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## Logistics Innovations and Their Impact on the Development of Transportation Infrastructure in Europe: Future Prospects

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**Abstract:** The article critically analysed the advancements in logistics and their profound influence on the expansion of transportation infrastructure in Europe. Its core objective was to evaluate the extent to which contemporary technological advancements and digital solutions contribute to the enhancement of efficiency, safety, and sustainability within transportation systems. The work focused on analysing the key innovations such as automated transport management, the integration of the Internet of Things (IoT) and the use of big data to determine how they contribute to infrastructure development and what challenges they pose. To achieve the article's goal, the research was based on an integrated approach that included the analysis of secondary data such as academic articles, reports from government and industry organisations, and case studies. A quantitative analysis was also used in order to assess the impact of innovations on key performance indicators of transport infrastructure. The main methods were the comparative analysis, modeling and scenario analysis, which allowed assessing potential future trends and risks. The investigation

was conducted by analyzing analytical reports from logistics companies, synthesising strategies for the development of transport infrastructure, and utilising contemporary scientific methodologies to establish logistics prowess. The use of scientific research methods in the article was determined in the context of the disclosure of key practices, trends and means of the functioning quality of the logistics networks improvement, chains supply and transport infrastructure, as a key source of economic development. The article analysed the theoretical concepts of innovations in logistics and the possibilities of their application in the modern business environment. Attention was paid to issues of applied strategic solutions based on the practice of developed countries, regarding the introduction of innovations in the provision of transport infrastructure and the possibility of its strengthening due to the automation of decisions and effective management. The paper presents the significant outcomes achieved through innovations in logistics and the implementation of logistics projects in Poland and other European countries. These nations have demonstrated active involvement in the development of exceptionally efficient logistics systems.

**Keywords:** transport infrastructure, warehouse logistics, digital technologies, supply chain, logistics routes, transportation, block-chain, warehouse automation.

## Introduction

The contemporary advancement of digital technologies, driven by the proliferation of scientific and technical progress and the enhancement of Big Data technologies and digital analytical systems, exerts a profound influence on the operations of governmental institutions, corporate entities, and social domains. The problem of ensuring the development of logistics is possible due to the active implementation of innovations, the use of digital technologies, which is directly affecting the efficiency and quality of the development of logistics routes and networks. For most developed countries, a powerful logistics network is a factor in the successful implementation of quality and the possibility of strengthening the own position on the international world stage, as it provides a number of advantages in mastering product markets, ensuring the reduction of costs for logistics routes and improving the conduct of one's own strategic economic activities in the conditions of globalisation. The war in Ukraine during the years 2022 and 2023 exacerbates the problematic parameters related to the supply of raw materials and goods by the aggressor country's market. Consequently, this has necessitated the exploration and implementation of novel logistics routes in order to ensure their seamless functionality with utmost efficiency and reliability. The search for new suppliers and optimisation of current logistics routes becomes a priority task for European countries. Particularly, it is difficult to overestimate the role of Poland, since Ukraine is a key supplier of agricultural products, which, in the conditions of blocked ports and access to the Black Sea, makes alternative logistics routes impossible. Therefore, the majority of modern agricultural products and other raw materials are delivered to the European Union through Poland, which is a strategically important transit facility. Under such circumstances, the costs optimisation and logistics development is possible only with the introduction of quality management and technological development, which in turn occurs due to the introduction of innovations. Modern innovations in logistics combine several factors related to technological development, appropriate digital infrastructure and an effective management approach.

## Research Problem

The innovation in logistics plays a key role in the development of transport infrastructure, especially in the context of the European area, where the efficiency and sustainability of the transport is crucial. The review of the current literature revealed that, despite a wide range of research in this

area, some aspects remain insufficiently covered. Among them is a deep understanding of the impact of digital technologies on the structure and efficiency of transport systems, as well as an assessment of the long-term socio-economic consequences of these innovations. Thus, the key issue of the study was the optimisation of the modern logistics policy of Poland due to innovative technologies in logistics, which can strengthen both the economic position of the country and the European Union. The significance of these issues stems from the necessity to adjust the transportation system in accordance with swiftly evolving technological advancements, while simultaneously guaranteeing its sustainable progress amidst mounting burdens and environmental obstacles. These factors understanding is the key in the formulation of long-term development strategies in the transport and logistics sector, which will contribute to the economic growth and social well-being in Europe. In addition, the advantages of innovations in the logistics segment can provide additional privileges in the development of new product markets, the creation of a more powerful and flexible logistics network in Europe and ensure positive logistics growth. Solving this problem involves defining the theoretical concepts of innovations in logistics, their clear segmentation and outlining the current trends in the development of logistics routes and supply chains in Poland.

### **Research Focus**

The focus of the research was based on the analysis of the experience of developed countries regarding the introduction of innovations in logistics, the possibility of using automation technologies and effective logistics management tools. Moreover, the utilisation of these instruments can be deployed to construct an individual's self-created electronic framework, while simultaneously enhancing the prominence of pertinent scientific advancements, within the framework of escalating worldwide rivalry. The key direction of the research was the analysis of the experience of developed countries and Poland, as the countries most in need of logistics innovations, as a source of ensuring the strategic advantage of the economic development of European countries.

### **Research Aim and Research Questions**

The purpose of the research was to analyse modern innovations in logistics and their role in the development of transport infrastructure in European countries. The main task was to outline the key trends of innovations in logistics and their spread to the transport infrastructure, particularly based on Poland experience. Modern European approaches to the development of transport infrastructure and potentially effective projects that ensure a sustainable development of logistics networks and systems were analysed. The research was based on two research questions: (1) What are the main trends and development prospects that can be identified in the context of digitalisation of logistics systems in European countries. (2) What impact do these digital technologies have on the optimisation of transport infrastructure and how do they contribute to its provision.

### **Literature Review**

The issue of innovation in logistics is debatable among scientists, as it concerns a wide segment of economic development, state development, and the corporate sector. According to (Afraz, 2021), innovations in logistics consist in the business processes optimisation based on the use of digital technologies. In this context the scientist (Bentahar, 2020) stated that the use of digital technologies in logistics could reduce company costs by more than 40%. An effective transportation, according to (Colombari, 2022), can help ensuring the company's development of new product markets. In a similar work (Shamout, 2022), considers effective logistics to be a key factor in the development of commodity markets. Kotzab (2020) judge that the modern practice of effective

logistics is also reflected in modern management. According to (Ardolino, 2022), the use of innovative practices in management can ensure the rapid integration of technologies and their further use. Belu (2021) evaluated that modern technological countries are fighting for innovative technologies. In his research (Pawłyszyn, 2019) determined that the struggle between the US and China is being waged in different strategic segments of activity, particularly in digital technologies. According to (Kam Pui, 2021), China has the most powerful logistics infrastructure, which makes it possible to find leadership positions in the world. Taking into account a number of such studies, the scientist (Stojanović, 2020) states that European countries should optimise their own activities and practices to improve the European logistics network. For Poland, according to (Dubey, 2022), the highest priority is the creation of an effective network of logistics routes for transporting goods from the countries of Eastern Europe and the Asian region to the countries of Western Europe. Such a policy, according to (Hong, 2018), can be strategically important to ensure the reduction of European Union countries' spending on raw materials and other essentials. Büyüközkan (2018) considers that the use of digital technologies in logistics is the most priority task in modern times. This is confirmed by (Strange, 2017), who notes that modern logistics practice should be built on the basis of automation and management of transport routes. Moreover, the scientist (Queiroz, 2020) states that the development of decentralised management systems, such as the blockchain, should be implemented in the corporate sector of most European countries. The use of this system, as analysed by (Bacchetti, 2022), can ensure the sustainable development of the company's business processes, the possibility of transparent control and further scaling, which is important when building a logistics system. The analysis by (Luke, 2020) shows that the trend of investments in the logistics industry is constantly growing every year by an average of 4.5%. According to (Sarbu, 2021), the practice of spreading investments in digital technologies for logistics is connected with the competitive struggle for modern commodity and raw material markets. Mastering new business segments for most companies, according to (Andrusiv, 2021), possible only with effective development of logistics and transport routes. Moreover, the scientist (Geuna, 2022) considers that ensuring logistics activity is possible with effective business management, i.e. the more the corporate production sector grows, the relevance of logistics increases proportionally. According to the research by (Philipp, 2020), logistics costs of an enterprise are one of the most important components of total costs, which is a strategic issue for business. The cost optimisation in logistics, as noted by (Radulescu, 2021), is possible due to the automation of most warehousing processes, routing and logistics project management. According to (Hryhorak, 2020), an effective means of building one's own digital infrastructure can be the use of cloud technologies, as this practice will reduce the amount of costs for own software, hardware, server support and other technological costs. In his research (Liashenko, 2021), identified a trend that in the coming years, the key issue in logistics will be the automated management and control of transportation, which will not require additional resources for the analysis of transportation, the formation of logistics routes, the conclusion of commercial contracts, etc. According to (Wagner, 2020), the use of such practices can help countries achieve economic leadership in the world market. Due to the aforementioned progression, the matter of guaranteeing efficient logistics has become a matter of strategic significance for every nation, thereby prompting the selection of this subject matter and undertaking subsequent scientific inquiry.

## **Research Methodology**

The methodology of the presented paper was based on the need to understand the impact of innovations in logistics on the development of transport infrastructure in Europe. The main goal was to establish the relationships between the introduction of the latest technological solutions and their

effects on the structure and efficiency of transport systems. This study characterised the key trends and perspectives in this field, and analysed how digitalisation and automation affected the level of safety, environmental sustainability and economic efficiency of logistics processes.

The general sector of the research of innovations in logistics on the example of European countries and the analysis of the experience of Poland was carried out on the basis of the use of scientific publications on modern practices of implementation and development of digital logistics, analytical reports of the corporate sector on the construction of an effective logistics network and reports of state administration and strategies for the development of logistics on European content.

The research methods were mixed, as the research combined both qualitative and quantitative approaches. The qualitative aspect included the analysis of scientific articles, expert reports and focus group results that helped understanding and interpreting the trends and the impact of innovations in logistics. The quantitative analysis was based on statistical data, which included transport infrastructure performance indicators, data on investments in innovation and their impact on logistics performance.

The research involved several stages of comprehensive analysis. First of all, an analysis of the theoretical concept of digital logistics and innovations in logistics, a disclosure of theoretical foundations and principles that could ensure effective logistics of this segment was carried out. The next stage of the research was the analysis of modern logistics projects in Poland, which were implemented on the basis of strata and corresponded to the strategy of the general development of Poland in the field of logistics and strengthening of economic development. At the final stage of the research, the prospects for the further development of innovations and digital in logistics were outlined and the vectors of further development of both European countries and Poland were determined.

The research methodology was based on the use of scientific research methods, on the analysis of current logistics development strategies and forecasting of future development prospects based on the analysis of state and corporate strategies for further innovation in logistics. A number of scientific publications were analysed, indicating the potential expansion of investments in the field of technological development of logistics, further optimisation, the use of variable technologies of artificial intelligence and Big Data. The research was conducted on the basis of the analysis of modern scientific approaches and practical results were obtained, regarding the growth of the scientific and technical market and investments among the developed regions of the world. The basic principles and prospects of building an effective system of warehouse logistics, transportation, optimisation of logistics routes, construction of new transit routes and determination of possible prospects for the activities of large multinational corporations and businesses were defined. The obtained results may indicate the aggravation of modern geopolitical competition for sustainable economic development and the need to optimise most scientific processes in the world, which, based on the determined research methodology, made it possible to outline the main trends, trends and possible further prospects for research and their development.

## Results

The continued advancement of digital technologies has had a significant impact on the operational paradigm of business processes worldwide. This is particularly evident when examining the business environment of transport infrastructure, logistics systems, and transport networks. The adoption of digital technologies in these sectors offers numerous scientific benefits, including expedited decision-making capabilities, decreased servicing costs, and enhanced provision capabilities. Theoretical aspects of modern innovations reflect the adoption of new technological

solutions or management practices that can have a quantitative impact on the effectiveness of the functioning of a particular system.

Innovations in logistics, as a rule, are divided into the implementation of digital technologies, which involve the development of software, maintenance of hardware infrastructure and the possibility of achieving logical algorithms in the selection of logistics routes, further sorting and structuring. In addition to this segment of innovations, it is customary to consider innovative developments in the field of transport production, the creation of sensors and, in general, to contain innovations in the production sector that can affect the quality of the warehouse, transportation, assembly and any other components of logistics activities.

During the last few years, the role of logistics significantly increased, it caused the aggravation of geopolitical economic competition and redistribution of product markets. Particularly, the war in Ukraine during 2022 and 2023 caused a number of processes, including the reorientation of European countries to new product markets, the search for new suppliers of raw materials and the acquisition of new sales segments. In recent years, the USA and China have been developing new solutions to optimise their own logistics systems for the purpose of strategic development. The transport infrastructure plays an important role in these processes, as the demand for it is constantly growing, and technological optimization can help achieving strategic and economic decisions.

The issue of transport infrastructure remains one of the most urgent problems in Europe, as there is a constant problem with the transportation of raw materials, the provision of goods transportation and the effective functioning of municipalities and any other cities. The possibility of strengthening the transport infrastructure will also play a role in the social aspect, since the quality level of the development of the transport infrastructure can significantly increase the standard of living of the population and create favorable conditions for life. In developed countries, the continuous advancement of transport infrastructure is driven by scientific progress. This includes the development of new technological solutions, innovative means of transportation, and the optimisation of control systems and organisational structures.

Scientifically, the contemporary evaluations of Europe's transportation infrastructure indicate a commendable standard. This is attributable to the presence of advanced technological hubs and ongoing research in logistics automation. Additionally, Europe is actively fostering international collaboration to guarantee the superior quality of logistics pathways and transport infrastructure. Notably, high-speed train systems like the French TGV, German ICE, Spanish AVE, among others, effectively link major urban centers, operating at speeds exceeding 300 km/h. The presence of a powerful back-end infrastructure provides advantages in the context of heavy cargo transportation and can improve the speed of delivery of goods for the purpose of their further sale. Therefore, the availability of high-speed trains can help businesses realise their goals and optimise the quality of spending. In addition, there are multinational projects in European countries, such as Eurostar and Thalys, that facilitate international travel. The development of transport infrastructure in the context of these projects is aimed at improving the efficiency of managing transport junctions and conducting commercial activities. In general, the main innovations of the transport infrastructure of European countries are depicted in Table 1.

**Table 1**

*Innovations in the Logistics of the Transport Infrastructure of European Countries*

| <b>Innovation</b>                     | <b>Description</b>                                                                           | <b>Advantages</b>                                              | <b>Challenges</b>                                                                    |
|---------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <i>Internet technologies</i>          | Using interconnected devices to collect data in real time.                                   | Increasing transparency, asset monitoring.                     | Ensuring data security, integration with existing systems.                           |
| <i>Warehouse automation</i>           | Robots and automated systems for managing warehouse operations.                              | Increasing productivity, reducing human error.                 | High implementation and maintenance costs.                                           |
| <i>Unmanned vehicles</i>              | Using drones or autonomous trucks to deliver goods.                                          | Reduction of delivery time, cost of transportation.            | Regulatory restrictions, security.                                                   |
| <i>Blockchain</i>                     | Distributed ledgers to ensure transaction security and transparency.                         | Reducing fraud, improving supply chain traceability.           | Complexity of integration, scaling.                                                  |
| <i>Ecological logistics</i>           | <b>Optimisation</b> of logistics processes in order to reduce the impact on the environment. | Reducing emissions, improving corporate responsibility.        | High cost, need to change business processes.                                        |
| <i>Advanced analytical tools</i>      | Using big data and artificial intelligence for analysis and forecasting.                     | Improvement of decision-making, <b>optimisation</b> of stocks. | Collection and processing of large volumes of data, the need for qualified analysts. |
| <i>Integrated logistics platforms</i> | Supply chain management platforms that integrate various aspects of logistics.               | One window for supply management, reducing process complexity. | Dependence on software vendors.                                                      |

Source: authors' own development.

Based on the data in Table 1., it can be concluded that the modern development of digital technologies in logistics and transport infrastructure is aimed at improving the quality of transportation, speeding up operations and increasing own capacities, in terms of freight traffic and the number of transportations. It should be taken into account that during 2022 and 2023, the countries of Europe faced the problems of the raw materials market, because before the war in Ukraine, most European countries purchased heavy metals, coal and a number of raw materials from Russia. However, due to sanctions and a number of restrictions, it becomes illegal to conduct any trade agreements with an aggressor country, which requires the construction of new logistics routes and the creation of its own transport infrastructure that can cope with the load on new commodity markets.

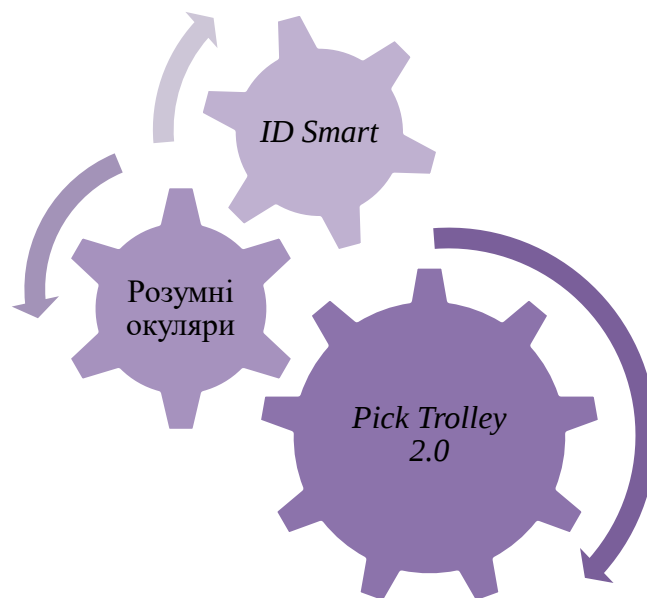
The diversification of such activities requires a comprehensive approach, as the search for new suppliers requires the redistribution of vehicles, the construction of new logistics and railway routes that will be in high demand. In addition, it is necessary to take into account the transit situation of Ukraine, that most of its own goods, such as metals and agricultural products, are transported through the borders of Poland. The effectiveness of the formation of transport interchanges in Poland will be of strategic importance for the countries of the European continent, as it makes it possible to receive a number of products via the old transit route, but due to the lack of additional logistics routes and transport infrastructure that was in Ukraine via the Black Sea or through the South of Ukraine is an important issue.

In such conditions, the importance of introducing innovations in logistics for Poland will have the highest priority, as it can strengthen additional investments in the Polish economy, create a

powerful potential logistics chain in Eastern Europe and ensure the sustainable development of transport infrastructure. In addition, the financing of innovations in logistics can be carried out on the basis of the use of digital technologies for the automation of business process management, which are aimed at the efficiency of the distribution of roles and the practice of their use. In Poland, the utilisation of contemporary analytical tools for assessing transport infrastructure is a customary practice as outlined in the country's logistics development strategy. Among the key means are the strengthening of the role of the implementation of transport technologies, the possibility of using blockchain as a single system of decentralised management of logistics processes, as well as the introduction of innovations in the field of management. All these processes will be important for Poland's economy and the development of its logistics. General logistics innovations implemented in Poland in the form of projects are shown in Figure 1.

**Figure 1**

*Logistics Innovation Projects in Poland*



Source: authors' own development.

The implementation of innovative logistics solutions in Poland highlights the significant progress made in digital technologies. The biggest impact on the transport infrastructure is the ID Smart project, which is aimed at optimising the distribution in the warehouse and the pace of implementation. In fact, this project envisages the development of an effective warehouse logistics operation system that is integrated with other transportation systems and can determine the amount of necessary transport, time and routes of transportation. The use of such a complex system is effective for the further development of Poland's transport infrastructure and can compete with many modern innovative technological projects of China or the USA. No less important is the "Smart glasses" project, which makes it possible, based on the use of augmented reality, to simulate logistics routes, transportation and assess the quality of the formation of transport infrastructure. Conducting scientific research in this segment opens up new potential opportunities for Poland and further development technologies. The PickTrolley 2.0 project is aimed at order segmentation, transportation, processing and further distribution. The use of such technologies will be most

effective for the modern corporate and public sector, as it can provide a high level of management and evaluation of current logistics activities.

Despite a number of innovative solutions in logistics, Poland has a fairly wide range of variability in the implementation of digital technologies in the transport infrastructure, which may include optimisation of transport, development of technical solutions for its modernisation. In addition, the presence of digital systems also requires significant investment, in terms of creating a unified logistics system of the country and effective distribution and optimisation. During 2023, Poland's logistics network is actively developing, and the state administration is looking for opportunities to finance relevant business projects that will be of strategic importance for both the country and the European Union. Carrying out joint projects with partners such as Germany can have a powerful factor in the development of transport through the improvement of rail transport. In addition, the issue of cooperation and coverage of common transport infrastructure is becoming increasingly important due to the transit of grain and other agricultural products, which can be solved by finding tariff customs compromises and improving logistics routes.

Thus, from the conducted research, it can be concluded that modern innovations in logistics affect the transport infrastructure of Europe, and Poland, due to the war in Ukraine, becomes one of the key transit centers of Eastern Europe and can contribute to the effective development of logistics routes, which is strategically important for European content. Making investments in transport infrastructure should become not only a strategic policy of the state administration, but also of the corporate sector in general, which requires decision-making on digitisation and optimisation of most business processes.

## **Discussion**

The results of the study indicate that the main trends and prospects for development in the context of digitalisation of logistics systems in European countries are the integration of innovative technologies, such as artificial intelligence, blockchain, and the Internet of Things. These technologies not only contribute to the automation and optimisation of logistics processes, but also provide greater transparency and security in supply chains. The use of these technologies in transport systems facilitates more accurate monitoring and management of flows, and also provides greater flexibility in responding to changes in demand and market conditions.

On the basis of the conducted research, it is possible to determine a clear trend in logistics innovations that are spreading to the countries of the European Union - the introduction of automation and digitalisation. The use of modern digital tools provides a number of advantages, which in the conditions of geopolitical challenges is a key task for European countries. Due to the war in Ukraine during 2022-2023, the issue of forming new logistics routes and supply chains has become a priority task, as the reorientation of product markets is happening at a rapid pace, due to the reduction of supplies from Asian countries. The scientist (Graham, 2022) considers that in order to ensure such an effective policy, it is necessary to use modern modeling and analytical tools that can be used by public administration and the private corporate sector in order to optimise current logistics systems. Taking into account the current problems of European countries, the spread of the use of logistics digital tools will have a trend in the future.

The obtained research results coincide with the analysis (Ferraris, 2021), which revealed the features of the modern development of European technologies. This emphasises the significant impact of innovations in logistics on the efficiency of transport systems. Such innovations include automation and the introduction of intelligent transport systems. The research by (Bentahar, 2020) also shares the results, the development of e-commerce infrastructure in Europe contributes to the

growth of demand for innovative logistics solutions. Such changes contribute to the development of integrated logistics networks capable of processing large volumes of online orders. This, in turn, requires greater flexibility and adaptability from the transport infrastructure.

The conducted analysis confirms the theses by (Bacchetti, 2022), where a special attention is paid to the ecological aspects of innovations in logistics. Environmental innovations, such as the use of electric vehicles for delivery, contribute to the reduction of carbon dioxide emissions. It also stimulates the development of charging stations and other necessary infrastructure elements to support the electric mobility. Innovative approaches in logistics, according to the current study, also described in the study (Weisheng, 2021), include the use of drones to deliver goods. This opens up new opportunities for the development of air infrastructure, which includes areas for launching and landing drones. Such innovations can reduce the load on road infrastructure, particularly in urban areas.

An important factor of related scientific results is manifested in the analysis (Paraschiv, 2021), which shows how the implementation of Internet of Things (IoT) technologies in logistics has significant potential. IoT integration enables the real-time cargo tracking, increasing the efficiency of logistics chains. It also encourages the development of integrated information systems for managing traffic flows. According to the results, the statement (Dwivedi, 2022), which emphasises the importance of multimodal transport solutions in Europe, remains debatable. Multimodal transportation promotes the efficient use of different modes of transportation, such as rail, road, and water. This not only improves logistics, but also encourages the development of infrastructure that supports such complex transport solutions. The study by (Alzoubi, 2022) highlighted the development of blockchain technologies in logistics. The use of blockchain can provide greater transparency and security in logistics chains. It also contributes to the creation of reliable digital platforms for coordination between different participants in logistics processes.

The hypothesis by (Radulescu, 2021) confirmed by the results that the development of digital platforms for sharing transport is a key aspect of innovation in logistics. These platforms allow efficient coordination of cargo flows, reducing the load on the road infrastructure. They also contribute to reducing the number of empty trips and optimising the use of vehicles. The study (Stojanović, 2020) emphasises the role of satellite monitoring in improving logistics operations, as indicated in the article. Using satellite data to monitor and manage traffic flows makes logistics more accurate and efficient. This, in turn, affects the strategic planning and development of transport infrastructure at the international level.

The specifics of using blockchain technology and the possibility of its implementation in logistics systems remain an important issue for discussion. The advantage of blockchain, as noted by (Dwivedi, 2022), is the possibility of complete decentralisation and effective control, the problematic aspect remains the quality of setting up and building the appropriate infrastructure that can use blockchain. The use of such practices can help reducing the risks associated with the operation of such systems, solving the problem of digital threats, since most servers and the general digital infrastructure are understood on the basis of cloud technologies. Therefore, a crucial factor in the context of contemporary digital transformation is the effectiveness of utilizing blockchain technologies and its potential for advancement in Poland, Germany, and France. These three countries are notable for having the most robust shared product markets, making it vital to assess the role of blockchain in enhancing efficiency within this context.

In recent years, there has been a significant increase in the development of digital innovations and startups that can be useful for the economy functioning improvement, public administration

melioration, or can have implications for the social sector. Logistics in Poland is undergoing its transformation due to the strengthening of the role of a transit center between Ukraine and Europe and can compete with the most developed countries. That is why a number of innovative projects aimed at the use of automation technologies are being adopted in the country, which can be applied to route planning and their further implementation in the activities of the corporate sector. Poland's experience is interesting from the point of view of attracting foreign investments and developing joint logistics projects. This practice makes it possible to spread the trend of building a modern digital logistics conglomerate of Europe, which is an important debatable issue in the scientific environment.

## **Conclusions and Implications**

So, it can be concluded that modern approaches to the development of innovations in logistics consist in the development of a product prototype, its testing and the search for the simplest model of implementation with further development. Innovation in logistics has become a new trend due to the geopolitical rivalry between China, the US and European countries. The key factor in the development of logistics was the price of transportation and transportation of products, as well as the cost of carrying out such operations and attracting personnel, work of departments and service. Large logistics multinational corporations use their own logistics networks and routes in the market, however, to ensure strategic security and strategic economic development, states are implementing a number of innovative projects to optimise logistics.

The theoretical concept of innovations in logistics consists in the use of modern digital technologies aimed at improving business processes in traditional logistics. This encompasses the efficient utilisation of warehouse logistics, upgrading current technical resources, implementing software solutions, boosting productivity, and minimizing expenses. In transportation, the development and implementation of vehicles, the construction of new logistics routes, the construction of legal commercial contracts that can be used in international legal systems and contain provisions on commercial activities. Innovation in logistics also involves the use and integration of the most popular project management platforms and managerial practices. The application of such practices will be important for modern logistics, as it significantly improves the quality of digital technology management, as it involves the use of innovative management and productivity, which can improve the quality of implementation of certain features.

A key trend among European countries in recent years has been the diversification of product markets and changes in orientation towards new raw material and product markets. Due to Russia's withdrawal from economic partnership and cooperation with European countries, a problem has arisen regarding the construction of new efficient logistics routes, supply chains, and packaging between new suppliers and European countries. Given this, the introduction of digital technologies such as smart logistics, the use of analytical systems, Big Data technologies is a prerequisite for increasing the efficiency and quality of logistics. The modern development of digital technologies is rapidly developing and can have a great impact on business activities, as it increases productivity and efficiency in the long term.

## **Suggestions for Future Research**

Further research on innovations in logistics should be carried out on the basis of several stages. First of all, it is necessary to take into account the features of the further economic development of the most developed countries, such as the USA, Germany, South Korea and China. The selection of

these countries is interesting for several reasons, the most important of which is that high technological development led to the improvement of business functioning and opportunities for corporate investors to search for customers and executors. Since the majority of companies providing logistics in Europe belong to the private sector, the implementation of such innovations should be carried out on the basis of cooperation with foreign countries. The development of the B2B segment in logistics can provide effective results and contribute to the improvement of the development and formation of the country's strategic logistics support.

Firstly, logistics innovations are designed to address crucial tasks that support the existing infrastructure, enable efficient provisioning, and aid in its future growth and development. In Poland, the implementation of new logistics routes and transportation is carried out through close cooperation with Ukraine, since during 2022 and 2023, the majority of exports from Ukraine to Europe will pass through Poland. Particularly, such a problematic issue as the export of grain also needs to be revised in relation to customs tariffs, but in any case, ensuring the efficiency of transportation should be based on the use of effective logistics, which will be able to reduce costs in quantitative terms and create favorable economic relations for the country.

An important direction of further research can be the applied development of logistics systems dealing with the analysis and distribution of routes. Additionally, for efficient operations, it is crucial to integrate CRM and ERP system software development with logistics. This integration involves the creation of a separate digital platform that enables seamless integration and enhances overall work efficiency. The perspective of this direction is to optimize the functioning of most business processes of logistics companies, and as a result, to improve the strategy of economic development of the state in the global market.

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