

A. M. Dauzova¹, S. Dyrka², V. L. Nazarova¹, A. A. Korzhengulova¹, K. Alaidarkyzy¹

¹Almaty Academy of Economy and Statistics, Chair of Accounting, Audit and Statistics, Almaty, Kazakhstan,

²Upper Silesian University of Economics named after V. Korfantogo, Katowice, Poland.

E-mail: aida_dauzova@mail.ru, stefan.d@onet.eu, vnazarova@lenta.ru, asiya_akanovna@mail.ru, alaidar@mail.ru

SCIENTIFIC-METHODICAL BASES OF THE DEVELOPMENT OF TRANSPORT LOGISTICS IN THE REPUBLIC OF KAZAKHSTAN

Abstract. The resolutions of the Government of the Republic of Kazakhstan (RK) and other state documents pay special attention to the development of the unified transport system of the Republic of Kazakhstan, modernization of all its elements, improving the efficiency of the transport complex, providing services to key sectors of the economy. It is also emphasized that the transport complex of the Republic occupies a special place in ensuring the implementation of the state strategy of further dynamic and stable development of the economy of Kazakhstan, its integration into the world economy. In this article discusses the issues of scientific and methodological basis for the development of the system of regional transport and logistics centers, taking into account the specifics of the Republic of Kazakhstan. In the context of market competition and globalization of the world economy, the most important factor of economic growth is the formation of integrated logistics systems, covering both individual areas of business and entire regions and countries. As a relatively new methodology of market orientation, which allows regulating regional markets of goods and services, the article considers the logistics approach, which provides an increase in the overall synergetic effect on the basis of the integration of participants of the regional system of cargo and goods movement.

Key words: transport and logistics centers, integrated logistics systems, logistics approach, transport and logistics infrastructure, cargo transportation volume, advanced logistics technologies, integration, world economy, entrepreneurship, economic growth.

Introduction. One of the most effective ways of economic and social development, both in individual regions and the Republic of Kazakhstan, in general, is the formation of a backbone network of regional transport and logistics centers. Logistic approach to material flow management has been known for a long time. However, the economy on a fairly large scale demands relatively recently. This is due to factors of the external material flow management systems, as well as the development of the logistics approach. Experience of using logistics systems in the developed capitalist countries shows, that transport costs were reduced on 7-20%; the cost of loading and unloading, storage inventories and finished products was reduced on 15-30%; total logistics costs on 12-35%; material stocks was accelerated on 20-40%; stocks of materials and finished products were reduced on 50-200%.

Methods. The results of the analysis of scientific research, as well as Russian and foreign experience in the management of the transportation process, show that one of the most significant areas of improvement of the cargo system and the movement of goods is the creation of support network of regional transport and logistics centers, which improve the productivity of vehicles, reduce the time of turnover, improve the coordination and interaction of modes of transport, the development of multimodal and intermodal transport of goods in containers, providing additional services to the clients on the level of international standards.

Results and discussion. Our bibliographic research showed that the applied aspects of use the logistics tools in the management of transport in our country have not yet been fully formed. However, over the past decade, a number of researchers have made a significant contribution to the definition of this fundamental application area. Theoretical and methodological basis of this research is laid in the works of

domestic and foreign scientists, for instance, A.I. Berg, A.N. Romanova, A. Vaisman, L.B. Mirotin, D.O. Novikov, V.N. Stakhanov, Y.E. Tashbayev. These issues were reflected in the works A.M. Gadzhinskiy, J.M. Nerush, A.A. Smekhov.

Among the foreign works in this area can be identified the research works of Ronald H. Ballou, M. Cristopher, J.A. Cooke, J. Durant, A.T. Kearney, M. Laplaze, J. Meunier, J. Weil, and others.

There are many logistic periodicals abroad. Among them are the following: Journal "Taga" (Switzerland), "International Journal of Physical Distribution and Logistics Management" (Great Britain), Journal of Business Logistics (USA), Modern Logistics Management (Germany). Very interesting ideas of logistics we can see in the Russian periodicals. There are such famous journals, as: Logistics, LogInfo, Resources: Information, Supply, and Competition. International Road X Transportation, and others.

It should be noted that the regional aspects of transport logistics in relation to the conditions of Kazakhstan have not been sufficiently studied. There are such Kazakh authors, who research this problem: Burkotov E.V., Tuleushin S.T., V.P. Dobritsa, Sisekenova M.B., and others [1, p. 38].

They created theoretical scientific base of logistics management on transport. At the same time, the development of information technologies, globalization of goods and transport markets, the integration of Kazakhstan into the world transport system require new scientific generalizations and determine the range of tasks to be solved in our article.

The relevance of logistics is explained by several factors:

- economic, the main priority for the company to search the opportunities to reduce production costs, in order to increase the profit of the organization and the growth of quality, providing a range of services to the consumer, therefore, the development of market relations, the principle of "calculation+benefit+consumer", which leads to increase of the importance of logistics;

- information, which most closely connects to the market and logistics, as the subject, means and component of logistics processes;

- technical, which manifested in the fact that logistics as a management system, its subjects and objects are developed on the basis of technical achievements in the warehouse and management (automation and computerization of management), providing decisive success in commodity markets [2, P.64].

In Kazakhstan, there is a formation of a multi-layered economy, intensive development of the market of transport services, the creation of a competitive environment in the field of goods movement and international transport of goods, changes in the system of organizational and economic relations between the participants of the transport process while strengthening the integration trends in the world economy, which requires the search for adequate market mechanisms to ensure the effective functioning of the transport complex, which is considered logistics.

In the world economic system, logistics, as the most effective, market-oriented way of planning, formation and development of commodity-material and related flows with the lowest costs in the entire logistics chain, has firmly gained its position.

The operation of transportation determines the efficiency of moving products. The progress in techniques and management principles improves the moving load, delivery speed, service quality, operation costs, the usage of facilities and energy saving. Transportation takes a crucial part in the manipulation of logistic. Reviewing the current condition, a strong system needs a clear frame of logistics and a proper transport implements and techniques to link the producing procedures. The objective of the paper is to define the role of transportation in logistics for the reference of further improvement. The research was undertaken to assist logistics managers, researchers and transportation planners to define and comprehend the basic views of logistics and its various applications and the relationships between logistics and transportation [3, p. 58].

Table 1 provides an overview of the Periods of development of logistics. Logistics services, information systems and infrastructure/resources are the three components of this system and closely linked. Also four characteristics of the period were included.

The interaction of the three main components in the logistics system is interpreted as follows. Logistics services support the movement of materials and products from inputs through production to consumers, as well as associated waste disposal and reverse flows. They include activities undertaken in-house by the users of the services (e.g. storage or inventory control at a manufacturer's plant) and the operations of external service providers.

Table 1 – Periods of development of logistics

The name of the period	The characteristics of the period
Fragmentation Period (1920-1950)	The formation of the principles of logistic management of material flows and reduce the overall costs
Period of formation (1950-1970)	Formation of the theory and practice of logistics, search for new ways to reduce costs in production and distribution, development of computer and information technologies
Period of Development (1970-1980)	Finding new ways to reduce production and distribution costs
Integration period (1980-1990)	Combining the logistics functions of the company and its partners in the logistics chain (purchase-production - distribution of sales)

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Since logistics advanced from 1950s, there were numerous researches focused on this area in different applications. Due to the trend of nationalization and globalization in recent decades, the importance of logistics management has been growing in various areas. For industries, logistics helps to optimize the existing production and distribution processes based on the same resources through management techniques for promoting the efficiency and competitiveness of enterprises. The key element in a logistics chain is transportation system, which joints the separated activities. Transportation occupies one-third of the amount in the logistics costs and transportation systems influence the performance of logistics system hugely. Transporting is required in the whole production procedures, from manufacturing to delivery to the final consumers and returns. Only a good coordination between each component would bring the benefits to a maximum [5, p. 16].

The purpose of this paper is to re-clarify and redefine the position relationship between transportation and logistics systems through collecting and analyzing various application cases and practices in logistics from literatures. It is to provide a general framework and expect to be referred for further development and researches. The paper started from introducing the development of logistics and transport-related sectors based on a historical review. Afterwards it discussed the interrelationships of transportation and logistics. It expresses the benefits that transportation brings to logistics activities and vice versa. For instance the increase of the efficiency of logistics also would bestead to release traffic load in the urban areas. Furthermore, some major logistics activities and concepts were also discussed in this paper. It especially presents City Logistics independently due to it is considered as a main tendency and an available method of future integration of transport and logistics in the urban areas. Finally, this paper will discuss and conclude the potential further development of logistics systems.

Currently, there is a model of relations between marketing and logistics in the management of all economic activities of the company:

- environmental analysis and market research;
- analysis of consumers;
- planning of goods, definition of assortment specialization of production;
- planning of services, optimization of market behavior on effective sales.

The first two marketing tasks can be solved without the participation of logistics, but the third and fourth should be solved together.

It should be noted that the object of logistics has been researched through material flow, but at some stages of its management is quite specific. Thus, procurement logistics is the management of material flows in the process of providing the enterprise with raw materials. At this stage, the contracts are

concluded and their execution is controlled, measures are taken in case of violation of the terms of delivery [6, p. 28].

Logistics services comprise physical activities (e.g. transport, storage) as well as non-physical activities (e.g. supply chain design, selection of contractors, freightage negotiations). Most activities of logistics services are bi-direction. Information systems include modeling and management of decision making, and more important issues are tracking and tracing. It provides essential data and consultation in each step of the interaction among logistics services and the target stations. Infrastructure comprises human resources, financial resources, packaging materials, warehouses, transport and communications. Most fixed capital is for building those infrastructures. They are concrete foundations and basements within logistics systems.

A significant part of logistics operations on the way of material flow is carried out with the help of various vehicles, and transport is a link between the elements of logistics systems.

Transport logistics is the movement of the required amount of goods to the desired point by the optimal route in the required time and at the lowest cost.

The exhibits at transport logistic cover the entire value-added chain in the industry, from intralogistics and warehouse management to systems and services for freight transport, and IT, telematics and telecommunications solutions. A detailed breakdown of the range of products and services on display is set out on the shows [7, p. 171].

The biggest exhibition of transport logistic every year we can see in Germany. The visitors and exhibitors at transport logistic come from all over the world, the majority, however, from Europe. According to Messe München, the international scope of this show is increasing steadily: in 2013 45% of the exhibitors came from outside Germany.

Establishing the most appropriate location of the facility in terms of logistics distribution network and customers can be quite critical. Potential suitability investigation of the region to set up an appropriate logistics geographical area center would be useful to be determined from multiple criteria. In geographic information systems (GIS), spatial analyses which consider multiple criteria are called multi-criteria decision analysis (MCDA). The aim of this study is to evaluate planning performance of GIS to determine logistics centers. This study was conducted to analyze the most suitable place for establishing new logistic park according to specified five criteria. The criteria which taken to account in practice have identified as: production areas, residential areas, leisure areas, transit transport network and slope map. Some district was selected as study of area. After all to the direction of selected criteria and given weights; close to the industrial areas, away from the residential areas, low slope areas, quit close to transit and port areas were identified as potential logistics park areas and GIS was found rapid and objective to produce suitable potential logistic areas.

The result of using the transport logistics system is a high probability in the “six rules of logistics”: the right cargo, in the right place, at the right time, in the right quantity, quality, with minimal costs [7, p. 172].

Logistics was initially a military activity concerned with getting soldiers and munitions to the battle-front in time for flight, but it is now seen as an integral part of the modern production process. The main background of its development is that the recession of America in the 1950-s caused the industrial to place importance on goods circulations. The term, logistics, was initially developed in the context of military activities in the late 18-th and early 19-th centuries and it launched from the military logistics of World War II. The probable origin of the term is the Greek *logistikos*, meaning ‘skilled in calculating’. Military definitions typically incorporate the supply, movement and quartering of troops in a set. And now, a number of researches were taken and made logistics applications from military activities to business activities. Business logistics was not an academic subject until the 1960-s. A key element of logistics, the trade-off between transport and inventory costs, was formally recognized in economics at least as early as the mid-1950-s.

The tasks solved by transport logistics, experts include:

- development of transport systems, including transport corridors and chains;
- ensuring technological unity of the transport and warehouse process;
- joint planning of transport process with warehouse and production;
- determination of the rational route of cargo delivery;

- selection of the type and type of vehicle, etc.

At the level of logistics management of the enterprise, transport logistics management consists of several main stages:

- choice of mode of transport;
 - choice of mode of transport;
 - vehicle selection;
 - selection of carrier and logistics partners for transportation;
 - optimization of transport process parameters.
- There are two main approaches to the organization of the transport process:
- traditional;
 - logistics, with the participation of the multimodal transport operator [8].

In the traditional approach, there is no single function to control them through material flow. The consistency of links in the promotion of information and finance is low; it is very necessary to coordinate their actions (figure 1).

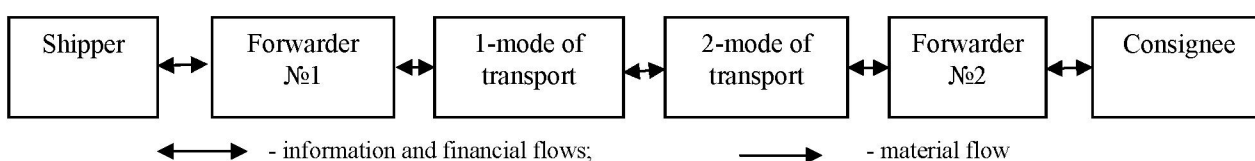


Figure 1 – Traditional approach to mixed transport

Without well-developed transportation systems, logistics could not bring its advantages into full play. Besides, a good transport system in logistics activities could provide better logistics efficiency, reduce operation cost, and promote service quality. The improvement of transportation systems needs the effort from both public and private sectors. A well-operated logistics system could increase both the competitiveness of the government and enterprises [8, p.144].

Transport system is the most important economic activity among the components of business logistics systems. Around one third to two thirds of the expenses of enterprises' logistics costs are spent on transportation.

In the logistics approach to multimodal transportation, a new section of the transport process is added - a single operator of multimodal transportation. The presence of such an operator makes it possible to plan the promotion of material flow and achieve the specified parameters at the output (figure 2).

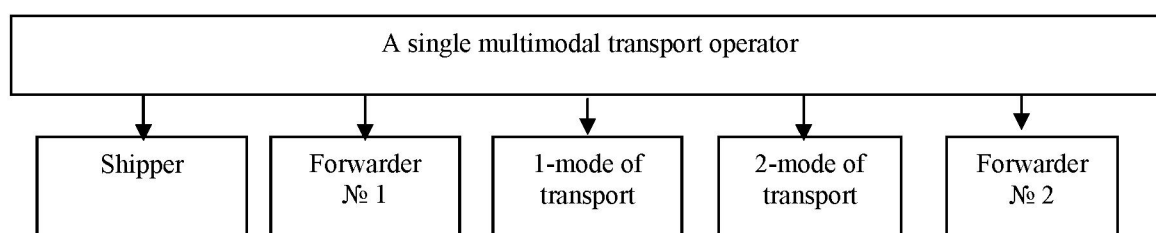


Figure 2 – Logistic approach to mixed transportation

The comparative characteristic of traditional and logistic approaches to the organization of the mixed transportations is given in table 2.

Table 2 – Comparative characteristics of traditional and logical approaches

Traditional hike (direct and mixed transport)	Logistic approach (multimodal transportation)
Two or more modes of transport	Two or more modes of transport
The lack of a common operator of the carriage	Availability of a single transportation operator
The lack of through rates for transportation	A single through rate for the transportation
Sequential scheme of interaction of participants	Sequential central scheme of interaction of participants

Logistics sector is one of the most prominent field in economic development of a country. Travelling Salesman Problem which is studied commonly in logistic sector is also based a number of other problems. Shortly, it is aimed to travel along to n locations with limitation of only visiting each location once. Due to NP-hard nature of problem, it is becoming impossible to find exact solution when the numbers of locations are above a certain level. Due to this reason, heuristic methods are mainly used for solving Travelling Salesman Problem. Ant Colony Optimization Algorithm which is a heuristic method that uses swarm intelligence gives good solutions in solving combinatorial optimization problems. In this study, Ant System and Ant Colony System are tested according to proposed principal of well distributed initial locations and different values of parameters for solving asymmetric Travelling Salesman Problem. Test problem which is in literature is solved by program that is coded in MATLAB programming language. Statistical analysis which is conducted on results indicates that proposed approach provides significant contribution on solutions.

It mainly explores the rationale for the creation of the Metro Mass Transit (MMT) system as a state-backed transit organization despite the Kazakhstan Government's cheered history in the transit industry. The empirical basis of this paper is both primary and secondary data with inclination toward qualitative methodologies. Findings indicate that state intervention in Kazakhstan's mass transit provision have been one of addressing various types of market failures. The paper also demonstrates how the Government was, inter alia, politically motivated to set up the MMT as a single dominant public transit company in Ghana to enjoy state patronage. Though the paper reveals political interference in MMT's operations, the public transit continues to register significant strides in alleviating transit problems encountered by both urban and rural commuters. The paper concludes that state-led transit investment which is closely-tied with private capital promotes efficient transit systems that are socially equitable, ecologically friendly and economically sustainable [8, p. 145].

Transport system makes goods and products movable and provides timely and regional efficacy to promote value-added under the least cost principle. Transport affects the results of logistics activities and, of course, it influences production and sale. In the logistics system, transportation cost could be regarded as a restriction of the objective market. Value of transportation varies with different industries. For those products with small volume, low weight and high value, transportation cost simply occupies a very small part of sale and is less regarded; for those big, heavy and low-valued products, transportation occupies a very big part of sale and affects profits more, and therefore it is more regarded.

Transportation plays a connective role among the several steps that result in the conversion of resources into useful goods in the name of the ultimate consumer. It is the planning of all these functions and sub-functions into a system of goods movement in order to minimize cost maximize service to the customers that constitutes the concept of business logistics. The system, once put in place, must be effectively managed. Traditionally these steps involved separate companies for production, storage, transportation, wholesaling, and retail sale, however basically, production/manufacturing plants, warehousing services, merchandising establishments are all about doing transportation. Production or manufacturing plants required the assembly of materials, components, and supplies, with or without storage, processing and material handling within the plant and plant inventory.

Warehousing services between plants and marketing outlets involved separate transport. Merchandising establishments completed the chain with delivery to the consumers. The manufacturers limited themselves to the production of goods, leaving marketing and distribution to other firms. Warehousing and storage can be considered in terms of services for the production process and for product distribution. There have been major changes in the number and location of facilities with the closure of many single-user warehouses and an expansion of consolidation facilities and distribution centers. These developments reflect factors such as better transport services and pressures to improve logistics performance.

In the conclusion we would like to note, that the concept of reverse logistics has been applied in promoting customer service and resources recycling. Concerning quality control, the defective components and finished products will be returned to their producers through reverse logistics systems. Nowadays, reverse logistics has been developed rapidly for increasing industries' competitiveness, promoting customer service level, and recycling the reusable material. Meanwhile, the demand of reverse logistics brings out a new market for the third-party logistics industries. The role that transportation plays in logistics system is more complex than carrying goods for the proprietors. Its complexity can take effect

only through highly quality management. By means of well-handled transport system, goods could be sent to the right place at right time in order to satisfy customers' demands. It brings efficacy, and also it builds a bridge between producers and consumers. Therefore, transportation is the base of efficiency and economy in business logistics and expands other functions of logistics system. In addition, a good transport system performing in logistics activities brings benefits not only to service quality but also to company competitiveness.

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**А. М. Даузова, С. Дырка, В. Л. Назарова,
А. А. Корженгулова, Қ. Алайдарқызы**

ҚАЗАҚСТАН РЕСПУБЛИКАСЫНДА КӨЛІК ЛОГИСТИКАСЫН ДАМУДЫҢ ҒЫЛЫМИ-ӘДІСТЕМЕЛІК НЕГІЗДЕРІ

Аннотация. Қазақстан Республикасы Үкіметінің Үкімет қаулыларында және басқа да мемлекеттік құжаттарда ҚР біртұтас көлік жүйесін дамытуға, оның барлық элементтерін жаңғыртуға және экономиканың негізгі секторларына қызмет көрсететін көлік кешенінің тиімділігін арттыруға ерекше назар аударылады. Қазақстанның экономикасын одан әрі серпінді және тұрақты дамытудың, оның әлемдік экономикаға интеграциялануының мемлекеттік стратегиясын іске асыруды қамтамасыз етуде республиканың көлік кешені ерекше орын алады. Осыған орай, мақалада Қазақстан Республикасының ерекшелігін ескере отырып, өңірлік көліктік-логистикалық орталықтардың жүйесін дамытудың ғылыми-әдістемелік негіздері қарастырылады. Нарықтық бәсекелестік және әлемдік экономиканың жаһандану жағдайында кәсіпкерліктің бөлек салалары мен елдер мен бірқатар аймақтарды қамтитын интеграцияланған логистикалық жүйелерді қалыптастыру экономикалық өсудің маңызды факторы болып табылады. Тауарлар мен қызметтер үшін өңірлік нарықтарды реттеуді қамтамасыз етуге мүмкіндік беретін салыстырмалы түрде жаңа нарыққа бағытталған әдіснама ретінде, мақалада жүк және өнімнің аймақтық жүйесіне қатысушылардың интеграциясына негізделген жалпы синергетикалық әсердің ұлғаюын қамтамасыз ететін логистикалық тәсіл қарастырылған.

Түйін сөздер: көліктік-логистикалық орталықтар, интеграцияланған логистикалық жүйелер, логистикалық тәсіл, көліктік-логистикалық инфрақұрылым, жүк тасымалының көлемі, озық логистикалық технологиялар.

А. М. Даузова¹, С. Дырка², В. Л. Назарова¹,
А. А. Корженгулова¹, К. Алайдаркызы¹

¹Алматинская Академия экономики и статистики,
кафедра Учета, аудита и статистики г. Алматы, Казахстан,

²Верхнесилезский экономический университет им. В. Корфанто, Катовице, Польша

НАУЧНО-МЕТОДИЧЕСКИЕ ОСНОВЫ РАЗВИТИЯ ТРАНСПОРТНОЙ ЛОГИСТИКИ В РЕСПУБЛИКЕ КАЗАХСТАН

Аннотация. В постановлениях Правительства Республики Казахстан и в других государственных документах особое внимание уделяется развитию единой транспортной системы РК, модернизации всех ее элементов, повышению эффективности работы транспортного комплекса, обеспечивающего обслуживание ключевых отраслей экономики. Также подчеркивается, что в обеспечении реализации государственной стратегии дальнейшего динамичного и стабильного развития экономики РК, ее интеграции в мировую экономику особое место занимает транспортный комплекс республики. Исходя из этого, в статье рассматриваются вопросы научно-методических основ развития системы региональных транспортно-логистических центров с учетом специфики Республики Казахстан. В условиях рыночной конкуренции и глобализации мировой экономики важнейшим фактором экономического роста становится формирование интегрированных логистических систем, охватывающих как отдельные сферы предпринимательства, так и целые регионы и страны. В качестве относительно новой методологии рыночной ориентации, позволяющей осуществлять регулирование региональных рынков товаров и услуг, в статье рассматривается логистический подход, обеспечивающий увеличение общего синергетического эффекта на основе интеграции участников региональной системы грузо- и товародвижения.

Ключевые слова: транспортно-логистические центры, интегрированные логистические системы, логистический подход, транспортно-логистическая инфраструктура, объем перевозок грузов, прогрессивные логистические технологии, интеграция, мировая экономика, предпринимательство, экономический рост.

Information about authors:

Dauzova A. M. – Almaty Academy of Economy and Statistics, Chair of Accounting, Audit and Statistics, Kazakhstan; aida_dauzova@mail.ru; <https://orcid.org/0000-0002-4457-6859>

Stephan Dyrka – assistant professor in economy Upper Silesian University of Economics named after V. Korfantogo, Katowice, Poland; stefan.d@onet.eu; <https://orcid.org/0000-0002-7174-2576>

Nazarova V. L. – Almaty Academy of Economy and Statistics, Chair of Accounting, Audit and Statistics, Kazakhstan; vnazarova@lenta.ru; <https://orcid.org/0000-0003-4320-5236>

Korzhengulova A. A. – Almaty Academy of Economy and Statistics, Chair of Accounting, Audit and Statistics, Kazakhstan; asiya_akanovna@mail.ru; <https://orcid.org/0000-0002-6629-2857>

Alaidarkyzy K. – Almaty Academy of Economy and Statistics, Chair of Accounting, Audit and Statistics, Kazakhstan; alaidar@mail.ru