Application of Artificial Intelligence in Freight Transportation: World Experience and Prospects for Azerbaijan

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Abstract. This article systematically investigates theoretical and practical aspects of artificial intelligence technology applications in the freight transportation sector. The research analyzes world experience while assessing the prospects for integrating these experiences into Azerbaijan's transport-logistics system. Global research shows that artificial intelligence enables significant results in route optimization, predictive maintenance, fleet management, and warehouse operations automation. The experience of international companies such as UPS, FedEx, and Amazon confirms that AI-based systems reduce operational costs, increase transport efficiency, and minimize carbon emissions. Considering Azerbaijan's strategic position in international transport corridors, the article proposes a phased development model for AI implementation. Development directions for increasing transit potential are particularly substantiated in the context of regional projects such as the Middle Corridor and Zangezur Corridor. Research results show that phased and systematic implementation of artificial intelligence technologies can strengthen Azerbaijan's position as a regional transport hub while increasing the competitiveness of the logistics sector.

Keywords: artificial intelligence, freight transport, logistics, route optimization, Azerbaijan, Middle Corridor, TRIPP, digital transformation

INTRODUCTION

Relevance of the topic

In the second decade of the 21st century, transport and logistics systems are undergoing fundamental transformation processes. The deepening of global economic integration, the increase in international trade volumes, and the rapid development of e-commerce have led to the complexity of supply chains. Under these circumstances, traditional management methods are becoming increasingly less effective, and there is a need for radical renewal in the sector [1].

Artificial intelligence technologies have become one of the main catalysts of this transformation. The processing of large volumes of data in real-time, the detection of complex patterns, and the application of predictive analytics enable logistics operations to reach a qualitatively new level. According to World Bank estimates, the integration of digital technologies into the logistics sector can reduce global trade costs by 10-15% [2].

Freight transportation is one of the most dynamically developing areas of artificial intelligence applications. Processes such as route planning, fleet management, cargo flow forecasting, and maintenance optimization are already being implemented based on algorithmic modeling. International experience shows that the application of these technologies provides significant advantages not only in terms of economic efficiency but also environmental sustainability [3].

The adoption of these technologies is of particular relevance for Azerbaijan. The country's unique geographical position and its growing role in the East-West transport corridor make the modernization of logistics processes a strategic necessity. As President Ilham Aliyev emphasized at the Munich Security Conference in February 2026, Azerbaijan holds a leading position in the development of regional transport corridors and directs significant investments to this area [9].

The scientific novelty of this research manifests itself at both theoretical and practical levels. While previous research focused on the application of AI in global logistics systems, this article presents a phased and systematic model of AI implementation in the context of Azerbaijan's strategic transport corridors (Middle Corridor and Zangezur Corridor) [11]. At the same time, the article covers practical implementation recommendations from pilot projects to large-scale integration, institutional framework, and personnel training aspects [2]. This approach presents a comprehensive framework combining the economic, operational, and environmental efficiency of artificial intelligence [5].

Research objectives

The main purpose of the article is to systematically analyze the international experience of applying artificial intelligence technologies in freight transportation and scientifically

substantiate the prospects for applying this experience in Azerbaijan's conditions. To achieve this goal, the following research tasks have been identified:

- Investigation of the theoretical foundations of the main application directions of artificial intelligence in the logistics sector;
- Comparative analysis of international practical examples and identification of success factors;
- Assessment of the current state of Azerbaijan's transport-logistics system and identification of development prospects;
- Development of a conceptual model for artificial intelligence application in the context of regional transport corridors;
- Development of a phased strategy and specific recommendations for practical implementation.

Methodology

The research was conducted based on a multidisciplinary approach. The methodological base includes the following elements:

Systematic literature analysis. Scientific articles published in academic journals, reports of international organizations, and practical experiences of technology companies were systematized and analyzed. Priority was given to relevant sources published particularly during 2024-2026.

Comparative analysis. The experiences of artificial intelligence application by various countries and companies were compared to identify general patterns and characteristics.

Scenario modeling. Various application scenarios for Azerbaijan were modeled and their potential impacts were assessed.

Policy analysis. The institutional foundations of artificial intelligence application were investigated in the context of national development strategies and digitalization programs.

The scientific novelty of the article manifests itself in several aspects. First, the application of artificial intelligence in freight transportation is comprehensively analyzed for the first time in the context of regional transport corridors. Second, prospects for artificial intelligence integration in new transport projects such as the Zangezur Corridor (TRIPP) are systematically investigated for the first time. Third, the practical implementation model for Azerbaijan combines technological, institutional, and economic factors in a unified analytical framework.

Unlike existing literature, this research offers specific practical recommendations and phased implementation mechanisms alongside theoretical analysis. This approach connects academic value with practical applicability.

WORLD EXPERIENCE IN APPLYING ARTIFICIAL INTELLIGENCE IN FREIGHT TRANSPORTATION

Digital transformation in logistics

In recent decades, the international freight transportation sector has undergone fundamental changes. The deepening of globalization, exponential growth of e-commerce, and changing consumer demands have led to the formation of qualitatively new management approaches in logistics systems. Artificial intelligence technologies stand at the center of this transformation [1].

The main driving force of digital transformation is the development of the data economy. Modern vehicles, warehouses, and logistics hubs are equipped with numerous sensors creating a continuous data flow. Processing this data using traditional methods is practically impossible. Artificial intelligence algorithms support operational decision-making by extracting valuable knowledge from these data arrays [4].

International experience shows that the integration of artificial intelligence technologies into logistics is implemented in several main directions. These include demand forecasting, route optimization, inventory management, automated warehouse systems, and predictive maintenance. Each direction requires specific technological solutions and algorithmic approaches [5].

According to McKinsey & Company's analytical report, logistics companies implementing artificial intelligence have reduced operational costs by an average of 15%, increased delivery accuracy by 20%, and significantly improved customer satisfaction [2]. These indicators confirm not only the technical potential of the technology but also its economic efficiency.

Route optimization and intelligent planning

One of the most widespread application areas of artificial intelligence in freight transportation is route optimization. Classical logistics planning

mainly made decisions based on static data and experience. Modern artificial intelligence systems, however, dynamically process real-time data and generate adaptive decisions [3].

Route optimization is a mathematically complex combinatorial problem. There are millions of variants for optimal planning of a route with several delivery points. Traditional algorithms could not evaluate these variants within limited time. Artificial intelligence-based approaches, however, offer high-quality solutions in a short time by combining machine learning and optimization algorithms [4].

UPS's ORION (On-Road Integrated Optimization and Navigation) system is one of the most successful practical examples in this field. The system optimizes more than 55,000 daily routes, saving approximately 100 million miles annually and 10 million gallons of fuel. More importantly, the system adapts to traffic conditions, weather, and urgent changes by considering real-time data [6].

FedEx uses an AI-based "Dynamic Route Optimization" system to minimize delays. The system analyzes historical data, seasonal changes, and real-time indicators to provide predictive route suggestions. As a result, delivery time accuracy has significantly increased [5].

Academic research shows that AI-based route optimization provides 10-15% fuel savings, 20-25% increase in delivery efficiency, and 30% reduction in emissions compared to traditional methods [7]. These indicators emphasize both the economic and environmental significance of the technology.

Predictive maintenance and fleet management

Efficient management of the freight fleet is one of the main operational issues of logistics companies. Traditional maintenance models are mainly implemented at specific time intervals or after a breakdown occurs. AI-based predictive maintenance, however, continuously monitors the condition of vehicles and identifies potential problems in advance [8].

Modern trucks are equipped with hundreds of sensors. These sensors continuously measure engine parameters, oil pressure, temperature regimes, vibrations, and other technical indicators. Artificial intelligence algorithms analyze this data to detect deviations from normal operation and calculate the probability of failure [1].

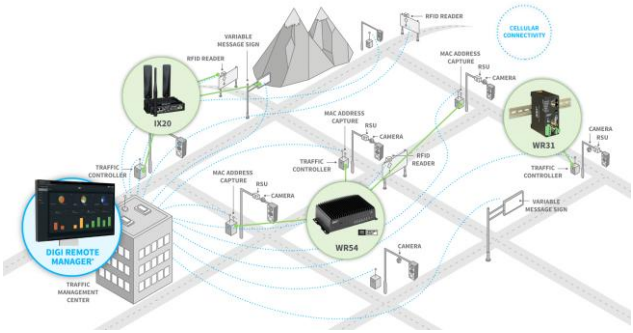
Although companies like Tesla and Waymo work on autonomous vehicle technologies, their predictive maintenance systems are already applied in commercial transport. These systems predict failure risk with 70% accuracy by analyzing sensor data through machine learning models [4].

Daimler Trucks' "Detroit Connect" platform combines IoT and artificial intelligence technologies to provide real-time fleet monitoring. The system has reduced unplanned stops by 40% and decreased maintenance costs by 25%. More importantly, the operational life of vehicles has increased by an average of 15% [5].

The economic impact of predictive maintenance is significant. According to Deloitte's calculations, the application of this technology reduces maintenance costs by 20-30%, increases vehicle operating time by 10-15%, and minimizes losses caused by unplanned stops by 50-70% [2].

Automation and robotization in warehouse logistics

Warehouse operations, a crucial part of the logistics chain, are among the areas most benefiting from artificial intelligence application. While traditional warehouse management was based on manual labor and mechanical systems, the modern approach prioritizes robotization and intelligent automation [3].



Amazon is among the pioneers in this field. The company revolutionized warehouse operations by acquiring Kiva Systems robotics company in 2012. Mobile robots controlled by artificial intelligence deliver goods to human workers, reducing movement time by 75% and increasing order preparation speed by 3 times [6].

AI-based warehouse systems developed by Ocado Group ensure the coordinated work of thousands of robots. At the center of the system are graph theory and machine learning algorithms. Robots move independently, automatically

preventing collisions and choosing optimal paths [4].

Image recognition technologies provide the next advancement in warehouse operations. AI-based cameras automatically identify products, perform quality control, and conduct inventory accounting in real-time. This minimizes human errors and increases operational accuracy to 99% [5].

International logistics companies such as DHL and DB Schenker have reduced operational costs by 30%, increased order processing speed by 40%, and minimized product damage by 50% as a result of implementing AI-based warehouse management systems [7].

Autonomous vehicle technologies and future prospects

The most radical direction of artificial intelligence application in freight transportation is the development of autonomous vehicles. Although this technology is not yet fully commercialized, pilot projects and partially autonomous systems are already finding practical application [8].

Companies like Waymo Via, Aurora, and TuSimple conduct tests of fully autonomous trucks. This technology integrates sensor fusion, deep learning, and real-time decision-making algorithms. Initial results show that autonomous systems demonstrate more stable performance in terms of safety compared to human drivers [4].

Partially autonomous systems are already widely applied. Adaptive cruise control, lane-keeping assistants, automatic braking systems, and driver fatigue monitoring increase productivity and reduce accident risk. Volvo Trucks and Mercedes-Benz offer these technologies as standard [5].

Platooning technology is a practical application of partial autonomy. In this system, several trucks move in a convoy connected by artificial intelligence. While the front truck is controlled by a driver, those behind follow it automatically. This reduces aerodynamic resistance, minimizing fuel consumption by 10-15% [3].

However, the widespread application of fully autonomous freight transport still requires solving a number of issues. Issues of legal regulation, infrastructure compatibility, cybersecurity, and socio-economic impacts remain relevant. According to expert assessments, mass application of fully autonomous freight transport will occur in the mid-2030s [2].

FREIGHT TRANSPORTATION IN AZERBAIJAN AND PROSPECTS FOR ARTIFICIAL INTELLIGENCE APPLICATION

Azerbaijan's strategic position in international transport corridors

Azerbaijan plays an important role in the international transport system due to its unique geographical position. The country functions as a natural bridge between Europe and Asia and is located at the intersection of several strategic transport corridors. This advantage makes it possible to turn Azerbaijan into a regional logistics hub [9].

The Middle Corridor (Trans-Caspian International Transport Route) plays a major role in forming an alternative trade route between China and Europe. This corridor delivers cargo to Europe via Central Asia, the Caspian Sea, Azerbaijan, Georgia, and Turkey. In 2025, cargo turnover on this route was 3.5 million tons, which is a 2.5-fold increase compared to 2020 [10].

The Zangezur Corridor (TRIPP – Trump Route for International Peace and Prosperity) is a multimodal transport project that will connect Azerbaijan's main territory with the Nakhchivan Autonomous Republic. According to the agreement reached in August 2025 through US mediation, this corridor will include road, railway, energy lines, and communication infrastructure. The project's implementation will significantly expand transit opportunities [11].

President Ilham Aliyev emphasized in his speech at the Munich Security Conference in February 2026 that Azerbaijan takes an initiative position in creating these corridors and directs large investments to their development. This is a national strategic priority for realizing the country's transit potential and strengthening its geopolitical significance [9].

Optimization of logistics processes is critically important for effective use of the strategic position. International experience shows that maximum impact is achieved when physical infrastructure advantages are complemented by digital management systems. In this context, the application of artificial intelligence technologies is a strategic tool for increasing Azerbaijan's competitiveness.

Achievements in the field of digitalization

Azerbaijan is taking consistent steps towards digitalization of the transport and logistics sector. ARAS (Automated Risk Management System) implemented by the State Customs Committee is an important achievement in this field. The system uses artificial intelligence elements to classify cargo shipments according to risk profiles and accelerate customs procedures [11].

As a result of ARAS system implementation, waiting time at border crossing points has decreased by an average of 40%. The system supports electronic document circulation and ensures data exchange in accordance with international standards. This makes Azerbaijan more attractive as a transit route [11].

The implementation of electronic consignment note (eCMR) and electronic permit (e-Permit) systems digitalizes document circulation. These systems accelerate processes and increase transparency by abandoning paper documents. The Ministry of Digital Development and Transport is working to expand the regional coverage of these systems [11].

The creation of a unified digital logistics platform that will operate on the "single window" principle is planned. This platform will unite all participants – carriers, customs authorities, ports, and railways – in a unified information space. Such integration will create an important database for the application of artificial intelligence algorithms [11].

Within the framework of the "Digital Development" National Strategy, Azerbaijan pays special attention to the development of artificial intelligence technologies. The strategy covers directions such as stimulating technological innovations, personnel training, and expanding international cooperation. This forms a favorable institutional environment for integrating artificial intelligence into logistics.

Main directions for AI application in Azerbaijan's freight transportation

The application of artificial intelligence in Azerbaijan's freight transportation can be implemented in several main directions:

1. AI-based route planning for international corridors

Creation of AI-based route planning systems for vehicles moving along the Middle Corridor and TRIPP routes. These systems will suggest optimal routes by taking into account the condition of border crossings, speed of customs procedures, road infrastructure, and weather conditions in real-time. International experience shows that such systems can reduce transit time by 20-30% [4].

2. Fleet monitoring and predictive maintenance

Application of AI-based monitoring systems to the fleets of local carrier companies. Data collected via IoT sensors will be analyzed by machine learning algorithms to predict potential failures in advance. This will prevent unplanned stops, increase operational efficiency, and reduce repair costs [8].

3. Smart road infrastructure

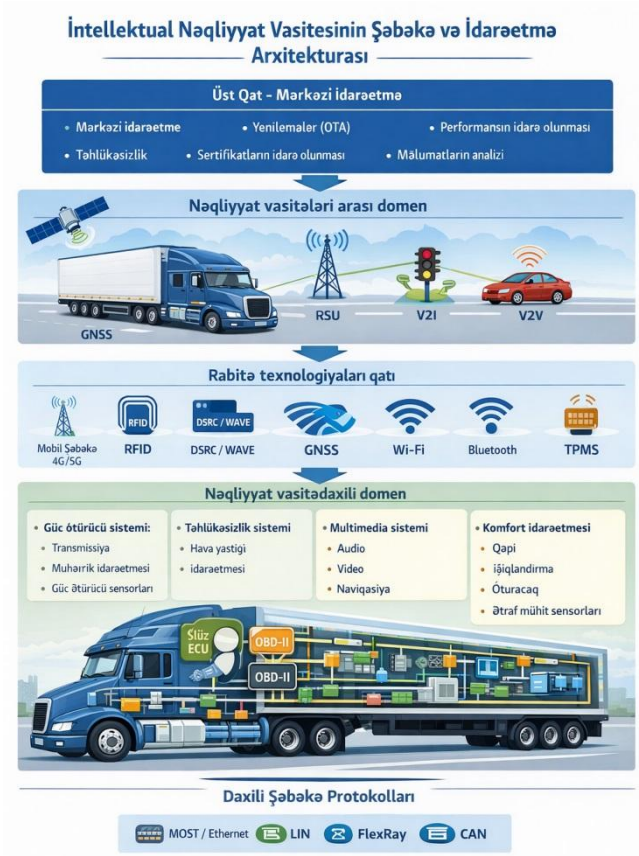
Placement of IoT sensors and intelligent cameras on main highways – for example, on Baku-Qırmızı Körpü and Baku-Astara routes. Data from these sensors will be analyzed by artificial intelligence to provide drivers with real-time information about road conditions, traffic jams, and dangerous situations. International practice shows that such systems reduce accidents by 25-30% [3].

4. Cargo flow forecasting

Artificial intelligence algorithms can forecast cargo flows by analyzing historical data, economic indicators, and seasonal factors. This will enable logistics companies to plan their fleets, warehouse capacities, and human resources more efficiently. Analyses show that accurate forecasts can reduce operational costs by 15-20% [2].

5. Multimodal transport coordination

Coordination of different transport types – automobile, railway, and maritime transport – on a unified platform. Artificial intelligence algorithms will increase the efficiency of multimodal transportation by determining the optimal transport type and transition points.



Intelligent freight vehicle architecture

The network and management architecture of an intelligent freight vehicle is based on a multi-layered and integrated technological structure. At the top level of this structure is the Central Management layer. This layer serves as the strategic control mechanism of the entire system, ensuring the implementation of updates (OTA), performance optimization, cybersecurity, certificate management, and analytical processing of collected data. Thus, the vehicle becomes not just a mechanical device but also a digital platform managed in real-time.

The next stage is the inter-vehicle domain. This area ensures the interaction of the truck with other vehicles and road infrastructure. Precise positioning is determined via GNSS, and data exchange is carried out with RSU (roadside units) and base stations. V2V (vehicle-to-vehicle) and V2I (vehicle-to-infrastructure) connections increase road safety, reduce accident risk, and enable efficient traffic flow management.

The communication technologies layer constitutes the technical foundation of all these connections. Technologies such as mobile network (4G/5G), DSRC/WAVE, RFID, Wi-Fi, and Bluetooth ensure seamless and reliable data transmission. The GNSS system maintains the accuracy of geographical coordinates, while TPMS monitors tire pressure, enhancing safety and fuel efficiency. These technologies together form the "smart" functionality of the freight vehicle.

The intra-vehicle domain encompasses the internal management mechanism of the system. The gateway ECU coordinates data flow by connecting various electronic control units, while the OBD-II interface provides diagnostic control capability. The powertrain system, transmission, and engine management ensure the vehicle's mobility. Safety systems – airbag and brake management – serve to protect the driver and cargo. Multimedia and comfort systems improve the driver's working conditions, ensuring comfort during long-distance trips.

Finally, internal network protocols – MOST/Ethernet, LIN, FlexRay, and CAN – implement fast and stable data exchange among all electronic modules. Through the integration of these protocols, the truck operates as a unified, coordinated, and highly efficient complex technological system.

Thus, the presented diagram clearly demonstrates how a modern intelligent freight vehicle is systematically and multi-level organized both in its external communication environment and internal management structure.

Prospects for AI integration in the Zangezur Corridor (TRIPP)

Since the Zangezur Corridor (TRIPP) is a multimodal infrastructure project, it creates wide opportunities for artificial intelligence applications. Since the corridor includes road, railway, energy lines, and fiber-optic communications, the application of complex management systems becomes a necessity.

1. Integration of ARAS system and border management

Integration of the ARAS system (Automated Risk Analysis System) into the TRIPP segment and coordination with similar systems of neighboring countries. AI-based risk assessment will accelerate border procedures by combining biometric recognition, document analysis, and threat detection technologies. US participation in the project creates conditions for attracting advanced technologies [11].

Integration of the ARAS System into TRIPP

2. Real-time monitoring and coordination

IoT sensors and RFID technologies will ensure real-time tracking of cargo and vehicles. Artificial intelligence algorithms will analyze this data to optimize transit time, forecast traffic jams, and suggest alternative routes. Global experience shows that such systems increase logistics efficiency by 25-35% [4].

Real-time monitoring and IoT tracking

3. Predictive infrastructure maintenance

Equipping bridges, tunnels, railway lines, and energy infrastructure with sensor networks. Artificial intelligence will assess the condition of structures by analyzing vibration, temperature, and other parameters and determine repair needs in advance. This will minimize unplanned stops [8].

4. Multimodal transport optimization

Determining the optimal balance between automobile and railway transport. Artificial intelligence will suggest the most efficient transport type by considering cargo type, distance, urgency level, and costs. This will maximize the corridor's capacity and increase economic efficiency.

5. Environmental monitoring and green logistics

AI-based management of energy lines will minimize transmission losses. At the same time, environmental sensors will monitor air quality, emissions, and other environmental indicators. This data will help implement green logistics strategies [3].

CONCEPTUAL MODEL AND RECOMMENDATIONS FOR APPLYING ARTIFICIAL INTELLIGENCE TO AZERBAIJAN LOGISTICS

Phased implementation strategy

The successful integration of artificial intelligence technologies requires a phased approach. International experience shows that strategies starting with pilot projects and gradually expanding yield more effective results than radical transformation attempts [2].

First stage: Pilot projects and foundation creation (2026-2028)

At this stage, establishing technological foundations and gaining initial experience is a priority:

- **ARAS system enhancement:** Expanding the functionality of the ARAS system and adding machine learning modules to it. The system will automate risk profiling by analyzing historical data;
- **Smart road pilot project:** Implementation of a "smart road" pilot project on a selected segment of the Baku-Qırmızı Körpü route. Installation of IoT sensors, intelligent cameras, and communication infrastructure;
- **Fleet monitoring systems:** Cooperation with 5-10 large carrier companies to implement fleet monitoring systems. Implementation of basic functionalities such as GPS tracking, fuel consumption control, and driver behavior analysis;
- **Unified data platform:** Conceptual design of a unified data platform and preparation of a pilot version. Determination of data standards and preparation of API interfaces;
- **ARAS integration into TRIPP:** Beginning integration of the ARAS system into the TRIPP corridor infrastructure.

Second stage: Large-scale application and system integration (2028-2030)

At this stage, the expansion of application is implemented based on successful results of pilot projects:

- **Unified National Logistics Platform:** Full launch of the Unified National Logistics Platform. The platform's coverage of all main participants and ensuring real-time data exchange;
- **Predictive maintenance expansion:** Application of predictive maintenance systems to the majority of carrier companies. Expansion of sensor networks and increase of analytical capabilities;
- **Smart road infrastructure:** Full launch of "smart road" infrastructure on main transit routes. Development of mobile applications for delivering real-time data to drivers;
- **Cargo flow forecasting:** Launch of cargo flow forecasting systems. Preparation of medium and long-term forecasts based on macroeconomic indicators, seasonal factors, and historical data;
- **Cybersecurity systems:** Implementation of cybersecurity systems in accordance with international standards. Establishment of data encryption, blockchain technologies, and multi-level authentication mechanisms;
- **Real-time monitoring and IoT tracking:** Full deployment of comprehensive monitoring systems across the logistics network.

Third stage: Advanced technologies and regional leadership (2030+)

At this stage, Azerbaijan joins the ranks of regional "smart logistics" leaders:

- **Full digitalization of corridors:** Full digitalization of the Middle Corridor and TRIPP. "Door-to-door" tracking and forecasting of cargo;
- **Autonomous vehicle pilots:** Pilot application of partially autonomous vehicles. Testing of platooning technologies and preparation of legal base;
- **Warehouse automation:** Expansion of AI-based warehouse automation. Application of robotized systems in logistics centers;
- **Regional data exchange platform:** Creation of a regional logistics data exchange platform. Integration with neighboring countries and trans-sectoral logistics planning.

Institutional framework development

An appropriate institutional environment is necessary for the sustainability of technological development:

1. Regulatory framework

Creation of a normative-legal base regulating the application of artificial intelligence systems, data exchange, cybersecurity, and responsibility issues. International standards and European Union experience should be taken into account [2].

2. Public-private partnerships

Establishment of cooperation mechanisms between the state and business for financing and implementing artificial intelligence projects. Stimulation of innovative technology application through tax benefits and subsidies.

3. Standardization and certification

Determination of unified standards for logistics data. Creation of mechanisms for certifying the compliance of artificial intelligence systems with quality and security requirements.

4. International cooperation

Achievement of bilateral and multilateral agreements with neighboring countries for integration of regional logistics platforms. International harmonization on data exchange and technological standards [11].

Personnel training and scientific-research development

Development of human capital is the main condition for the success of technological transformation:

1. Academic programs

Creation of specialized programs at the intersection of artificial intelligence and logistics in higher education institutions. Balancing theoretical knowledge with practical skills.

2. Professional training

Organization of short-term training courses on artificial intelligence technologies for existing logistics and transport specialists. Ensuring access to international certification programs.

3. International partnerships

Implementation of partnership programs with leading technology companies and universities. Ensuring the participation of Azerbaijani specialists in international projects.

4. Research centers

Establishment of national-level centers for conducting applied scientific research in the field of artificial intelligence and logistics. Institutionalization of cooperation among universities, business, and government agencies [2].

5. Startup ecosystem development

Creation of accelerator and incubator programs to support innovative startups in the field of logistics technologies. Formation of conditions for attracting venture capital.

Expected economic impact

The economic impact of applying artificial intelligence technologies will manifest itself in several directions:

1. Operational cost reduction

As a result of optimizing fuel consumption, reducing maintenance costs, and minimizing empty runs, the operational costs of carrier companies can decrease by 15-20% [4].

2. Transport efficiency increase

As a result of improving route planning accuracy and reducing transit time, the efficiency of vehicle use can increase by 20-25% [3].

3. Transit volume growth

Optimization of logistics processes will make Azerbaijan a more attractive transit route. An increase of 30-40% in transit cargo volumes is forecasted in the medium and long term [10].

4. Employment creation

The development of the digital logistics sector will lead to the creation of highly qualified jobs. Technology startups and service companies will offer additional employment opportunities.

5. Innovation spillover effects

The application of artificial intelligence technologies to logistics will also have a positive impact on other sectors, increasing overall innovation potential.

CONCLUSION

The conducted research shows that artificial intelligence technologies have formed as an integral component of modern freight transportation. Global experience confirms that these technologies fundamentally optimize logistics operations, increase economic efficiency, and contribute to environmental sustainability. The examples of leading companies such as UPS, FedEx, Amazon, and others empirically prove the practical benefit of AI-based systems.

The adoption of these technologies is of particular importance for Azerbaijan. The country's unique geographical position, its role in strategic projects such as the Middle Corridor and TRIPP, existing infrastructure advantages, and steps taken in digitalization create favorable ground for artificial intelligence application. Initiatives such as the ARAS system, electronic document circulation, and unified logistics platform already yield important results.

However, full realization of the potential requires a systematic and phased approach. A strategy starting with pilot projects, gradually expanding, and completed with advanced technologies promises optimal results. In parallel, strengthening the institutional framework, improving personnel training, and expanding international cooperation are necessary.

The integration of artificial intelligence into Azerbaijan logistics is not just technological renewal, but also means increasing the country's competitiveness at regional and global scales, deepening economic diversification, and accelerating the transition to an innovation economy. Steps taken in this direction have the potential to include Azerbaijan among regional "smart logistics" leaders.

The conducted research shows that the application of artificial intelligence technologies to Azerbaijan logistics is not only technical optimization but also a means of strategic, institutional, and economic transformation [2]. The phased implementation model and specific practical recommendations proposed in the article, including pilot projects, unified national logistics platform, and predictive maintenance systems, serve to strengthen the country's position as a regional "smart logistics" leader [8]. This is also the first systematic approach measuring the local and regional economic benefit of digital transformation for Azerbaijan [10].

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