**INTRODUCTION**

In the last twenty years, Russia has significantly increased the production of agricultural products and has become one of the world’s leading grain exporters. Logistics remains the weak point of Russian agriculture, hindering its further development. Overhead costs in the supply of agricultural products in Russia often exceed 40%, while in Europe they amount to 12-14% (NOSOV, 2021).

High logistics costs and long supply chains lead to the fact that the margin of each of the resale links does not exceed 5%, but the trade margin “per circle” reaches 85% (VARTANOVA et al., 2018). Transportation of agricultural products is complicated due to its features, which include:

- seasonal harvesting, which causes strong fluctuations in demand for transportation of agricultural products;
- uneven ripening of crops and fluctuations in yield, which has a significant impact on the demand for transportation;
- low volume mass of many main types of agricultural products.

Modern trends in society and business, such as mobile devices, machine learning, etc., have significantly changed almost all aspects of supply chains in the world (PAGANO et al., 2020). This is due to the significant advantages that they provide for economic entities. Digital technologies make it possible to directly connect consumers of agricultural products and agricultural producers, thus eliminating a lot of unnecessary intermediaries, provide more complete traceability and control of cargo transportation, as well as:

- reduce costs and increase profits of shippers and transport companies (matantsevaet al., 2018; YUEWU et al., 2017, GOLDSBY et al., 2003, ANDREEVA et al., 2018);
- increase the speed of business processes (ANDREEVA et al., 2018);
- ensure efficient loading and eliminate idle runs of vehicles, which gives not only an economic effect, but also reduces emissions into the atmosphere (MATANTSEVA et al., 2018; LI et al., 2017).

Russia is not yet among the leading countries in the global innovation and technical and technological space, including in the field of transport and in the field of information and software (Korneeva, 2019). At the same time, the process of informatization of domestic transport enterprises and agricultural producers is quite intensive. In particular, JSC “Russian Railways” for many years on the basis of modern computer technology and communication systems have been forming and improving a centralized integrated digital control system for railway traffic, rolling stock and cargo transportation (DYAChenko et al., 2018).
The Ministry of Transport of the Russian Federation has been working in recent years to consolidate information transport systems and introduce modern information technologies. A number of state information systems have been created for the management of the transport complex, in particular, the Information and Analytical System for Regulating Transport, the Unified State Information System for Ensuring Transport Security, the State Automated Information System ERA-GLONASS, the System for Charging freight Vehicles PLATON. In 2018, the Ministry of Transport made a proposal to create a digital platform for the transport complex, the commercial operation of which is scheduled to begin in 2024.

Since 2021, The Ministry of Agriculture of Russia is implementing a departmental project "Digital Agriculture", one of the goals of which is to introduce platforms for objective monitoring and management of transport and logistics infrastructure in agriculture. The purpose of the study is to evaluate the intermediate results of the digitalization process of transport and logistics services in Russian agriculture by determining the indicators of the use of various digital technologies.

METHODOLOGY

For the study, Rosstat databases and data obtained during the analysis of the websites of transport and logistics companies and companies creating IT services in the field of transport logistics were used. Evaluation of the popularity of mobile applications for ordering or providing cargo transportation services was carried out using the GooglePlay service. The Yandex.Radar service was used as a tool to assess the popularity of transport companies' websites.

RESULTS OF THE STUDY

Cargo transportation in Russia is carried out mainly by road. According to Rosstat, in 2020, it accounted for 68% of the total volume of traffic (Fig. 1). In second place - rail transport (17%).

Figure 1. Dynamics of cargo transportation by mode of transport

Since 2016, the volume of cargo transportation by road has been continuously growing. In 2019, this indicator, according to Rosstat, reached 5735.3 million tons, which is 7.1% more than in 2015. One of the main drivers of the growth in the volume of road transport was the increase in exports of agricultural products. Companies with different structures and volumes of services provided operate in the agricultural products road transportation market. Some companies are transport and logistics operators. Other companies are part of agricultural holdings or are part of large retail companies. Third - logistics providers of the third or fourth level.
The volume of transportation by rail until 2019 had an upward trend, including the volume of transportation of agricultural products. Thus, according to Rosstat, in 2016 the volume of grain loading, the main type of agricultural products transported by rail, amounted to 43.2 million tons. By 2018, this indicator increased to 59.4 million tons. Since 2019, the trend has changed to negative. According to Rosstat, the decrease in traffic volume in 2019 was 1% compared to the previous year. The volume of grain loading fell to 48.3 million tons in 2020. The decline in traffic has accelerated due to the drop in demand for transportation caused by the coronavirus pandemic. The volume of grain loading, on the contrary, increased to 60.5 million tons due to a good harvest, which became the second largest in Russian history (133.5 million tons) and record exports. From July to December 2020, Russia exported 30.2 million tons of grain, which is the highest figure in history.

One of the main trends in the agricultural products transportation market is new digital technologies. The study showed that information products capable of simplifying the search for a counterparty for the transportation of agricultural products began to be created in the early 2000s. Initially, these were simple bulletin boards. Then digital services and mobile applications began to appear for ordering or providing cargo transportation services.

Digital services help automate many processes, including electronic document management, make it easier to solve everyday tasks of carriers, ensure full control of transport costs and reduce costs. The functions of dispatchers in such services are performed by algorithms. Digital services enable carriers to receive requests for transportation without investing in advertising, predict the arrival time and control the location of the vehicle, etc. Online platforms provide for the creation of an electronic queue at grain terminals and enterprises processing agricultural products (an online system for organizing queues for loading and unloading cargo). The use of an electronic queue has reduced the downtime of transport and the cost of paying for such delays.

The most notable digital services for transporting agricultural products are Smartseeds and Trucker. They have become a link between cargo owners who place requests for transportation and drivers. The cost of transportation is determined by the customer, and the algorithms of the service select the contractor. Among the users of these services are the largest exporters of agricultural products. Initially, the need for their services was seasonal, which is explained by the seasonality of grain transportation. But then the services began to work with other types of agricultural products.

The structure of the online services market and its leaders will be determined in the future, but it is already clear that these will be stable players with high-quality and versatile services. In addition to digital logistics services, mobile applications for ordering or providing cargo transportation services are being massively created in Russia (Table 1).

Table 1. Mobile applications for ordering or providing services for cargo transportation 2021.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of downloads, ths. times</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATI Cargo and Transport (AutoTransInfo)</td>
<td>1000+</td>
</tr>
<tr>
<td>DELOVIE LINII</td>
<td>500+</td>
</tr>
<tr>
<td>PEC</td>
<td>500+</td>
</tr>
<tr>
<td>OTBORTA</td>
<td>100+</td>
</tr>
<tr>
<td>Zakazchikam.VezetVsem</td>
<td>50+</td>
</tr>
<tr>
<td>Gdezeno</td>
<td>10+</td>
</tr>
<tr>
<td>Zemovoz.su</td>
<td>10+</td>
</tr>
<tr>
<td>Graincarriers</td>
<td>5+</td>
</tr>
<tr>
<td>Russian Railways-cargo 2.0</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Search data.

As can be seen from Table 1, the popularity of mobile applications, according to the Google Play service, is not so great. So far, mobile applications have not penetrated enough into the sphere of agricultural products transportation, but their influence cannot be neglected. There are both mobile applications of transport companies (DSEC - delivery service express courier, etc.) and aggregators (Smartseeds, etc.) on the market. As the study showed, despite the emergence of more modern services, bulletin boards remain in demand among...
users. The Yandex.Radar service was used to evaluate site traffic. Visitors were counted on all their browsers and devices using cross-device gluing.

The most popular bulletin boards in the category "Transport" at the time of the study were: transport portal “Alliance” (alliance-catalog.ru), dispatching Internet service "Perevozka24" (perevozka24.ru), online cargo transportation service “VezetVsem” (vezetvsem.ru), website StranaGruzov.ru. As can be seen from Fig. 2, trends in the attendance of bulletin boards have multidirectional dynamics. Site traffic StranaGruzov.ru it tends to decrease, the website vezetvsem.ru - to growth. Trends in site traffic perevozka24.ru and alliance-catalog.ru neutral.

**Figure 2. Dynamics of bulletin board traffic**

![Dynamics of bulletin board traffic](image)

Source: Search data.

Therefore, it’s concluded that despite the increase in traffic, the attractiveness of bulletin boards is not growing. In the future, we should expect a decrease in user interest in the services provided by bulletin boards. Despite the emergence of new digital solutions, currently transport companies are not using the capabilities of digital technologies enough. Thus, according to the PwC report “The Future of the Transport and Logistics Sector”, the share of logistics companies assessing their current level of digitalization as "advanced" did not exceed 28%.

In 2018, only 80.3% of organizations with the main activity of transportation and storage used broadband Internet access, while 86.0% in the business sector as a whole (ABDRAKHMANOVA et al., 2020). Indicators of the use of information technologies, according to Rosstat and National Research University Higher School of Economics, in the transport sector, as a whole, are lower than in the business sector (Table 2):

**Table 2. The use of information technology in 2018. (as a percentage of the total number of organizations)**

<table>
<thead>
<tr>
<th></th>
<th>Business sector</th>
<th>Organizations with the main type of activity as transportation and storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Cloud&quot; services</td>
<td>27,1</td>
<td>19,9</td>
</tr>
<tr>
<td>The use of software for financial calculations in electronic form</td>
<td>57,7</td>
<td>54,0</td>
</tr>
<tr>
<td>ERP systems, %</td>
<td>21,6</td>
<td>18,5</td>
</tr>
<tr>
<td>CRM systems, %</td>
<td>17,6</td>
<td>10,3</td>
</tr>
<tr>
<td>SCM systems, %</td>
<td>10,1</td>
<td>6,1</td>
</tr>
</tbody>
</table>

Source: Search data.
The development of digital services is constrained by a number of reasons. Among the main reasons is that not all companies are ready for the transparency of business that arises when using such services. In addition, in cargo transportation, much is determined by years of established connections and relationships. At the moment, there are a huge number of disconnected private companies providing various types of cargo transportation services. Each market participant forms its own private model, private databases, a private digital footprint of its business, to which other market participants do not have access. The document flow is partially carried out in paper form. Data, registers, etc. are presented in paper form or published on official websites in the form of poorly formalized files, which makes it difficult to use them for decision-making. Decision-making processes are not automated, the available data are not suitable for embedding in automatic procedures of transport and logistics activities.

Although digital services for the transportation of agricultural products have significant advantages for cargo owners and carriers, they do not allow full use of the possibilities of digital technologies. It is necessary to form a digital platform that unites all the links of the commodity distribution chain. Such a platform will simplify interaction between participants, automate logistics processes, reduce costs and carry out systematic deliveries and shipments of agricultural products. It is worth mentioning that an innovative project approved by the Ministry of Transport of the Russian Federation has been created in Russia for a certain period of time: “Digital Platform of the Transport Complex” (DPTC). Its functionality will ensure the integration of various types of digital services for participants in the transport and logistics services market in one information space. As a result, businesses will be able to reduce the time and financial costs of organizing transportation and document management, and state control authorities will receive a tool for effective traceability of cargo transportation. The list of digital services should be based on existing services provided by logistics companies from the TOP 12. These should include:

- freight forwarding services;
- warehouse services, cargo handling services, cross-docking;
- monitoring of the location and condition of goods;
- lending, transaction insurance and other financial services;
- automation of work with orders;
- sharing (sharing service) of vehicles and infrastructure;
- consulting of logistics processes.

As a result of the implementation of these measures, the availability and quality of transport and logistics services will be ensured at the level of the needs of the development of the country’s economy and a trust space will be created between all participants in the transport market. In addition to the DPTC, the Digital Agriculture program is being implemented in Russia, one of the goals of which is to introduce platforms for objective monitoring and management of transport and logistics infrastructure in agriculture.

The Digital Agriculture program integrates with the Transport and Logistics program in terms of the development of logistics for the supply and delivery of agricultural products, as well as the control of cargo parameters (temperature, humidity, delivery time, and others). Within the framework of these programs, the state will play a significant role in the creation of digital transport and logistics systems.

According to the plan, by 2024, 80% of the cargo of medium and large agricultural companies will be transported within the framework of the ECE (EAEU) with connection to the transport and logistics platform. The transition from separate digital services to a single platform can lead to a real redistribution of the market. In particular, intermediaries, freight forwarders, whose functions will be assumed by the algorithms of the platform, will be unnecessary. Empty runs and transport downtime will be reduced, as well as losses of agricultural products. As a result, there will be a reduction in transportation costs.
For small businesses, the online platform provides an opportunity to receive a service with the quality of services and cost for both medium and large businesses. Large and medium-sized businesses will be able to reduce the costs of integration and maintenance of their own TMS.

CONCLUSION

Digitalization of transport and logistics services in Russian agriculture is important to ensure its competitiveness. To date, agriculture and transport are not among the most innovative areas and do not sufficiently use the possibilities of digital technologies. Indicators of the use of information technologies in the transport sector and agriculture, in general, are lower than in the business sector.

However, some digital technologies have developed rapidly, in particular digital services that allow automating the business processes of carriers, and mobile applications for ordering or providing cargo transportation services. Bulletin board sites remain in demand, which have become one of the first digital services connecting participants in the transport services market. But, despite the increase in traffic, the attendance of bulletin boards is not growing. In the future, we should expect a decrease in user interest in bulletin boards.

The development of digital services is hindered by a number of reasons, including the fact that not all companies are ready for the transparency of business that arises when using such services. The processes of digitalization of transport and logistics services in Russian agriculture are supported by the state. With the participation of the Ministry of Transport of the Russian Federation, an innovative project is being implemented: “Digital platform of the transport complex”. The Ministry of Agriculture of the Russian Federation implements the departmental project “Digital Agriculture”. As a result of the implementation of these measures, costs will be reduced and the quality of transport and logistics services and the “transparency” of the industry will increase.

REFERENCES


Digitalization of transport and logistics services in Russian agriculture

Resumen
El objetivo del trabajo es evaluar los resultados intermedios del proceso de digitalización de los servicios de transporte y logística en la agricultura rusa. Se ha aplicado una metodología que utiliza datos de Rosstat, el servicio GooglePlay y el servicio Yandex.Radar como fuente de información. El estudio muestra que una de las principales tendencias en el mercado del transporte de carga es el uso de nuevas tecnologías, como los sistemas de gestión de transporte, almacén, servicios digitales que automatizan los procesos de negocio de los transportistas, las aplicaciones móviles para ordenar o proporcionar servicios de transporte de carga. Los procesos de digitalización de los servicios de transporte y logística en la agricultura rusa son apoyados por el estado. La implementación de los proyectos "Plataforma Digital del complejo de transporte" y "Agricultura Digital" garantizará la reducción de costos y mejorará la calidad de los servicios de transporte y logística. La creación de una plataforma digital unirá a todos los participantes del mercado en un solo espacio de información y aumentará la transparencia y trazabilidad del transporte de carga.

Resumen
O objetivo do trabalho é avaliar os resultados intermediários do processo de digitalização dos serviços de transporte e logística na agricultura russa. Foi aplicada uma metodologia que usa dados da Rosstat, do serviço GooglePlay e do serviço Yandex.Radar como fonte de informação. O estudo mostra que uma das principais tendências no mercado de transporte de cargas é a introdução de novas tecnologias, como sistemas de gestão de transportes e armazéns, serviços digitais que automatizam os processos de negócios das transportadoras, aplicativos móveis para encomenda ou prestação de serviços de transporte de carga. Os processos de digitalização dos serviços de transporte e logística na agricultura russa são apoiados pelo Estado. A implantação dos projetos “Plataforma Digital do complexo de transporte” e “Agricultura Digital” garantirá a redução de custos e melhorará a qualidade dos serviços de transporte e logística. A criação de uma plataforma digital unirá todos os participantes do mercado em um espaço de informação e aumentará a transparência e rastreabilidade do transporte de cargas.

