

THE INTRODUCTION OF MODERN METHODS OF LOGISTICS IN ENTREPRENEURIAL ACTIVITY

Galyna L. MATVIIENKO-BILIAIEVA¹, Hanna V. STROKOVYCH², Kseniia O. VELYKYKH³, Viktoriia O. KOZUB⁴, Mykhailo S. BRIL⁵

¹Department of Economy of Enterprise and Management; Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

²Department of Management, Logistics and Economics; Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

³Department of Management and Public Administration; O.M. Beketov National University of Urban Economy in Kharkiv, Kharkiv, Ukraine

⁴Department of International Economy and Management of International Economic Activity; Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

⁵Department of Economic Theory and Economic Policy; Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine

Abstract: *The functioning of each state is ensured by the effective public administration and functioning of the enterprises that form the basis of its economy. The current state of the Ukrainian economy has defined the problem for many business entities regarding reforming management systems by introducing organizational models that maximize profits in the short term, increase capital, in the long run, and address social issues of staff. Logistical management greatly influences the state of financial and economic and legal support in the market conditions of various economic relations. The article deals with the essence of logistics in the process of doing business. The basic methods of logistics are investigated, namely: system analysis method; method of cybernetics; economic and mathematical modeling; method of operations research; predictive method. It is determined that the application of each of them depends on the competence of the specialists who apply them. It is suggested to use expert computer support of logistics processes to increase the effectiveness of managerial decision making.*

Keywords: business entity, efficiency, stages of logistics implementation, Ukrainian economy.

The functioning of each state is ensured by the effective public administration and functioning of the enterprises that form the basis of its economy. The current state of the Ukrainian economy has defined the problem for many business entities regarding reforming management systems by introducing organizational models that maximize profits in the

short term, increase capital¹, in the long run, and address social issues of staff. However, the practical implementation of these processes has been delayed and modern management of business entities is mainly focused on solving short-term operational problems^{2,3}. To put it in other words, the owners and management of business entities want to gain an immediate profit and are not aimed at long-term development. Meanwhile, in a market economy, the effective functioning of every business entity is ensured through development^{4,5,6,7}.

For Ukrainian business entities as a system, in the complex conditions of modern business, it is especially important, because the changing situation in the country, the gradual development of a new economic order is making an increasing number of entrepreneurs and logisticians aware of the need to achieve not only the present (gain immediate profit), but also long-term goals. Depending on the stage of development of the enterprise at the moment, some measures may be

¹ O.V. Takhumova, M.A. Kadyrov, E.V. Titova, D.S. Ushakov, M.I. Ermilova, "Capital structure optimization in Russian companies: Problems and solutions", in *Journal of Applied Economic Sciences*, 2018, vol. 13, no. 7, p. 1939-1944.

² E.M. Akhmetshin, V.D. Sekerin, A.V. Pavlyuk, R.A. Shichiyakh, L.M. Allanina, "The influence of the car sharing market on the development of ground transport in metropolitan cities", in *Theoretical and Empirical Researches in Urban Management*, 2019, vol. 14, no. 2, p. 5-19. Adel A. Daryakin, Aliya A. Ahmadullina, „Economic and mathematical modeling and forecasting of key performance indicators of pjsc "sberbank," in *Astra Salvensis*, V (2017), no. 12, p. 390.

³ E.M. Akhmetshin, K.E. Kovalenko, J.E. Mueller, A.K. Khakimov, A.V. Yumashev, A.D. Khairullina, "Freelancing as a type of entrepreneurship: Advantages, disadvantages and development prospects", in *Journal of Entrepreneurship Education*, 2018, vol. 21, no. 2, 1528-2651-21-S2-262. Linar R. Yusupov, Dmitry N. Demyanov, „Technological process modeling for castings according to specified parameters of output production quality based on production-frame model of knowledge representation," in *Astra Salvensis*, V (2017), no. 12, p. 410.

⁴ D. Ushakov, E. Rubinskaya, "Reforming of the state immigration policy in the context of globalization: On the example of Russia", in: *Immigration and the Current Social, Political, and Economic Climate: Breakthroughs in Research and Practice*, IGI Global, Pennsylvania, 2018.

⁵ D.S. Ushakov, O.I. Khamzina, R.A. Karabassov, I.A. Zaiarnaia, V.A. Gnevasheva, Countries' competitiveness as a factor of MNCs' global expansion, in *Journal of Advanced Research in Law and Economics*, 2018, vol. 9, no. 6, p. 2169-2175.

⁶ V.I. Mishchenko, S.V. Mishchenko, "Enhancing the effect of transmission channels in monetary policy of Ukraine under the transition to inflation targeting", in *Actual Problems of Economics*, 2015, vol. 163, no. 1, p. 421-428.

⁷ S.V. Mishchenko, V.I. Mishchenko, "Combining the functions of strategic development and crisis management in central banking", in *Actual Problems of Economics*, 2016, vol. 176, no. 2, p. 266-272.

proposed to optimize both the system as a whole and its individual elements.

The efficiency of logistics systems has been studied by such scientists as A. Denysenko⁸, A. Kalchenko⁹, E. Krykavsky¹⁰, Yu. Ponomareva¹¹, D. Waters¹², E. Nagorny¹³ and others. However, the questions regarding the effectiveness of the implementation and operation of the logistics system in business remain unsolved.

Analysis of the concept of “logistics” and its methods

Logistics is part of the supply chain process, where productive planning, implementation and control of its milestones involves the storage and the flow of goods, as well as the direction of related services and information flows from the point of delivery to the end user to meet customer requirements¹⁴. When solving certain problems related to logistics, it is necessary to start from the specific production activity of the enterprise. For this purpose, logistics is considered to be an object of management, namely¹⁵:

⁸ A.M. Denysenko, *Logistics management as a tool for improving the efficiency of enterprises*, DonNUET, Donetsk, 2011.

⁹ A.G. Kalchenko, V.V. Kryveschenko, *Logistics*, Kyiv National Economic University, Kyiv, 2008.

¹⁰ E. Krykavsky, *Logistics department*, Lviv Polytechnic National University, Lviv, 2005.

¹¹ Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003. Linar R. Yusupov, Dmitry N. Demyanov, „Technological process modeling for castings according to specified parameters of output production quality based on production-frame model of knowledge representation,” in *Astra Salvensis*, V (2017), no. 12, p. 410.

¹² D. Waters, *Logistics. The supply chain management*, YUNITI-DANA, Moscow, 2003.

¹³ E.V. Nagorny, V.S. Naumov, A.V. Ivanchenko, “Analysis of modern approaches to improving the efficiency of logistics systems for cargo delivery in the international connection”, in *Transportation Systems and Transportation Technologies*, 2012, no. 3, p. 68-72.

¹⁴ D.J. Bowersox, D.J. Kloss, *Logistics: integrated supply chain*, Olymp-Business CJSC, Moscow, 2008.

¹⁵ Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; O.V. Khadzhinova, *Logistics strategy of cost management of a large multidisciplinary industrial enterprise*, Donetsk State University of Management, Donetsk, 2006; A.G. Kalchenko, V.V. Kryveschenko, *Logistics*, Kyiv National Economic University, Kyiv, 2008; I.P. Mishchuk, “Evaluation of the efficiency of the logistics enterprise trading system”, in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110; M.B. Shevchuk, “Logistics as a system of material and information flow management in a trading enterprise”, in *Innovative Economy*, 2012, vol. 4, no. 30, p. 219-222.

1. Logistics as an operational activity – transport, warehouses, equipment, marketing, accounting and information exchange, customer service.

2. Logistics, as an activity that is associated with the management of the enterprise provides all the opportunities for effective joint management and provides flexibility in a competitive environment.

3. Logistics, as a way of thinking, makes it possible to consider different logistics processes in the aggregate, which has mutual cause and effect relationships.

4. Logistics as a field of science studies different methods, using the functioning of logistics processes and related phenomena.

Logistics is, first and foremost, a strategic management that can improve the strategic position of the business entity and increase its competitiveness. Logistics is a way of thinking that involves all areas of activity and levels of enterprise, as well as a line of action that supports independent units. When an enterprise opens a new department where the logistics related activities are carried out, then this department should be responsible for coordinating all the logistics related activities.

A business entity can organize its logistics related business as follows: by creating its own department that organizes logistics related activities; by purchasing separate logistics services from a third party organization providing logistics services (transportation, storage and handling, etc.); by purchasing logistics services using long-term contracts. In this case, strategic alliances can be formed, and the parties involved in the delivery (the sender and the recipient of the goods) agree on the use of a common logistics firm, that is, the use of a third party.

The analysis of entrepreneurial activity revealed four consecutive stages of development of logistics systems¹⁶. In the first stage, business entities work on the basis of daily shift tasks, with the least sophisticated form of logistics management. The logistics system usually affects the storage of finished goods and transportation. The system works to eliminate malfunctions of scheduled tasks. The operation of the system is estimated by the proportion of the cost of transportation and distribution of products in the total amount of sales revenue. The logistics systems of the second stage of development are characterized by the management of

¹⁶ Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; M.B. Shevchuk, “Logistics as a system of material and information flow management in a trading enterprise”, in *Innovative Economy*, 2012, vol. 4, no. 30, p. 219-222; I.P. Mishchuk, “Evaluation of the efficiency of the logistics enterprise trading system”, in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110

material flow from production to the end consumer. System control extends to order processing, product storage, scheduling, inventory management, customer service. However, the information system that provides these processes has no complicated architecture. Costs for logistics operations should be realized within the limits of estimates.

Logistics systems of the third stage of development coordinate logistics operations from the purchase of raw materials to the end-user service. The only area not controlled by the logistics manager is the day-to-day management of the business entity. Logistics manager's activities are usually based on an annual plan. System performance is evaluated against quality of service standards. In doing so, businesses seek to improve system performance rather than reduce costs, as is typical for second-tier systems. Management is not based on the response of the system to deviations, but on the prevention of such influences¹⁷.

The number of business entities using the logistics systems of the fourth stage of development is still small. The scope of logistical functions here is basically similar to that which is characteristic of logistics systems of the third stage of development, but with one important exception. These entities integrate the planning and control of logistics operations with marketing, sales, manufacturing and finance operations. Integration helps to link the often conflicting goals of different business entities. System management is implemented on the basis of long-term (more than one year) planning. The performance of the system is evaluated in accordance with the requirements of international standards. As a rule, companies operate globally, not just nationally or regionally^{18,19,20}. They manufacture products for the global market and manage part of the world's production and distribution systems, providing cost optimization and customer satisfaction²¹.

¹⁷ I.P. Mishchuk, "Evaluation of the efficiency of the logistics enterprise trading system", in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110;

¹⁸ A. Arkhipov, D. Ushakov, "Functional effectiveness and modern mechanisms for national urban systems globalization: The case of Russia", in: *E-Planning and Collaboration: Concepts, Methodologies, Tools, and Applications*, IGI Global, Pennsylvania, 2018.

¹⁹ D. Ushakov, S. Chich-Jen, "Global economy urbanization and urban economy globalization: Forms, factors, results", in: *E-Planning and Collaboration: Concepts, Methodologies, Tools, and Applications*, IGI Global, Pennsylvania, 2018.

²⁰ I.A. Kapitonov, "Peculiarities of applying the theory of international business by Russian oil and gas companies", in *Space and Culture, India*, 2018, vol. 6, no. 4, p. 5-14.

²¹ Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; I.P. Mishchuk, "Evaluation of the efficiency of the logistics enterprise trading system", in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110; O.V. Khadzhinova, *Logistics strategy of cost management of a large multidisciplinary industrial enterprise*, Donetsk State

Managing global distribution functions as well as the flow of information and materials places new increased requirements on logistics managers and their professional level. For example, the strategy of organizing material supply and storage of products in warehouses requires knowledge of the legal bases, tax systems, features of government regulation. The inventory management strategy is associated with specific packaging and labeling requirements, and language differences must be taken into account. The efficiency of customer service is determined by the efficiency of preparation and processing of complex documentation, as well as the results of actions to eliminate customs barriers. In addition, the logistics manager must have good information technology skills, be able to use the modern day telecommunication technology. The need to involve other firms in logistics processes is increasing, and outsourcing is becoming more common²².

However, nowadays, the advanced enterprises have traditional functional areas of logistics: procurement and inventory management, transportation, production planning, warehousing, marketing, integrated on the basis of a common software and information platform and form the basis of corporate information system.

Thus, the introduction of modern methods of logistics management in the practice of business will allow enterprises to reduce inventory significantly, accelerate the turnover of working capital²³, and reduce the cost of production and logistics costs, to ensure consumer satisfaction in quality products and related services.

Logistics methods are techniques that allow you to influence the object of management so that the logistical tasks of the enterprise are solved effectively and with maximum effect. The main groups of methods

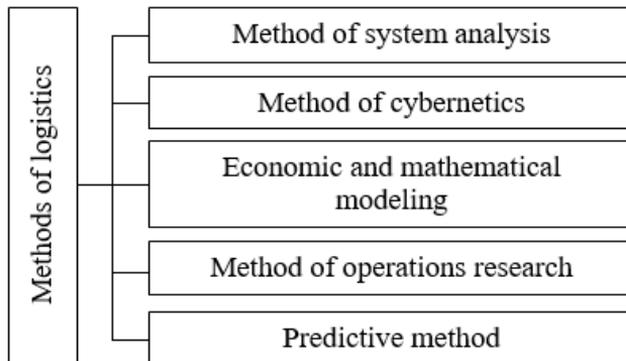
University of Management, Donetsk, 2006; E.V. Nagorny, V.S. Naumov, A.V. Ivanchenko, "Analysis of modern approaches to improving the efficiency of logistics systems for cargo delivery in the international connection", in *Transportation Systems and Transportation Technologies*, 2012, no. 3, p. 68-72; M.B. Shevchuk, "Logistics as a system of material and information flow management in a trading enterprise", in *Innovative Economy*, 2012, vol. 4, no. 30, p. 219-222.

²² I.P. Mishchuk, "Evaluation of the efficiency of the logistics enterprise trading system", in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110; Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; M.I. Paska, "Theoretical and methodological approaches to the definition of the category "logistics", in *All-Ukrainian Scientific and Production Journal "Sustainable Economy"*, 2012, vol. 4, no. 14, p. 279-283.

²³ R.A. Abramov, I.V. Morozov, M.S. Sokolov, "Legal basis for the development of social capital in the conditions of the state transition to an innovative economy", in *Utopia y Praxis Latinoamericana*, 2018, vol. 23, no. 82, p. 292-300.

of logistics include (Figure 1): the method of system analysis; method of cybernetics; economic and mathematical modeling; method of operations research; predictive method.

Figure 1: Methods of logistics



Each of these methods allows you to predict the parameters of material flows, to form flexible systems for managing the movement of goods and other values, to optimize the inventory of goods and products in warehouses and to solve other problems.

1. The method of system analysis is based on the general theory of systems, on the basis of which each logistics chain and the flows that move on it, constitute a single system, which is subject to analytical research. It is the formation of the logistics system that identifies ways to improve it in all areas of material, information, financial, energy²⁴ and other flows.

2. The cybernetic method provides an information approach to the management of logistics and its operations, which are considered as a cybernetic system consisting of many interdependent objects.

3. The method of economic and mathematical modeling is based on the creation of logical models of real logistics processes. This group of methods includes ABC analysis. When using this ABC method, all objects are divided into three groups: A – 20 % of valuable objects, which give 80 % of all results; B – 30 % of objects providing 15 % of results; C – 50 % of objects that give only 5 % of results. The result is an opportunity

²⁴ H.T. Van, I. Onyusheva, D. Ushakov, R. Santhanakrishnan, Impedimental policies impacting shrinking world solar industry eco-economic development, in *International Journal of Energy Economics and Policy*, 2018, vol. 8, no. 4, p. 21-27.

to focus all the efforts of the business entity on a small group of important objects that affect the end result, to create the appropriate logistics of supply, inventory management, and sales in trade.

4. The operations research method uses a quantitative approach to the decision-making process. At the same time, the best solution should include a set of factors, in which the indicator of the efficiency of the operation becomes optimal in magnitude. This method explores the resources of the business entity, optimizes the value of inventories, and refines the delivery schemes of products. The use of operations research helps to distribute work between units of equipment, between production units so that the profit reaches maximum values.

5. The method of forecasting in logistics is considered one of the key ones, by means of which the conditions of dynamics of development of different systems are predicted, and scientifically based approaches are applied to decision making. Within the prognostic method, using different approaches, the following paths can be used: analysis and prediction of data series, in which dependencies are determined between the data series, which determine further development trends; expert judgments that are subjective; method of research of cause and effect relationships.

Each of the methods considered has wide application in logistics. When the business entity's logistics service is well-versed in all of these methods and is able to put them into practice in a rational way, it leads to more efficient organization of business and to achieving optimal results, thus the enterprise gets maximum results.

Characteristics of expert computer support systems for logistic methods

Flow management decisions are largely based on the intuition of qualified suppliers, sales professionals, production staff, and transporters. While developing a methodological apparatus, modern logistics along with the development and use of formalized decision-making methods seek opportunities for widespread use of the experience of the named category of professionals. To this end, the so-called expert computer support systems are being developed to allow members of staff who have no advanced training in logistics to make quick and effective decisions²⁵.

²⁵ O.V. Khadzhinova, *Logistics strategy of cost management of a large multidisciplinary industrial enterprise*, Donetsk State University of Management, Donetsk, 2006; S.V. Churilov, "Logistic management of the enterprise: theoretical aspect", in *Economics and Management*, 2012, no. 6, p. 142-147; M.B. Shevchuk, "Logistics as a system of material and

The systems of expert computer support of logistic methods include²⁶: MRP (Material Requirements Planning); MRP II (Manufacturing Resource Planning); ERP (Enterprise Resource Planning); DRP (Distribution Resource Planning). Let's have a look at each of them in more detail.

MRP (Material Requirements Planning). The idea of a system of “planning of needs for materials” – is first determined by how much and in what time it is necessary to produce the finished products. Then it is necessary to determine the time and amount of material resources needed to complete the production plan. The main purpose of the system is to ensure the flow of planned volumes of material resources and inventories at the planning horizon.

When choosing a method of organizing material flow management, it is important to find out what kind of demand the enterprise is dealing with: dependent or independent. If overall demand is generated by a large number of individual buyers, each of whom, independently of the other, needs a product, then there is an independent demand. If, for example, a manufacturer uses a number of components to manufacture a product, then the demand for each of these components is related to each other and depends on the production plan for the manufacture of the final product. In this case, there is a dependent demand. With dependent demand, material requirements planning or MRP becomes possible. The essence of this approach is to calculate the needs for all types of materials, raw materials, components, parts needed to produce each product from the main schedule in the required volume, and submit the appropriate orders for delivery.

One of the large-scale extensions of MRP is manufacturing resource planning (MRPII), which involves planning all other production resources: employees²⁷, equipment, structures, finance, transportation, etc.

information flow management in a trading enterprise”, in *Innovative Economy*, 2012, vol. 4, no. 30, p. 219-222; E.V. Nagorny, V.S. Naumov, A.V. Ivanchenko, “Analysis of modern approaches to improving the efficiency of logistics systems for cargo delivery in the international connection”, in *Transportation Systems and Transportation Technologies*, 2012, no. 3, p. 68-72.

²⁶ Yu.V. Ponomareva, *Logistics*, Center for Educational Literature, Kyiv, 2003; M.I. Paska, “Theoretical and methodological approaches to the definition of the category “logistics”, in *All-Ukrainian Scientific and Production Journal “Sustainable Economy”*, 2012, vol. 4, no. 14, p. 279-283; I.P. Mishchuk, “Evaluation of the efficiency of the logistics enterprise trading system”, in *Mechanism of Regulation of the Economy*, 2012, no. 4, p. 102-110.

²⁷ D. Ushakov, I. Elokhova, I. Kharchenko, “Tax instruments in public regulation of population employment: The factors of today’s efficiency”, in *International Journal of Ecological Economics and Statistics*, 2017, vol. 38, no. 2, p. 161-168.

So MRP II is MRP planning plus warehouse management, supply, sales and production management. Since most of the assets in an industrial enterprise are in any way related to production or inventory, the use of the functions listed above makes it possible to include accounting and financial management functions in the same system. The MRP II system rarely works perfectly, since it is not always possible to have such rigorous control of the output (occasionally there are errors in specifications and technology, estimates of available stocks, etc.). In addition, not all operations are conducted as planned (shortage, quality mismatch, deadlines, etc.).

An ERP system is a financially-oriented information logistics system that serves to identify and plan the resources of the entire enterprise that are required to receive, manufacture, ship and record customer orders. An ERP system differs from a typical MRP II system in terms of technical requirements such as a graphical user interface, relational database, use of fourth-generation language and automated software development tools, client/server architecture, and open systems portability. A method for effectively planning and managing all the resources required to receive, fulfill, ship and record customer orders in manufacturing, logistics and service organizations. For doing business effectively, employees are required to track and process vast amounts of information. The more the business grows, the more clients and partners, the more acute the question of the need to use effective tools for doing business.

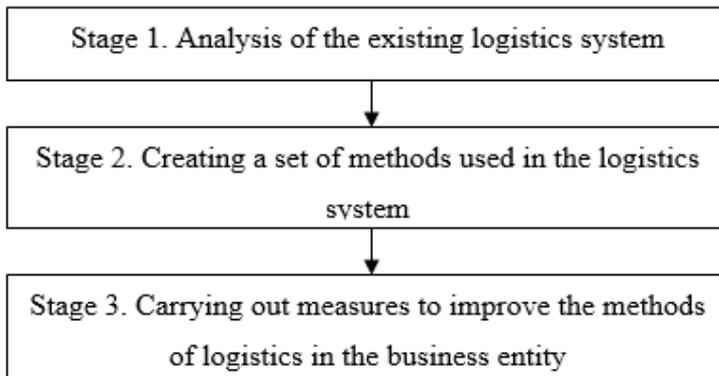
Most modern ERP systems are built on a modular principle, which gives the customer the ability to select and implement only those modules that he really needs. Modules of different ERP systems may differ in name and content. However, there are some features that can be considered typical of ERP software. The main task of the ERP-system is to achieve optimization (in time and resources) of all these processes. Quite often, the entire set of ERP systems is implemented not by one integrated system, but by some software package. Such a set usually contains a basic ERP package to which specialized third-party products (responsible for e-commerce, for OLAP, for sales automation, etc.) are connected through the appropriate interfaces.

The operation of DRP systems is based on consumer demand, which cannot be controlled by the firm, so the uncertain environment imposes additional requirements and restrictions in the policy of stock management of finished products in distribution networks unlike MRP systems, where the production schedule is controlled by the manufacturer of finished products and so conditions are more clearly defined. DRP

systems plan and regulate inventory levels at the bases and warehouses of the enterprise, that of its own distribution network or at wholesale resellers. For its part, the main stages of the implementation of modern methods of logistics in business activities (Figure 2):

Stage 1. Analysis of the existing logistics system: identification and description of existing logistics processes; determination of resource intensity of existing logistic processes; collecting information about the methods used in the logistics system by functions, processes and operations; evaluation of the efficiency of the existing logistics system.

Figure 2: The main stages of implementation of modern methods of logistics in business



Stage 2. Creating a set of methods used in the logistics system: defining the goals of the logistics system; description of logistics processes of the future logistics system; description of inputs and outputs; description of the requirements for the logistics system (internal subsystems – business entity units and partner companies – supply chain links); formation of conditions for integration of functional units within certain methods of logistics system; creating the conditions for creating a partnership in the supply chain; creating a forecast for the operational development of the logistics system and supply chain, taking into account all the possible risks and opportunities.

Stage 3. Carrying out measures to improve the methods of logistics in the business entity: defining strategy, tactics, policies, budgets, resources, boundaries of responsibility, consultants, experts, stakeholders,

motivation²⁸, PR and promoting change; implementation of a logistic system performance evaluation system.

To sum up, logistical management greatly influences the state of financial and economic and legal support in the market conditions of various economic relations. Logistics is the science of managing and optimizing material, financial and information flows, service flows based on the use of modern technologies and the most advanced economic decisions, integrating internal and external material flows and aimed at achieving the end results. The purpose of logistics is to provide the consumer with the products at the right time and place at the lowest cost of logistics operations and production resources used.

Therefore, the basic methods of logistics have been investigated, namely: system analysis method; method of cybernetics; economic and mathematical modeling; method of operations research; predictive method. It has been determined that the application of each of them depends on the competence of the specialists who apply them. It has been suggested to use expert computer support of logistics processes to increase the effectiveness of managerial decision making. The main stages of implementation of modern methods of logistics in business include: analysis of the existing logistics system; creation of a complex of methods used in the logistics system; carrying out measures to improve the methods of logistics in the business entity.

²⁸ S.A. Makushkin, "Company's personnel motivation", in *Espacios*, 2019, vol. 40, no. 40, p. 23.