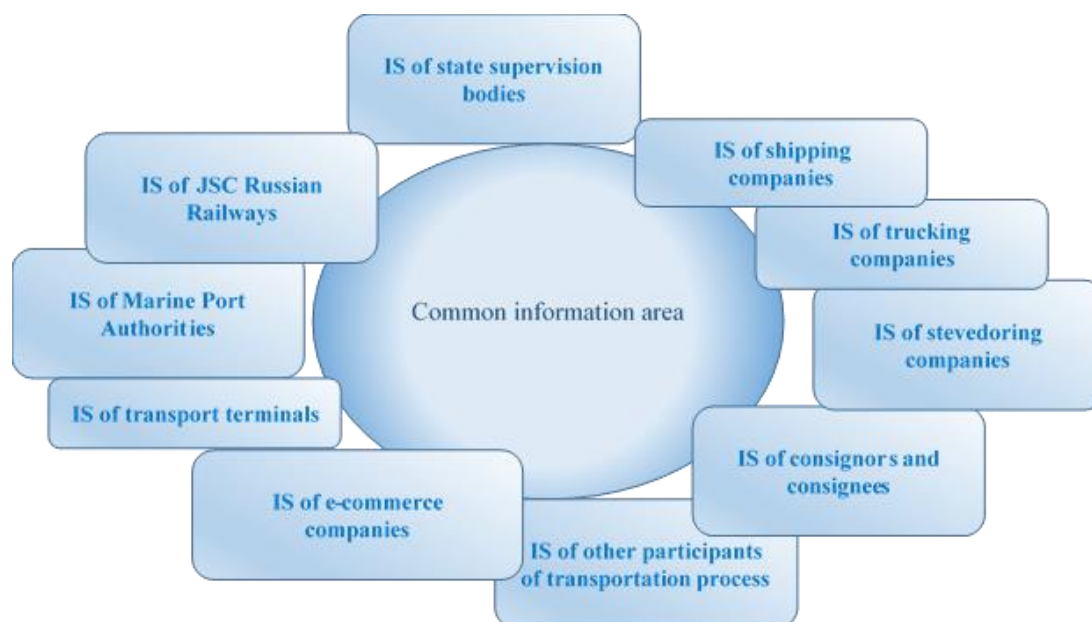


Figure 1 - Participants in the integration of information systems (ISs) in the market of transport and logistics companies in the Russian Federation. *Source: Compiled by the authors*

Forming such a space will allow conducting transactions that were previously impossible due to informational asymmetry, that is, situations where the parties simply are not aware of each other's existence, or one party has insufficient data, which reduces the level of trust and the likelihood of a transaction. Overcoming such barriers leads to entry into new markets and the expansion of existing ones, thereby increasing the efficiency of the economy and individual industries, and the degree of integration. Moreover, transport and logistics companies operating with a focus on the development of digital logistics have a competitive advantage, as they can best meet the needs of a shipper for which such factors as shipping costs, security, transit time, meeting deadlines, frequency of shipments, etc. are important. Digital logistics makes possible the so-called "synchromodal" transportation, that is, the movement of goods from point A to point B, where in any segment we can choose another type of transport based on real-time information.

Russian practice in the field of transport and logistics process digitalization

One of the important vectors of Russia's socio-economic development in the medium and long term is digitalization, which is indicated in the Strategy for the Development of the Information Society in the Russian Federation for 2017-2030 and the Digital Economy Development Program

until 2035. The program defines the main goals, objectives, implementation dates and sources for financing of state measures to create the institutional and infrastructural conditions necessary for the development and operation of DE, including regulations, personnel and education, the formation of research competencies and technical reserves, information infrastructure and information security (The program for the development of the digital economy in the Russian Federation until 2035, 2017). Currently, the government is considering the issue of entering the Digital Transport and Logistics direction into the Program, an application submitted by major industry players like OJSC Russian Railways, operator of the Platon system RT-Invest Transport Systems, and FSUE ZashchitaInfoTrans.

In 2018, Russia ranked 75th in terms of logistics efficiency (LPI) having gained 2.76 points, while at the leading countries (Germany, Sweden, Belgium, Austria, Japan, the Netherlands and Singapore), this figure exceeds 4 points. At the same time, the work of the customs (2.42), cargo tracking (2.64) and the status of international transport (2.65) are the lowest estimated (Figure 2). Freight forwarders also highlight the lack of logistics technologies, poor infrastructure, inefficient work of customs structures and imbalance of cargo traffic (Belozertseva & Yaraikina, 2013; Jinadu et al., 2017).

| | Points max 4.2 |
|---|-------------------|
| The level of logistics efficiency in Russia, (75th place out of 160 countries participating in the study of The World Bank) | 2.76 |
| - Work of customs authorities | 2.42 |
| - Cargo tracking | 2.64 |
| - State of international traffic | 2.65 |

Fig.2 - The level of logistics efficiency in Russia (LPI) in 2018
 Source: Prepared by the authors according to (Belozertseva & Yaraikina, 2013).

The unevenness of digitalization in the constituent entities of the Russian Federation is associated with such factors as the lack of qualified specialists (in IT and high-tech industries) and financing, the lack or low degree of development of the necessary information and communication infrastructure (Internet, mobile Internet). Besides, in many regions, the process of forming a regulatory environment that stimulates the spread of digital technologies is just beginning.

V.P. Kupriyanovsky believes that the development of digital logistics and supply chains is a priority for the Russian economy (Kupriyanovskiy et al., 2017; Kupriyanovskiy & Sokolov, 2017). He calls it "intellectual glue", that is, a channel through which not fully understood concepts, concepts and ideas of the new way of the economy are distributed. The Strategy of the Scientific and Technological Development of the Russian Federation states that "superiority in research and development, a

high rate of development of new knowledge and the creation of innovative products are key factors determining the competitiveness of national economies and the effectiveness of a national security strategy”, which is promoted by the “connectedness of the territories of the Russian Federation through the creation of intelligent transport systems, as well as the occupation and retention of leadership positions in the creation of international transport systems ” (On the Strategy of the Scientific and Technological Development of the Russian Federation, 2016).

However, at present, Russia lags far behind European countries in terms of digitalization in

many key sectors, especially in the field of transport and storage, which, as shown above, have a significant impact on the evolution of other sectors of the economy (Fig. 3). The experience of foreign countries shows that it is extremely difficult to eliminate the inter-branch gap, since digital leaders have significant advantages due to which they are increasingly accelerating the pace of their development, being more attractive to investors and qualified professionals. That is why active measures are already needed to create favourable conditions for the formation and improvement of digital transport and logistics.

| The level of digitalization of individual areas | Level of development | Russia | Europe | GDP share |
|---|----------------------|--------|--------|-----------|
| low ----- | | | | |
| high ----- | | | | |
| Information and communication technologies | -23 | | | 9 |
| Transportation and warehousing | -56 | | | five |

Figure 3 - The difference in the level of digitalization of individual areas between Russia and Europe, percentage points. *Source: Compiled by the author according to (Aptekman et al., 2017).*

The relative weight of the Russian market of transport and logistics services is small: according to expert estimates, in 2018 its total volume amounted to about 3.5 trillion roubles (global market volume is 5.2 trillion US dollars) while showing an increase of 6.6% (Fig. 4). It is

predicted that due to the risks of expanding anti-Russian sanctions, which will affect the leading companies in the industry and banks in the country, in 2019 it will grow by no more than 3.3% (The market for logistics outsourcing: the results of 2018 and the forecast until 2022, 2018).

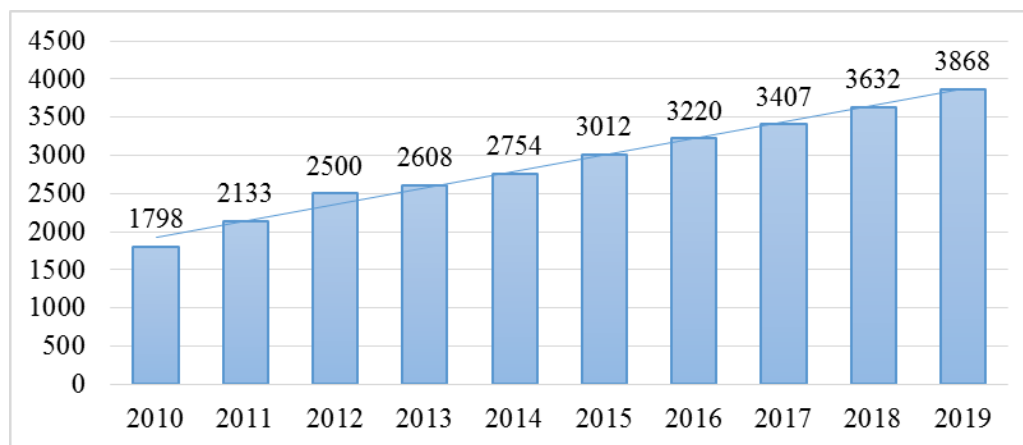


Figure 4 - Volume of the Russian transport and logistics services market, billion roubles. *Source: (Andreeva & Zenkin, 2019).*

This is due to the low share of logistics outsourcing, which is about 39% of the total volume of transport and logistics services in Russia (in other countries this value ranges from 49% to 81%) since most companies create subsidiaries or internal divisions responsible for transportation and logistics. 2PL services (freight, forwarding, and direct warehouse rental) prevail, while 3PL services (8% of the market) and 4PL services are underdeveloped. However, the gradual transition of customers from basic services to developing complex relations with freight forwarding companies leads to the development of 3PL market: in 2017, it grew by 11.8%, and in 2018, by about 5% (The market of transport logistics in 2018). The above-highlighted arguments make it possible to conclude that the Russian market of transport and logistics services has tremendous growth potential. One of the most important areas for improving it is the digitalization of the industry, which can improve the quality of services provided and the level of transparency, and thereby solve the problem of customer mistrust towards the existing proposal that will allow the development of complex (contract, 3PL) and integrated logistics (4PL). Increasing competition in the international arena determines the relevance of the "digital" reforms in this area since otherwise, it will lead to the loss of significant potential and existing market share.

An important trend in the development of smart logistics in the Russian Federation is the transition from individual solutions to platform solutions: the achievement of this goal is facilitated by the creation of the Digital Transport and Logistics Association (CTL) which co-founders are Russian Railways, Avtodor SC, PJSC Aeroflot - Russian Airlines, LLC RT-Invest Transport Systems, ZashchitaInfoTrans, Glosav and Business Lines. According to V.N.Parakhin, "the main objectives of the Association will be to provide the Ministry of Transport with complete and accurate information about the needs of market players in digital services, the formation of proposals and draft standards for the safe use of digital technologies in transport and the pooling of efforts by industry leaders to integrate the solutions they create in a unified transport complex digital platform (CPTK)" (A digital platform for transport will work in the Russian Federation, 2018). According to many experts, the catalyst for a huge number of digital transformations will be the digital railway (CZD), that is, a single information complex of interconnected data processing systems and traffic management automation systems, thanks

to which the railway network's capacity can be increased to 50% in optimal ways while reducing the cost of transportation is almost half. The International Electrotechnical Commission notes that railway transport is the most energy-efficient mode of transport and has the potential to further improve its energy efficiency, so it plays an important role in the development of passenger and freight traffic within the urban, long-distance, national and global environment (Kupriyanovskiy et al., 2019; Rezaei & Nemati, 2017). According to WEF estimates, even though 1/2 of the goods in the world are transported by sea, in some cases, for example, when transporting expensive container goods using digital tools, railway transport is economically more profitable (Sokolov et al., 2018). UK, USA, China and many other countries are actively implementing the ambitious project for the development of digital railways. In Russia, the driver for the integrated implementation of modern technologies in the transport industry is Russian Railways: on March 19, 2019, the Russian government approved a long-term development program that provides for the transition to "digital railways" to improve the quality of transport and logistics services provided by the company in the field of passenger and transport traffic.

The Federal Customs Service also considers digital technologies as an important and promising direction of development, the apogee of which will be the creation of digital customs. According to the Strategy for the Development of the Customs Service of the Russian Federation up to 2020 and the Comprehensive Program for the Development of the Federal Customs Service of Russia for the Period up to 2020, information and communication technologies are one of the tools for improving customs administration. The development of automated information systems of customs authorities united into a single centralized network, the creation of a modern departmental IT infrastructure, the introduction of service-oriented technologies for interaction with the participants of the transportation process, etc., are highlighted as their main areas (Development Strategy of the Customs Service of the Russian Federation up to 2020, 2012). Currently, there are 3 electronic customs houses and 7 electronic declaration centres within the FCS, the "Personal Account of a Foreign Economic Activity Participant" service is being actively developed (about 200 thousand users) for the interaction of shippers and consignees with customs authorities, almost 100% of declarations are submitted electronically, and data on exporters/importers are recorded in the

"Electronic file of the participant of foreign economic activity". In total, the FCS uses more than 80 specialized information systems integrated into the "Unified Automated Information System of the Customs Authorities" (UAIS).

Also, the "single window" mechanisms, the prototype of which is the Sea Port software package (KPS) designed for electronic documentation of vehicles and goods transported by water vessels across the border of the Customs Union, are being developed. In 2016, the ports of such cities as Novorossiysk, Vladivostok, Nakhodka, Kaliningrad, Ust-Luga, Feodosiya, Kerch and Yevpatoria successfully completed KPS pilot projects. By decree of the President of the Russian Federation, by 2021, the Russian export centre should develop a system with more advanced functionality and coverage, which will synchronize the work of all regulatory agencies. Within the framework of the Eurasian Economic Union, work is also underway to create a "single window": currently, the EAEU countries are defining a reference model for the implementation of this area (On the plan of measures for the implementation of the Basic Directions for the Development of the "Single Window" Mechanism within the System of Regulating Foreign Economic Activities, 2015).

Another instrument for regulating transport and logistics processes in the Russian Federation is the National System for Digital Marking and Traceability of Goods - "Honest Sign". Figures D.2 and D.3 show the product groups to be labelled, and the scheme of the system: a unique digital code (DataMatrix), put by the manufacturer, allows a user to track the movement of goods along the logistics chain from production to sale to a final consumer (until the code "goes from turnover" at the time of sale at the checkout). Moreover, it is planned to launch a mobile application that will allow a user to find out all the necessary information about the product by scanning its code. Through the use of the platform, consumers will be able to verify the authenticity and quality of products; business will obtain a possibility to increase its revenue and competitiveness, and to reduce costs through access to information on the movement of goods, and the state will receive a tool for public control and effective fight against counterfeit products, which will ensure a higher collection of tax and customs fees and budget savings for ensuring control over commodity markets (Dmitriev, 2019).

Private initiatives in the field of digitalization of Russian transport and logistics are mainly aimed

at automating internal processes and introducing electronic document management systems. One of the recognized leaders in the field of digitalization of business processes is the transportation and logistics company "Business Lines" which actively implements various corporate information systems, such as ERP, CRM, BPM, WMS and TMS systems. Moreover, it popularizes the concept of "physical Internet". "First Forwarding Company" (PEC) is another leader promoting smart solutions and using a wide range of EIS. PEK is the creator of the Easy Way e-commerce service that provides efficient logistics for online stores. An interesting example of the digitalization of logistics operations is the online retailer Lamoda, which has implemented almost complete automation of business processes through the introduction of a modern ERP system. Automation and synchronization of acceptance of goods, moving to the shipping, sorting, packaging, preparing for shipment and other processes ensures round-the-clock uninterrupted operation of the warehouse which serves more than 8 million goods.

Large projects are carried out by state-owned companies and by joint efforts of combinations of various companies. RT-Invest Transport Systems, the operator of the state charging system Platon, is responsible for the development and implementation of a system of electronic navigation seals which are devices that serve as electronic storage of cargo information due to the integration with the FCS and GLONASS database. They allow "sealing" the load at customs to further track its location and safety. RTITS is also carrying out a pilot project on the integration of equipment based on GLONASS and Beidou satellite navigation systems for the exchange of data between Russia and China on truck and bus routes.

Conclusion

This paper reviewed the scientific and expert opinions on the digitalization of the transport and logistics market. Firstly, the authors turned to the study of the terminological apparatus and the chronology of the "digital economy" concept. It is found that this is quite a "young" term. Its appearance originates in the 1990s [Negroponte, N], and it was discussed by American and English scientists in various fields from information technology to economics. The identification of this chronology formed the basis for studying the integration of information systems into transport and logistics processes, and for the proposal of the author's wording of the term "smart logistics". At the next stage, the

experience of using information systems in transport and logistics companies has been studied; the areas of their application and functionality have been identified. It provides automation and control in warehouse operations, transportation, fleet, and order management. The role of state structures that perform control and supervisory activities in ensuring the integration of transport and logistics processes is highlighted. The proposed term of smart logistics contains a description of the term essence, characterizing its specific features and effects that are achieved as a result of processes of the same name. Smart logistics reflects the degree of penetration of information systems into the organization of business processes in transport and logistics companies and characterizes the level of transport and logistics market digitalization. In this regard, the study highlights the participants of the information system integration in the market where transport and logistics companies operate at the level of the Russian Federation. The necessity to form such a space is grounded.

The study of a Russian practice in the field of transport and logistics process digitalization emphasizes the attention of government decisions to this kind of transformation and highlights some companies to which the Government of the Russian Federation trusts to implement such a large-scale macroeconomic process at the country level. At the same time, factors determining the uneven development of digitalization and, as a result, digital logistics in the territory of the Russian Federation are highlighted. Despite the identified lag in the digitalization of transport and logistics processes, Russia demonstrates steady growth rates in the volumes of the transport and logistics services market and is undergoing significant changes in the structure of the services provided in this market, which leads to the conclusion that the Russian transport and logistics services market has a huge growth potential. One of the most important areas of its improvement is the digitalization of the industry, which is able to improve the quality of the services provided and the level of transparency, and thus, to solve the problem of customer's mistrust of the current proposal, which will allow developing complex (contract, 3PL) and integrated logistics (4PL).

Highlighting the opinion of experts in terms of intra-sectoral development of digitalization, the study noted that the dominant role here belongs to large market participants, such as Russian Railways, Aeroflot - Russian airlines (the company specializing in passenger and freight

traffic), and a number of companies for land transportation of goods, and for seaports. It highlights the functionality of digital technologies in the logistics market:

- Data processing systems and automation systems in transportation management,
- Electronic declaration and customs administration systems,
- System of electronic registration of vehicles and goods transported by watercraft across the border of the Customs Union,
- System of digital marking and tracking of goods.

For private companies, these are digitalization systems for internal corporate processes and e-commerce services that provide objectively logistics for online retailers.

Thus, digital technologies have wide applications in the field of transport and logistics. Timely inclusion in the digital race is the key to the country's economic competitiveness in the global market. Transport and logistics systems are a connecting component of the development of the country's economy since they have a direct impact on the production and distribution of goods and services. It follows from this that digitalization of the transport and logistics complex is of paramount importance both for individual regions and for the entire economy.

As future research directions, we can designate a proposal for smart logistics level for regional and intra-company scale, adaptation of tools and methods of the unified theory of adoption and use of technology (UTAUT), the theory of introducing information and communication technologies in business TOE (Technology-Organization-Environment Framework) by Tornatsky and Fleisher 1990 for the purpose of studying processes of the same name in transport and logistics companies in the regions of the Russian Federation (Oliveira & Martins, 2011).

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