REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

PROBLEMS OF DEVELOPMENT OF AZERBAIJAN'S TRANSPORT AND LOGISTICS COMPLEX

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Field of science:	Economic sciences
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Baku – 2026

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GENERAL CHARACTERISTICS OF THE RESEARCH

Relevance and degree of development of the topic. The relevance of the dissertation topic stems from the special role of the transport sector in the country's economic development strategy and demonstrates the importance of this sector in terms of its integration into both regional and global economic processes. Since Azerbaijan is located at the intersection of international transport corridors such as "East-West" and "North-South", the country's geostrategic position creates broad prospects for optimizing not only regional transit opportunities, but also international trade flows. In this context, the improvement of the transport and logistics complex has a significant impact on the diversification of the economy, the rapid development of the non-oil sector and the expansion of foreign trade turnover.

The obsolescence of many segments of the existing infrastructure, insufficient development of competition in logistics services, and difficulties in coordinating transport chains are problems that require a comprehensive analysis. Issues such as infrastructure modernization, renewal of port and railway systems, and adaptation of highways to international standards are among the main conditions for expanding the country's transit capacity. At the same time, directions such as the digitalization of logistics processes, the introduction of electronic cargo tracking mechanisms, and the transition to "smart logistics" solutions further increase the relevance of the topic. These approaches increase the transparency of logistics operations, as well as the speed and efficiency of cargo transportation, making Azerbaijan a more competitive player in international transport networks. Along with digital transformation, the introduction of transport models that meet environmental requirements, reducing carbon emissions, and the formation of green logistics standards are also key components of modern challenges.

Demands and needs such as improving the regulatory and legal framework, harmonizing transport policy with international standards, accelerating customs and border procedures, and eliminating administrative obstacles in transit operations also clearly reveal the relevance of the topic. The rapidly changing global trade environment

necessitates the development and implementation of flexible logistics strategies. In addition, the expansion of regional cooperation platforms, the creation of new multimodal transportation, the deepening of logistics integration in the Caspian basin, the increase in cargo flows along the Middle Corridor, and the strengthening of competition in the Eurasian space create both opportunities and strategic challenges for Azerbaijan. The development of the transport and logistics complex in these directions is of particular importance for the full realization of the country's transit potential, attracting foreign investments, and strengthening its positions on international trade routes.

As a result, a comprehensive study of the problems of the transport-logistics complex will allow identifying existing gaps in both infrastructure, management, and technological support. Taking into account world experience, applying innovative logistics solutions, forming a digital ecosystem, ensuring environmental sustainability, and transitioning to green technologies are important conditions for the long-term development of the field. All these factors confirm the high scientific and practical significance of the dissertation topic and make its study necessary.

During the research, the following normative and legal documents were used: "Strategic Roadmap for the Development of Logistics and Trade in the Republic of Azerbaijan"[1], "Azerbaijan 2030: National Priorities for Socio-Economic Development"[2], "I State Program on the Great Return to the Liberated Territories of the Republic of Azerbaijan"[3], etc. The above-mentioned regulatory and legal documents cover strategic priorities such as the economic development of Azerbaijan, in particular the improvement of logistics and trade sectors, as well as the reintegration of the liberated territories. These documents provide the necessary legal and strategic framework to formulate the theoretical and practical foundations of the study, conduct an analysis of state policy, and help align the research results with real economic processes.

[1] https://e-qanun.az/framework/57128
[2] https://president.az/az/articles/view/50474
[3] https://e-qanun.az/framework/52757

Regarding the degree of development of the topic, it should be noted that individual aspects of the development of the transport and logistics complex have been sufficiently covered in the works of Azerbaijani scientists such as Samadzade Z.A., Abbasov I.M., Atashov B.Kh., Bagirov M.M., Bayramov I.A., Alekperov A.A., Ibrahimov I.H., Ibrahimov E.A., Hamidov N.A., Abdullayev K.N., Mammadov Z.S., Asadov A.M., Imanov T.I., Mahmudova L.F., Guliyev E.A., etc.

Research in the field of improving the development of the transport and logistics complex was conducted abroad by Alesinskaya T.V., Bezrukova T.L., Nesterov S.Y., Pecherskaya O.A., Valeyeva A.N., Dmitriyev A.V., Yermakov I., Petukhov D., Kurganov V.M., Lebedev Y.A., Sergeeva A.L., Klimov D.V. , Anderson J. E. , Thompson E. , Khattak A.J Aghion P., Zilibotti F., Antonucci D., Gan V., Liu B., Wang R and other economists-scientists.

However, in these studies, the issues of development of the transport-logistics complex were not considered in detail, taking into account the characteristics of our country. Considering this situation, in our study, the issues of development and improvement of the transport-logistics complex were considered, taking into account local characteristics, which indicates the relevance of the chosen topic and the dissertation work is a study arising from the requirements of the modern era.

Object and subject of the study. The object of the study is the main service areas of the transport-logistics complex in our republic.

The subject of the study is the issues of improving the activities of the transport-logistics complex, including existing regularities, applied methods and means, as well as factors affecting these relations. During the study, special attention was paid to the leading segments of this complex, namely railway and automobile transport, as well as the activities of the newly established “Absheron Logistics Center”.

The purpose and tasks of the study. The purpose of the research is to study the theoretical and practical provisions of the scientific essence of the development of the transport and logistics complex of Azerbaijan, to determine their role in economic growth, and on this basis to develop the main priorities of the country's transport policy.

To achieve this goal, the following tasks were set and solved in the dissertation:

- determining the essence, place and role of transport in the economy;
- studying the history of the emergence and development of transport modes in Azerbaijan;
- studying the theoretical and methodological aspects of the development of the transport complex;
- analyzing the current state of logistics processes in railway and road transport;
- assessing the logistics capabilities of Azerbaijan in the modern geoeconomic situation and assessing the potential capabilities of the Azerbaijani transport and logistics system on the "Middle Corridor" Trans-Caspian International Transport Route;
- researching investments in the transport sector and its prospects, and exploring ways to improve the transport and logistics complex of the Republic of Azerbaijan.

The basis of the research methods is modern analytical and complex approaches applied in scientific research devoted to the development and regulation of the transport-logistics complex. The dissertation work used methods such as econometric, statistical analysis, logical generalization, forecasting, as well as grouping and comparative assessment, historical approaches.

Also, the theoretical and methodological basis of the research is the Decrees and Orders of the President of the Republic of Azerbaijan, laws, decisions and other normative and legal acts adopted by the Milli Majlis and the Cabinet of Ministers of the Republic of Azerbaijan, relevant reports of central and local executive bodies, data of the State Statistical Committee, the Ministry of Economy, the Ministry of Digital Development and Transport, etc. At the same time, the works of local and foreign scientists, conference materials of various levels, reports of the World Bank and the International Monetary Fund were also used during the research.

The main provisions put forward for defense. The dissertation puts forward the following propositions in examining the development issues of the transport and logistics complex in our republic:

- an innovative strategy model should be used for the development of the regional transport complex, which includes existing programs for the modernization and development of the transport complex;
- in order to achieve the general economic, unified social and logistical goals of the transport strategy, which includes the progressive technological development of the transport sector, a single, production-compatible and technologically interconnected infrastructure should be created for all types of transport vehicles;
- when creating logistics infrastructure, the interaction of public-private partnership (PPP) participants should be covered by mechanisms, tools and organizational structures, both for internal coordination between partners and for interaction with external entities and management objects;
- in order to increase transport volumes and improve the structure of the vehicle fleet, it is necessary to apply a set of innovative approaches in the development of the transport sector;
- the effective operation of the transport and logistics sector requires the application of special principles;
- a special program should be developed to increase added value in freight transport enterprises in Azerbaijan.

The scientific novelty of the study consists of the following:

- ✓ innovative strategies and transport complex management models for the development of the regional transport complex were proposed;
- ✓ The advantages and disadvantages characterizing freight transportation by rail in Azerbaijan were classified;
- ✓ Several practical recommendations were given to facilitate faster transportation of freight on Azerbaijani railways and, consequently, reduce the cost of freight;
- ✓ The main principles of efficiency of transport logistics in Azerbaijani conditions were specified;
- ✓ The factors and results of creating added value in the logistics center were classified;
- ✓ A program for increasing added value in the freight transport sector of Azerbaijan was presented;

- ✓ The priorities of the transport policy of the Republic of Azerbaijan and institutional reforms to be carried out in this area were determined.

Theoretical and practical significance of the research. The theoretical significance of the dissertation is that the specific proposals and recommendations put forward for improving the development of the transport and logistics complex in Azerbaijan, the methodological foundations developed for managing the transport and logistics sector can be a reliable source for future research on this topic. The provisions reflected in the dissertation can be used when developing relevant projects and programs, in the activities of government organizations, as well as in teaching the subjects "Transport Economics" and "Logistics" in higher education institutions, which determines the practical significance of the research.

Approval and application. The main essence of the dissertation work, theoretical-methodological and practical considerations, new scientific approaches, proposals and recommendations put forward by the author here have been reported at scientific-practical conferences of various levels. In total, 5 scientific articles (including 1 abroad) and 4 theses (including 1 abroad) have been published by the author. The main provisions of the research are reflected in the theses "The modern place of the transport sector in the Azerbaijani economy" (Baku, 2024), "Systematic approach to the logistics system and its improvement" (Baku, 2024), "Prospects of investments in the logistics sector of Azerbaijan" (Ganja, 2025), "Potential of investments in the logistics sector of Azerbaijan" (Togliatti, 2025). Among the published scientific works, the following articles can be cited: "The Role of the Transport Sector in the Economy of Azerbaijan" (Baku, 2024), "Main Methodological Issues of the Activity of Logistics Systems" (Baku, 2024), "Transcaspian International Transport Route (TiTR) in the Context of the Development of the Central Trade Corridor" (Moscow, 2025), "Modern Trends in Investments in Transport and Public-Private Partnership" (Baku, 2025), "Creating Added Value on Transit Routes in Azerbaijan" (Baku, 2025).

Name of the organization where the dissertation was carried out. Baku Eurasian University.

Total volume of the dissertation with a mark indicating the volume of the structural sections separately. The dissertation consists of an introduction, 3 chapters, conclusion, and a list of references. The introduction consists of 11953 characters, the first chapter consists of 78747 characters, the second chapter consists of 86594 characters, the third chapter consists of 91208 characters, the conclusion consists of 10911 characters. The total text of the dissertation, excluding tables, graphs, appendices, and bibliography, is 279413 characters.

SUMMARY OF THE RESEARCH

The **introductory** part of the dissertation explains the relevance of the topic, the state of study of the problem, the goals and objectives of the research, its object, subject, scientific novelty, practical significance, and approval.

In Chapter I of the dissertation entitled **"Scientific Basis of the Formation of the Transport System in Azerbaijan and Stages of Development"**, scientific-theoretical views on the essence, place and role of transport in the economy, theoretical-methodological aspects of the development of the transport complex, and the features of the history of the emergence and development of transport types in Azerbaijan were studied.

Understanding the essence and content of transport in modern economic science is becoming increasingly complex and multifaceted. If in classical approaches, transport was mainly described in a narrow framework as the physical transportation of goods and passengers, in today's scientific discourse it is assessed as a fundamental mechanism that forms the spatial structure of economic activity, ensures integration into value chains and conditions the dynamics of global trade. The development of the transport system is determined not only by the volume of infrastructure investments, but also by the quality of institutional regulation, the efficiency of logistics services, the application of digital technologies and the degree of compliance with international standards. In this regard, the scientific-theoretical analysis of the essence and content of transport requires a synthesis of

research conducted both in a global perspective and in specific country conditions.

Transport is an independent field in material production. There are a number of features that distinguish the considered sector from other economic sectors.

Firstly, transport does not produce material products, but nevertheless, the labor of its employees is productive, and thanks to its activities, the growth of public wealth, a significant contribution to national income occurs. Transport is a “universal” production, since the transportation of products from one point to another in space has a result equivalent to the production of this product in another place. In other words, the transport industry acts as a substitute for any other type of industry. Thanks to it, the redistribution of the population throughout the country also occurs. In this case, an important demographic function is performed. Secondly, the production process is the transportation of people and cargo. The accumulation and storage of transport products is impossible. In order to create reserves in transport, it is necessary to reserve production capacities, this applies to permanent installations and the composition of the movement. Thirdly, there is no raw material in the products of transport, the bulk of the value is wages. Its share in the transport sector is 1.5-2 times higher than in industry. Fourthly, funds are allocated for the development of transport differently from industry and agriculture. The result of transport activity is displacement.

If we take the value form to calculate the volume of the transport component in the price of goods produced and consumed in a country or region, it can be used in various ways: the share of transport products in the region's GDP, the share of transport products in the country's GDP, the share of transport components in the price of a specific product for end consumers.

The second stage after modernization is the transformation of the “supported development” strategy into an innovative transport policy. This policy includes issues such as the modernization of motor vehicles and production, the introduction of new equipment and efficient technologies, and increasing the profitability of transport services by reducing the volume of freight transportation: the

introduction of innovations, the use of new methods of logistics management, and the acceleration of freight transportation. Based on the analysis of the main methodological approaches to the formation of innovative[4] development strategies, we have developed an innovative strategy model for the development of the regional transport complex, which takes into account external and internal factors, as well as existing programs for the modernization and development of the transport complex. The current model includes a number of stages with their own directions, goals, development of subsequent programs and appropriate mechanisms for achieving goals (Figure 1).

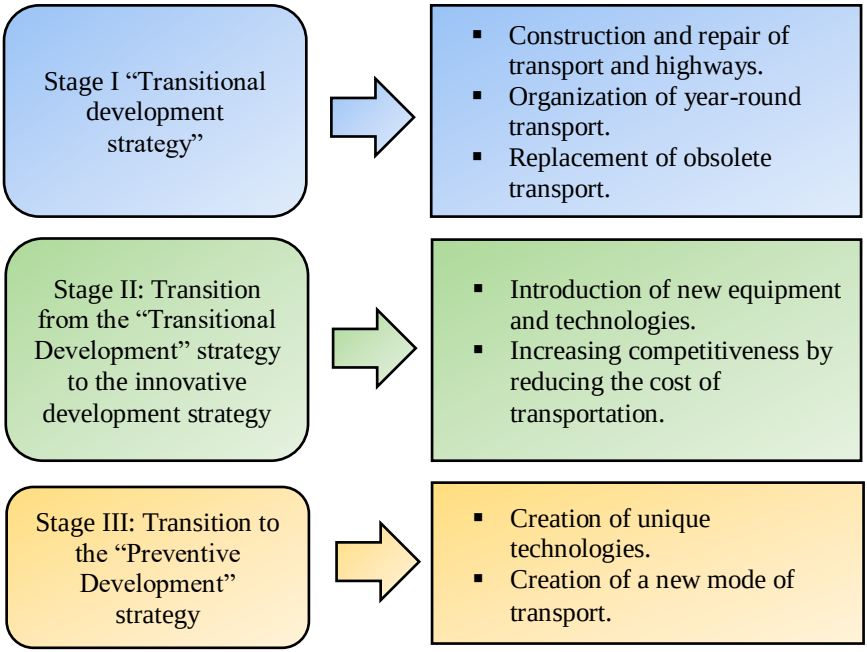

Figure 1. Innovative strategy model for the development of the regional transport complex

Source: Figure compiled by the author

[4] Gareeva, N.A. "Assessment of Innovation-Oriented Regions in the Context of Marketing Management." Current Issues of Science and Technology, Izhevsk, 2021, pp. 642–645.

The first stage is the modernization of the transport system, which involves a complete reconstruction of the transport system in accordance with the requirements that meet the realities of the modern era. The modernization procedure should be based on the principles of development, introducing various innovations. Currently, the national transport system is moving into the “development” stage, and the goal is to transform transport companies in the future into a comfortable development stage in an innovative aspect. The main tasks of this stage are the same as those already planned: updating the road infrastructure, creating year-round transport communications, replacing obsolete vehicles with a service life of up to 10 years.

The successful implementation of this stage depends on the ability of transport companies to improve the acquired technology in order to keep up with competitors. One of the most important events taking place in the country today is the creation of a transport and logistics center in the Alat settlement, which will combine all types of transport, warehouse and logistics facilities, telecommunications and insurance support necessary for the transportation of goods along various routes into a single system.

The third stage is the implementation of a development strategy (innovative management strategy), that is, the use of national achievements of the transport complex in the field of new materials and technologies (including the military industry) in order to develop our own technologies (including industrial parks), as well as the development of promising methods of transportation in order to increase competitiveness not only in the regional, national, but also in the global market. If a phased approach is chosen at the first two stages, then a move towards intensive development is applied here. Since at the beginning of the third stage the volume of transported cargo will increase (compared to the current level), it is very important to accelerate the supply of goods, taking into account the high dynamics of market activity.

The main objectives of the three stages of this strategy are to focus on the priorities of sustainable development, the formation of national incentives and the main opportunities for obtaining financial benefits in these areas. The difficulty in choosing an experimental innovation is overcome by a detailed analysis of the following conditions: the purpose of the acquired technology or transport equipment, the

expected efficiency from the application of the innovative solution, risk analysis, and the features of the subsequent modernization process. The determination of the best option for an innovative solution should be based on the calculation of an integral indicator that combines all these conditions. The tasks and objectives of the innovative development stage (including long-term ones) describe a modern view of reality at a certain time period. Also, along with the dynamics of the development of the transport system, at least based on the formation of new realities and business criteria, the potential and range of achieving the desired goals may change. In this context, it is necessary to constantly develop innovative solutions that allow transport companies to increase their competitiveness.

In Chapter II of the dissertation entitled **"Current Status of the Transport and Logistics Complex of the Republic of Azerbaijan and Analysis of Subsystems",** issues such as analysis of the modern state of logistics processes in railway and road transport, assessment of logistics capabilities in the modern geoeconomic situation, assessment of potential opportunities of the transport and logistics system of Azerbaijan on the Trans-Caspian International Transport Route ("Middle Corridor" project) were analyzed.

On February 13, 2017, according to the presidential decree, two ministries in Azerbaijan were merged into a single Ministry of Digital Development and Transport. It included the Ministry of Transport and the Ministry of Communications and High Technologies. Now it is this organization that is most actively engaged in improving the quality of management with the help of digital tools, innovations and technological solutions in the field of communications.

Increasing the efficiency of transport arteries is primarily a response to modern challenges created by globalization processes. Within the macroregion, Azerbaijan is trying to cover as wide a market as possible and ensure freedom of access to a wide range of goods and services. Maintaining high-level economic and trade relations is the main task of increasing the quality, speed and volume of international transportation.

Let's continue with the analysis of statistical data on the current state of road transport in our republic. First, let's analyze the cargo turnover in the road transport sector (chart 1).

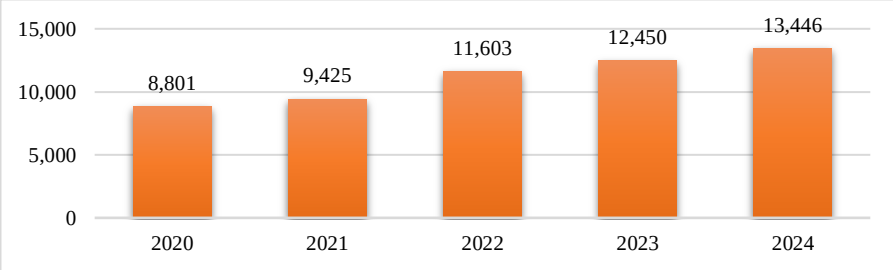

Chart 1. Dynamics of road freight transportation (million tons/km)
Source:*https://www.stat.gov.az/menu/6/statistical_yearbooks/source/transport_2024.zip.*

As can be seen from Chart 1, the freight turnover of road transport in Azerbaijan is increasing year by year during the studied period. This increase was even observed during the Second Karabakh War. It is clear from the figures that during 2020-2024, freight turnover increased by 1.5 times, and the average annual growth rate was approximately 11%. It should be noted that the growth of road freight transportation in the last 5 years is associated not only with the development of the country's oil and gas sector, but also with the rapid growth of the non-oil sector.

In general, the specific weight of road freight transportation has been superior in recent years compared to other types of transport. Thus, the structural ratio of transport engaged in domestic freight transportation in 2023 is reflected in the diagram below (diagram 1).

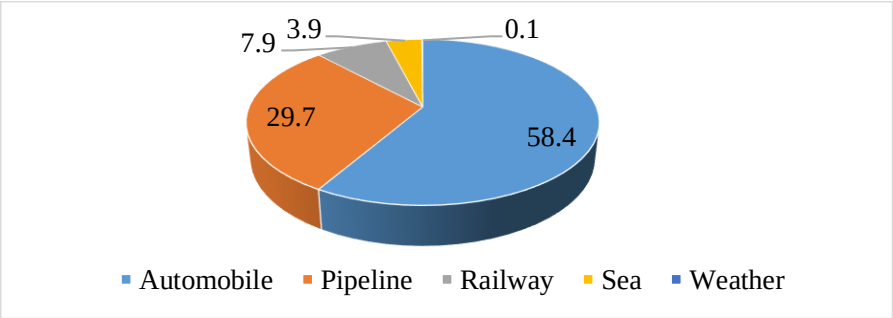

Diagram 1. Share of freight transportation by transport mode (%)
Source:https://economy.gov.az/storage/files/files/6299/yUY5C6dFoLmFDuOYjpbSBHAJmyb9dtNLJUtnNyZE.pdf

According to the statistical data presented in Figure 1, the transport system demonstrates a clear diversity in the distribution of cargo flows. Road transport provides 58.4% of total transportation, which allows it to be classified as the dominant type of transport in this system. Pipeline transport takes second place with an indicator of 29.7%, which accounts for more than a quarter of all transportation. Railway transport provides 7.9% of cargo turnover, and sea transport - 3.9%. The share of aviation transport is statistically insignificant.

In general, the revenue from road freight transportation in 2019-2023 also demonstrated positive dynamics (Chart 2).

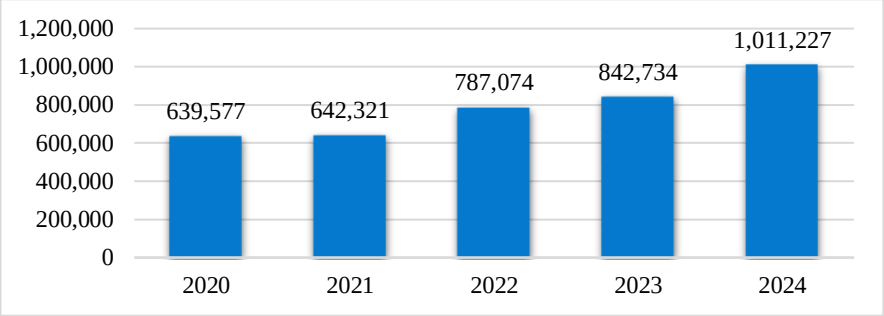

Chart 2. Revenue from road freight transportation, thousand manats
Source:https://www.stat.gov.az/menu/6/statistical_yearbooks/source/transport_2024.zip.

As can be seen from Chart 2, the statistical data covers the period 2020–2024, which is characterized by significant economic fluctuations associated with both global crisis events and structural transformations in the system of international economic relations.

The analysis of the time series of road freight revenues demonstrates clear positive dynamics throughout the studied interval. The absolute growth of the indicator amounted to 371,650 thousand manat, and the relative growth was 58.1%. The average annual growth rate for the period under review was 11.6%, which is significantly higher than the typical GDP growth rates in developing economies.

In recent years, work has become even more intensive to modernize and expand the existing railway network. High international standards are taken as a basis. Deep interaction with international partners is

ensured for the rapid and uninterrupted operation of the Baku-Tbilisi-Kars route and two other major projects - the “Middle Corridor” and the “North-South” projects.

In addition, reconstruction work has intensified in Nagorno-Karabakh. After the reconstruction of the Horadiz-Aghband railway, which is a key part of the Zangezur corridor, it is planned to increase the accessibility of the liberated territories. The ultimate goal is a direct connection between the main part of the country and the Nakhchivan Autonomous Republic. At the same time, the Barda-Aghdam railway, which served thousands of passengers every month until 1991, is being restored. The dynamics of the development of freight transportation by rail are reflected in chart 3.

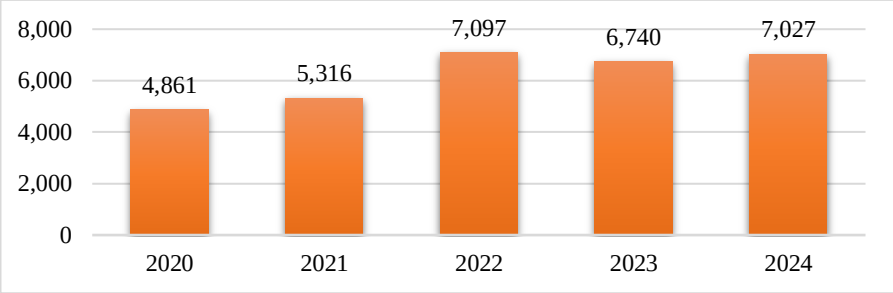

Chart 3. Dynamics of freight transportation by rail (million tons/km)
Source:https://www.stat.gov.az/menu/6/statistical_yearbooks/source/transport_2024.zip.

As can be seen from Chart 3, freight transportation by railways has begun to increase since 2020. These transportations reached their peak (maximum) in 2022. It should be noted that goods going abroad from Azerbaijan mainly go along the “Middle Corridor”. In this corridor, most of the cargo is carried by road. Analysis of the graphical indicators reflects the complex nonlinear development direction of railway freight turnover. In 2020, the base value of freight turnover by railway was 4,861 million ton-kilometers. The maximum value was recorded in 2022 at 7,097 million ton-kilometers, which is 46.0% higher than the base value. The final value for 2024 (7,027 million ton-kilometers) indicates a total increase of 44.5% compared to 2020.

The average value of freight turnover for the period under review

is 6,208 million ton-kilometers, and the statistical standard deviation is 1,074 million ton-kilometers, which proves the significant variability of the indicator and the presence of structural changes in the sector's activities. At the same time, the revenue from rail freight transportation in 2019-2024 demonstrated positive dynamics (Chart 4).

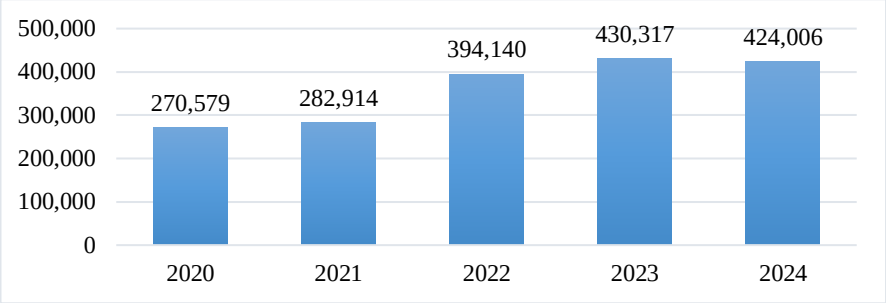

Chart 4. Revenue from railway freight transportation, thousand manats.
Source:https://www.stat.gov.az/menu/6/statistical_yearbooks/source/transport_2024.zip.

The statistical data presented in Chart 4 reflects the trajectory of revenue from freight transportation in the Azerbaijani railway sector in the period 2020–2024 and demonstrates the presence of a clear positive trend.

In 2020 (the peak period of the pandemic), revenue amounted to 270,579 thousand manat. In 2024, this indicator reached 424,006 thousand manat, and an overall increase of 56.7% was recorded compared to the base year (absolute increase +153,427 thousand manat). The average compound annual growth rate (CAGR) was calculated at 11.9%, which is considered high dynamics compared to other segments of the transport sector.

The growth rates by year were uneven. Thus:

• 2020–2021: +6.8% (initial and weak recovery);

• 2021–2022: +36.4% (maximum jump, absolute increase of 105.2 million manat);

• 2022–2023: +9.3% (relative decrease);

• 2023–2024: +2.5% (lowest annual growth).

The already established relations between shippers, Eurasian

partners and other market participants allowed to achieve more effective results than before. In particular, the work carried out over many years to ensure the sustainable operation of the railway network has raised Azerbaijan's competitiveness to a new level due to the increase in the volume of transportation and railway transportation. In fact, the railway transport transport indicators are updated every year in a row. The main factor was the increased participation in Eurasian projects, but the rapid development accompanying it in related industries also makes its mark.

The task of diversifying transport arteries in the territory of the Republic of Azerbaijan is now emerging. It is necessary to diversify only in order to regulate the growing flows. Another way out from here to the eastern countries will be the construction of the railway lines "China – Kyrgyzstan – Uzbekistan" and "Tajikistan – Afghanistan – Turkmenistan".

The Zangezur corridor will play an important role in strengthening ties with Georgia, since this corridor itself plays the role of a substitute for other routes and its analogues are needed. Currently, there is only one road connecting Baku with Tbilisi, but one more road (Yevlax – Balakan) will increase reliability and expand the circulation of goods and passengers. In addition, this contributes to the development of the Araz corridor, which currently passes through the territory of Iran - the corridor plays the role of a full-fledged route replacing the Zangezur corridor.

Chapter III of the dissertation entitled **"Development prospects of the transport and logistics complex of the Republic of Azerbaijan"** examines issues such as investments in the transport sector and its prospects, improvement of the transport and logistics complex of the Republic of Azerbaijan, creation of added value on transit routes in Azerbaijan, priorities of the transport policy of the Republic of Azerbaijan and institutional reforms required in this area. In our opinion, in order to strengthen the achieved results and ensure the future development of the transport sector, it is necessary to continue investments in infrastructure and apply modern approaches to management. The application of public-private partnership (PPP) is a promising direction that allows attracting special investments and

optimizing the allocation of resources. Various PPP models, such as cooperation, leasing, concession, etc., can be applied depending on the specific project conditions. However, for the effective functioning of the PPP, it is necessary to clearly define the institutional framework of cooperation, ensuring transparency, risks and fair distribution of responsibility between the state and private partners. The experience of international PPP practices can serve as a basis for developing an effective development strategy for the transport infrastructure of Azerbaijan.

Participants in public-private partnership (PPP) projects in the field of transport infrastructure are structured into specialized groups of management entities, depending on the functions performed (table 1).

Table 1.

During the implementation of a transport and logistics infrastructure project, partner management entities - investors and PPP participants

PPP participants with investors and investment attraction	**PPP participants without attracting investments**
The role of state and municipal authorities in projects includes licensing, provision of state guarantees and land plots, definition of objective goals and development directions, as well as possible co-financing and participation in management.	Transport companies, including rail, road and other modes of transport, together with logistics service operators and adjacent infrastructure owners (terminals, yards, IT platforms and service providers), as well as customs brokers, ensure integration with the main transport arteries.
The project involves leading logistics, industrial, commercial and development companies as special partners and co-investors, forming a management company responsible for all stages of project implementation, from construction and development to operation, marketing and management.	Potential tenants of logistics projects include forwarding companies, transport operators, warehousing companies, logistics departments of manufacturing enterprises, as well as logistics providers providing services at the level of a regional center and technology firms specializing in the automation and mechanization of warehousing processes.

Source: Table compiled by the author.

It should be noted that in order to form added value, the logistics center should offer the widest possible range and volume of additional services. This value is defined as the difference between the price that

the buyer is willing to pay for the expanded product and the cost of production and delivery for use. This value can be affected by operations aimed at increasing the functional parameters of products. Services are usually enriched with products in logistics centers. During the implementation of the expanded service, additional new value is created on the basis of the "shipper - recipient" relationship, which can lead to a number of effects in the transport and logistics chain as a whole (Figure 2).

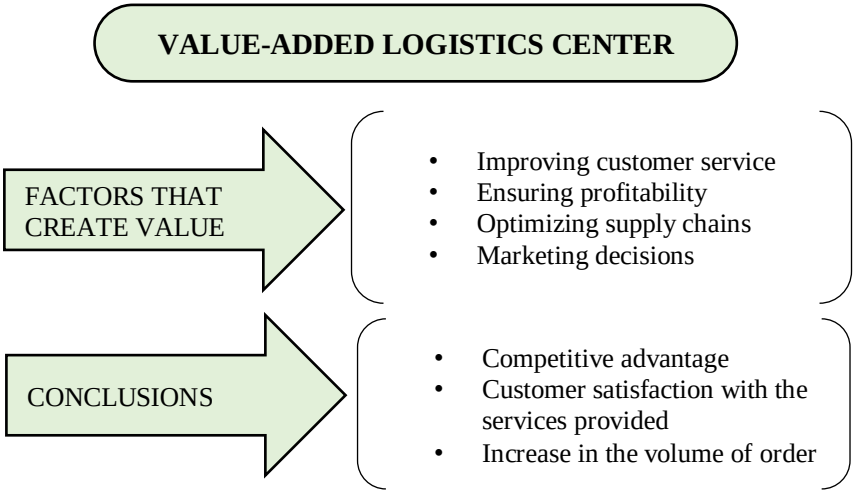

Figure 2. Factors and results of value creation in a logistics center
Source: figure was compiled by the author.

Future research may focus on developing standardized methodologies for measuring added value, integrating digital technologies (Internet of Things, artificial intelligence) into logistics chains, and developing high-margin services such as agricultural processing. Analyses of the impact of logistics centers on the regional economy and infrastructure modernization will strengthen Azerbaijan's position in global logistics chains. These studies will serve to increase the country's economic competitiveness and sustainability.

Consequently, creating added value on transit routes is of strategic

importance in realizing Azerbaijan's economic potential.

The most important component of logistics added value is cooperation between enterprises cooperating with the logistics center; various factors, including coordination of activities, can significantly affect this. The signing of flexible, responsive, and timely contracts indicates the high quality of cooperation between enterprises. An indirect impact on logistics added value can be demonstrated by joint information exchange and joint decision-making. It often happens that the better the cooperation between enterprises cooperating with the logistics center, the higher the logistics added value. However, disruptions in collaboration are also another source of logistics value, as they develop new forms of collaboration. All these components can form the basis of a logistics value chain. They explain why value is created in the logistics center and in the business entities collaborating with it. Interdependence, coordination and location in the chain affect value through the harmony of their activities. Interdependencies affect the quality of the network of relationships between the logistics center and the entities connected to the supply value chain on the one hand and the other.

CONCLUSION

The development of the transport and logistics system of Azerbaijan faces a number of challenges. Issues such as modernization of infrastructure, increasing the competitiveness of logistics services, application of digital technologies and ensuring environmental sustainability are among the main problems in this area. Large investments have been made in the development of railway, road, sea and air transport infrastructure in the country, but the efficient management of this infrastructure and its adaptation to international standards still remain relevant. For example, although projects such as the Baku-Tbilisi-Kars railway or the Alat International Sea Trade Port have made Azerbaijan an important player on the global logistics map, in order to fully utilize the potential of these projects, it is necessary to optimize logistics services and strengthen regional cooperation. Taking into account the above, summing up our research, we should

note that the following main scientific results were achieved in the dissertation work, and scientifically and practically significant proposals and recommendations were put forward.

1. When developing transport networks, work should be carried out to build new, shorter or less loaded lines. This may allow increasing the carrying capacity of the shortest highways, as well as locating production facilities along the already existing, well-equipped and developed transport lines.

2. The development of the transport system creates conditions for the formation of a more efficient economic space in Azerbaijan, and there is a continuous relationship between the growth of freight traffic and economic development. Since long-term investments in the transport sector are justified, the application of innovative technologies is considered necessary. A number of modernization projects aimed at developing innovative technologies in the transport sector are envisaged within the framework of the State Program "Azerbaijan 2030: National Priorities of Socio-Economic Development". The application of new technologies may allow reducing the lag of Azerbaijan from advanced trends in the transport and logistics sector in other countries in conditions of limited resources.

3. Modern transport enterprises can be classified according to their industrial orientation as intra-industrial, extra-industrial and combined. The first group includes transport enterprises whose main activity is directly related to the organization of transport. The second group includes transport enterprises operating in the field of production, repair, and technical service of vehicles and other basic means. Changing the form of ownership does not in itself automatically guarantee the achievement of efficiency in financial and economic activities. Restructuring the ownership structure alone is not enough to create a management system that can turn a loss-making or inefficient enterprise into a profitable one.

4. In our opinion, the practical value of the proposed concept based on a unified management mechanism for improving the quality of transport services is not only its application in real conditions, but also the use of the simulation method through experimental calculations of

forecast indicators of financial and economic activity. The scientific novelty of the results obtained can be used in the formation of new methodological foundations for studying the process of providing transport services and in building a unified mechanism for managing a transport enterprise, taking into account the characteristics of the economy.

5. We believe that by 2030, it is necessary to equip the railway transport of Azerbaijan with satellite navigation systems on a large scale and integrate them into a common coordination system. Complex control should be the basis for studying and predicting the operational state of each element and technological process of the operational unit. In our opinion, in two to three years it will be possible to solve the problems of using satellite technologies for the purpose of instantly searching for the location of the relevant transport for cargo and passenger transportation (including for the transportation of special cargo and explosive cargo). There is a potential for developing digital electronic maps of railway routes and their service networks, which can be developed and updated using the GPS spatial navigation system. This work can allow solving the problem of flexible management of segmentation of transportation in order to increase the efficiency and capacity of the railway network, analyze the state of the infrastructure, as well as identify environmental and technogenic hazards.

6. Today, scientific, technical and organizational development of solutions to improve operational activities on railways is ongoing. The most promising in this regard is the introduction of electronic sealing systems and electronic identification tools. The widespread application of innovative approaches will increase the safety and stable mobility of cargo due to the ability to promptly respond to possible incidents, including unauthorized access to wagons.

7. The introduction of public-private partnerships (PPPs) is a promising direction that allows attracting special investments and optimizing the allocation of resources. Various PPP models, such as cooperation, leasing, concessions, etc., can be applied depending on the specific project conditions. However, for the effective functioning of the PPP, it is necessary to clearly define the institutional framework

of cooperation, ensuring transparency and fair distribution of risks and responsibilities between the state and private partners. The experience of international PPP practices can serve as a basis for developing an effective development strategy for the transport infrastructure of Azerbaijan.

8. For the successful implementation of projects, it is necessary to ensure transparency and public participation at all stages. When financing, especially when it is implemented by the state, social and environmental efficiency is often a priority over purely financial profitability, especially for strategically important projects that contribute to sustainable development.

9. Our research showed that the main development directions of the transport and logistics infrastructure include the following:

- construction of modern high-speed highways and railways;
- reconstruction of existing transport arteries in accordance with new standards;
- creation of optical-fiber communication lines to ensure logistics and transport processes;
- development of regional transport infrastructure, in particular, in the Karabakh and East Zangezur regions, as well as in the areas of implementation of national projects;
- construction of new ports and increasing the existing throughput capacity for foreign trade cargo (fruits, vegetables, coal) and container transportation;
- transfer of foreign trade flows from foreign ports to Azerbaijani ports;
- formation of hubs for air transportation, construction and modernization of terminals for cargo and passenger transportation, as well as reconstruction of runways;
- expansion of the capacity of existing terminals, including container complexes, and creation of new ones;
- application of modern logistics and digital technologies;
- creation and modernization of transit infrastructure to accelerate cargo delivery, enhance their protection and improve the quality of service;

- optimization of border checkpoints, simplification of customs procedures, their alignment with international standards;
- application of digital technologies for customs control and electronic tracking of goods and vehicles.

10. For the effective functioning of the international transport corridor, the coordinated work of distribution centers, consignors and carriers is important. In the development of transport and logistics infrastructure, external (uncontrollable) and internal (dependent on policy and organizational structure) factors are distinguished. The main internal problems are the following:

- Infrastructure diversification: Since the expansion of the railway network requires high costs, a more realistic direction is the development of mixed transportation and strengthening the integration of rail-road transport.
- Technological level: An outdated rolling stock and a lack of specialized wagons reduce the competitiveness of the railway, but the reforms carried out may improve the situation in the coming years.
- Personnel training and motivation: Weak employee motivation limits the increase in service quality, and progress in areas where competition is weak is possible only with state regulation and strengthening reforms.

11. We put forward the following proposals to increase the speed of freight transportation on Azerbaijani railways and reduce the cost:

- The introduction of special containers (containers) instead of wagons will significantly reduce the time for loading and unloading cargo and reduce the cost by shortening the total duration of transportation.
- The introduction of folding containers, as in the Chinese experience, will make the return transportation of empty containers much cheaper and create great savings in logistics. It is possible to introduce such containers in Azerbaijan in a short time.
- The installation of special climate systems in wagons and trucks for perishable cargo such as fruits and vegetables will

significantly reduce product loss by maintaining a constant temperature and humidity and increase the quality of transportation.

12. One of the important steps in the implementation of the "Middle Corridor" in Azerbaijan was the creation of the Alat Free Economic Zone and the very large "Absheron" regional logistics center. The success of this initiative will be determined by how efficiently it can achieve the organization of uninterrupted supplies of cargo from East Asia to Europe. At this time, special attention should be paid to the organization of warehousing within this center. The application of artificial intelligence technologies and machine learning to logistics processes is becoming an important direction. These technologies allow you to predict demand, optimize transportation routes and automatically allocate resources, which significantly increases the efficiency of the entire system. In addition, the strengthening of international cooperation in logistics creates new opportunities for integration into global supply chains.

13. To form added value, the logistics center should offer the widest possible range and volume of additional services. This value can be affected by operations aimed at increasing the functional parameters of products. Services are usually enriched with products in logistics centers. During the implementation of an extended service, additional new value is created on the basis of the "shipper - recipient" relationship, which can generally lead to a number of effects in the transport-logistics chain. We have reflected the structure of the added value created in the proposed logistics center in Figure 3.3.1 of the dissertation.

14. Standardization of service efficiency in the logistics center can increase efficiency, and collaboration in the chain can give the center better understanding and opportunities to manage the changing environment at lower costs. It should be noted that the creation of new added value in the logistics center can increase, for example, when special control is applied to incoming materials and incoming transport and warehousing services. This can be as shown in Figure 3.3.3., where new value can be achieved by ensuring the storage control of materials and products during transport to quality control zones.

15. In our opinion, in order to develop a program for adding added value in freight transport enterprises in Azerbaijan, the specificity of the country's transport sector, its strengths, such as its geographical location and participation in international corridors (TRACECA, “North-South”), as well as current problems - high transport costs, insufficient digitalization, lack of qualified personnel, outdated infrastructure and limited financing of innovations should be taken into account. The program should help reduce costs, increase efficiency and competitiveness, and increase non-oil exports in line with Azerbaijan's strategic goals.

The following articles and theses of the author on the topic of the dissertation have been published:

1. Aghayev Z.B. The role of the transport sector in the Economy of Azerbaijan // – Baku: "Cooperation" scientific and practical journal, 2024, № 3 (74). – p. 153-160

2. Aghayev Z.B. Main methodological ıssues of the activity of logistics systems // – Baku: "Construction Economics and Management" scientific and practical journal, 2024, № 3. – p. 119-125

3. Aghayev Z.B. The modern place of the transport sector in the Azerbaijani economy // – Baku: Materials of the republican scientific-practical conference on the topic "The role of national leader Heydar Aliyev in improving the environment in Azerbaijan", 2024. – p. 71-73.

4. Aghayev Z.B. Systematic approach to the logistics system and its improvement // – Baku: Book of Proceedings of the XI International Turkic World Studies Symposium, 2024. – p. 853-858.

5. Aghayev Z.B. Transcaspian International Transport Route (TiTR) in the Context of the Development of the Central Trade Corridor // – Moscow: Competitiveness in the global world, 2025, № 2. – p. 3-7

6. Aghayev Z.B. Modern Trends in Investments in Transport and Public-Private Partnership // – Baku: Scientific News Journal of Western Caspian University: Social and Technical Sciences Series, 2025. – p. 101-108

7. Aghayev Z.B. Creating Added Value on Transit Routes in Azerbaijan // – Baku: “Construction Economics and Management" scientific and practical journal, 2025, № 2. – p. 415-425

8. Aghayev Z.B. Prospects of investments in the logistics sector of Azerbaijan // – Ganja: Materials of the international scientific-practical conference on the current state and development prospects of science and technology in the era of the fourth industrial revolution, 2025. – p. 20-22

9. Aghayev Z.B. Potential of investments in the logistics sector of Azerbaijan // – Togliatti: "Development of the Innovation Ecosystem of the Russian Federation Based on Import Advancement Processes in Technological Innovations for Economic Sectors" Collection of scientific articles from the International Scientific and Practical Conference, 2025. – p. 47-53

The defense will be held on 29 April 2026 at 16^{00} at the meeting of the Dissertation council FD 2.46 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan Cooperation University.

Address: AZ1106, Azerbaijan Republic, Baku city, Narimanov district, Najaf Narimanov street, 93.

Dissertation is accessible at the Azerbaijan Cooperation University Library.

Electronic version of the abstract is available on the official website of the www.aku.edu.az

Abstract was sent to the required addresses on 18 March 2026.

Signed for print: 17.03.2026

Paper format: 60 x 84 1/16

Volume: 42036 characters

Number of hard copies: 20 pcs