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**DEVELOPMENT OF TRANSPORT AND LOGISTICS
INFRASTRUCTURE IN AGRARIAN BUSINESS**

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Abstract

The paper deals with transport and logistics infrastructure in agrarian business. It provides a theoretical analysis of Russian and foreign scientists on the definitions of logistics activity, logistics infrastructure and one of its branch varieties – logistics activities of agricultural enterprises. Infrastructure as a branch of the national economy is highly costly and needs significant investments that have a long payback period. On the other hand, extensive infrastructure is an important contribution to investment attractiveness. The paper is concerned with the status and expected future development of the transport and logistics infrastructure of enterprises, including agrarian enterprises, which will provide insights into logistics and its adaptation to current economic transformations. Due to the fact that agrarian logistics infrastructure is of great importance to ensure effective economy, its development should rest on geographical, socio-economic, infrastructural, political and regulatory conditions. Moreover, some characteristics of a particular region accommodating logistics infrastructure facilities and logistics service providers in this region should not be ignored. The paper concludes that Russia will not be able to reach sufficient economic rates unless it establishes an advanced and constantly updated transport and logistics infrastructure both within the country and abroad, which would facilitate the effective movement of national domestic goods and services to markets both inside and outside the country.

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1. Introduction

Today, much attention is paid to the issues of logistical support for agricultural enterprises, but there is still no systematic solution found. The issues cover all areas of logistics activities of agricultural enterprises – procurement logistics, marketing (distribution) logistics, transportation logistics, inventory logistics, storage and processing, manufacturing logistics, service, information, and financial logistics. A low level of logistics infrastructure in Russia, poor quality of management in agrarian business cause significant damage to the economy and society as a whole, hindering import substitution of agricultural products.

Material flows travel inside the agrarian business through various production and economic stages, ranging from supply and transportation, transforming at the production stage, ending with the sales and marketing of products. Russia is just prepared to develop logistics management, especially for agro-industrial enterprises.

2. Problem Statement

Theoretical and applied aspects of establishment and development of the logistics infrastructure of enterprises, including agricultural enterprises, were studied by the leading scholars (Altukhov, 2020; Christopher, 2004; Dybskaya et al., 2008; Grigoriev & Uvarov, 2014; Stock & Lambert, 2005; Waters, 2003), and others. A great contribution to the issues of distribution logistics, stocks of agricultural products is made by Minakov (2004). The development of agrarian business based on strategic interaction is considered by Ushachev and Serkov (2012). An analysis of literary sources on various aspects of logistics infrastructure suggests that most authors have studied it either at the enterprise level, or within the development of state transport infrastructure, in the context of regional development.

However, the development of logistics infrastructure at various levels of the economy from the perspective of “novel logistics” caused by globalization, internationalization and information technology remains unresolved, which proves the need for further research. The global information society that is now almost shaped indicates a special role of infrastructure in its development.

3. Research Questions

A growing role of logistics infrastructure through a prism of the quality of logistics services by logistics providers, co-created consumer value in supply chains and networks, competitive advantages in the interaction of companies in various industries, including agricultural enterprises and their enhanced intellectual capacity requires clarified definition and classification.

4. Purpose of the Study

The study aims to explore the status and expected future development of the transport and logistics infrastructure of organizations, including agrarian companies, which will provide insights into logistics and its adaptation to current economic transformations.

5. Research Methods

The paper relies on some general scientific methods of comparative, systemic, and statistical analysis in economics. A methodological toolkit involved the publications of Russian and foreign economists, agricultural practitioners, provisions and conclusions of scientists involved in the development of agrarian transport and logistics infrastructure.

6. Findings

Logistics infrastructure should be referred to as a set of general-purpose and/or in-process objects necessary to move or place people, raw materials, goods and information, etc. that, once combined, make it happen in the space-time dimension. The economic idea of the logistics infrastructure is that it is a system of economic relations between business entities and institutions that are designed to provide a market mechanism for uninterrupted travel of logistics flows in the space-time dimension. Three components of the logistics infrastructure can be distinguished including productive (availability and functioning of transport, warehouses, terminals, etc.), institutional (financial institutions, customs authorities and other organizations that are directly involved in maintaining commodity traffic) and social. Institutionally, the infrastructure is aimed at creating a single economic environment, which emphasizes its network hierarchical structure. The institutional logistics infrastructure is a system of federal (regional) impacts, as well as a set of institutions aimed at effective logistics systems at various levels, lower transaction costs and higher efficiency of logistics processes.

The components making up logistics infrastructure should be considered in different management levels: macro, meso and micro levels. Each of these levels corresponds to a certain composition of elements constituting infrastructure and requirements therefor, which also affects managerial decisions taken for strengthening the agrarian infrastructure (Table 1).

Table 1. Classification of logistics infrastructure by management levels

Management level	Type of logistics infrastructure	Definition
Macro level	Macrologistic Infrastructure	a network of facilities that create conditions necessary for streamlining various flows, enhancing company investment potential, and providing logistics services and performance of all sectors of the economy
Meso level	Logistics Infrastructure for Supply Chain	a network of facilities that ensure space-time travel of material flows within a specific supply chain with minimal costs
Micro level	Company Logistics Infrastructure	a network of warehouse, transport, handling, packaging, information and financial facilities of a company, which cross-functionally provide an effective 'door to door' and 'just in time' logistics service for material flows with optimal costs to meet consumer needs
	External Company Infrastructure	a group of nearby infrastructure facilities providing logistics services necessary for input and output material flows with minimal cost and appropriate level of service
	Internal Company Infrastructure	a subsystem of a company, which, in a certain combination of infrastructure elements, ensures the implementation of processes for servicing internal material flows and gives the maximum economic effect from the logistics activities performed by the company

Hence, infrastructure services are provided both in the internal and external environments of a company in the travel direction of material flows to each next participant. Therefore, all enterprises that are links in a particular chain must be coordinated and aligned to enable material flows to the final destination.

This is what conditions external logistics facilities as integrated centers of logistics services.

Infrastructure as a branch of the national economy is highly costly and requires significant investments that have a long payback period. On the other hand, extensive infrastructure is an important contribution to investment attractiveness. According to AASHTO estimates, the funding gap for infrastructure support and development reaches 70 % of the need (AASHTO, 2020).

Investments in logistics infrastructure not only increase the potential for advanced logistics services and innovation practices of providers in logistics services industry, but also enhance efficiency, quality of services and travel of commodities, which ultimately raises the competitiveness of the national economy. Attracting investments for construction, reconstruction or overhaul of transport terminals, roads and railways, creation of service and multimodal logistics hubs, rapid integration of modern information and communication technology increase the overall productivity and efficiency of the entire logistics system of the country.

Numerous studies by Russian and foreign authors provide the basic features defining the current state of infrastructure. In a majority of countries, infrastructural changes depend on the trends in economic sectors, decentralization and deregulation. Diminished direct state regulation is compensated by intensive indirect methods of regulation and expansion of public governing institutions. The freedom of infrastructure service markets, which is happening in many countries, leads to increased competition: the number of infrastructure service providers is growing, and consumer influence is increasing.

Well-developed transportation and communication infrastructures are a prerequisite ensuring the timely delivery of goods and services to end users, as well as the mobility of population.

The scientific literature has adopted the terms ‘digital economy’ and ‘digital logistics’, emphasizing that digital technology creates unique opportunities for managing supply chains/networks on-line avoiding any territorial, technical or legal barriers (Cronin, 2020; Dunaev & Nesterova, 2013). Digital technology is being actively implemented on all means of transport and transport terminals. Maritime transport is being equipped with electronic document management systems. In the field of road and rail transportation, digital transport and supportive documents are just being integrated, however, electronic document management to be designed for international transportation is getting greater attention from governments, businesses and international organizations.

The pyramid of the logistics services market proposed by the Boston Consulting Group rests on the idea of integrating the activities of logistics service providers with the customer’s business and the complexity of the logistics functions performed. Joint activities of economic agents to create added value in commodity traffic has produced a new generation of logistics operators that are classified as per the 1PL – 5PL scheme (Sandberg et al., 2011). Digital technology provides ample opportunities for the development of public administration, since it creates a high-tech digital platform for public administration, which minimizes the human factor, automates the collection of statistical, tax and other reporting, decision-making based on real-world estimates.

Subsequent upon current functions of logistics, special attention should be paid to conceptual foundations of intellectualized logistics activities, i.e. intellectualized logistics systems designed as a sophisticated framework for managing, coordinating and controlling tactical and strategic tasks solved by the logistics system at micro, meso and macro levels, its infrastructure, and during its interactions with the external environment. Such sophisticated systems should operate on-line in a single coordinate system and a shared information environment, thereby creating a methodological basis for optimizing logistics solutions and making better use of the existing transport infrastructure. The use of advanced smart transport systems and technologies should provide situational support for decision-making, automate the process of searching for managerial decisions based on accumulated knowledge, and ensure decision-making in conditions of uncertainty. The establishment of intellectualized logistics systems that are an integrated ‘people – logistics infrastructure – smart technology’ system, with the maximum use of the latest information and management technologies, will allow our country to successfully integrate into the global information environment and ensure high efficiency of logistics activities.

Thus, the status and expected future development of the logistics infrastructure show that it, being one of the most important components in the national logistics system, must ensure material, human, information, financial and service flows, requires significant financial resources and an integrated approach to planning and managing innovation-driven growth.

The best practices integrated in planning, implementation of projects and operation of infrastructure facilities improve the economic efficiency of investments and provide cost savings. In order to realize the identified savings potential, it is necessary to improve and update the infrastructure governing system. According to experts, decisions are often made as to whether it is rewarding to invest in projects that are not tailored to meet certain clearly defined needs or are not able to provide the benefits expected. Therefore, developing logistics infrastructure, it is advisable to respect the following principles: competitive selection of infrastructure projects, creation of a balanced system to develop all types of transport, support for international interaction and cross-sectoral cooperation, unity of legal support, innovation-driven growth and orientation towards scientific and technological progress, staffing for infrastructure facilities.

Following these principles is the key to successful infrastructure projects. For example, in selecting projects in public transport, the Singapore government has a clear criterion: 70% of passengers should be carried by public transport. In the UK, the following criteria are used: a project must contribute to combating climate change, mitigate CO₂ in the atmosphere and improve transport networks, promote competition, create a human-friendly environment, improve the long-term safety of citizens through sustainable means of transportation.

The idea of the need for rapid development of transport and logistics infrastructure cannot but be considered fruitful. With current trends, this law should better be called the law of advanced development of transport and logistics infrastructure. It is very important that its provisions are beginning to penetrate into the program and strategic documents adopted at the level of the Russian government. Thus, the draft Transport Strategy of Russia until 2035 states that “the transport industry should develop at a more advanced rate than other industries, including fuel and energy, agriculture, construction and machine-building.” The same idea is reflected in the draft Transport Strategy of the Russian Federation until 2030,

with a forecast for the period up to 2035, considered at a meeting of the Presidium of the State Council of the Russian Federation in October 2021 (CNTD, 2021).

The agrarian logistics infrastructure should be accelerated based on the following ideas: the material and technical base for storing products should be optimized; much attention is required to all types of stockpiles to ensure ongoing manufacturing; information and transport support for logistics and the state of the road sector is a priority area for increasing the efficiency of logistics services. Accelerating the implementation of the principles and methods of logistics management is becoming an objective necessity for agrarian businesses that seek to successfully compete not only in the national, but also in the international market of agricultural producers (Popova et al., 2018).

7. Conclusion

All in all, to set the tone for development, it is necessary to respond to a number of factors including geographical, socio-economic, infrastructural conditions, political and regulatory environment.

Since highly intensive infrastructure is of great importance for the effective economy, all of the listed factors should be brought in the development agenda, as well as some other factors that characterize a particular region where logistics infrastructure facilities are located and the activities of logistics service providers in this region. Optimal strategic and tactical decisions on the location of infrastructure network, warehousing, packaging, cargo processing, transportation, inventory management are closely interconnected, thus making the basis for integrations between logistics market entities in supply chains/networks, as well as synchronization of logistics and infrastructure systems. Russia will not be able to reach sufficient rates of economic growth if it does not create a modern and constantly updated transport and logistics infrastructure both within the country and abroad, contributing to the effective movement of national goods and services to markets both in the country and abroad.

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