

Organizational and Economic Support of Logistics Activities of Machine-Building Enterprises

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ABSTRACT

The ways to build an effective organizational and economic mechanism for managing the logistics activities of machine-building enterprises are considered in the article. A theoretical definition of the concepts of logistics activity and logistics system are provided, taking into account their complexity and multidimensional nature. The concepts are defined taking into account the specifics of industrial enterprises. The development of the engineering sector of the national economy was analyzed. It was determined that the machine-building complex is in crisis, which is associated with the loss of links between production cooperation, and the need to enter the new markets of the European Union, the standards of which do not correspond to the quality indicators of the manufactured machine-building products. Accordingly, among the priorities of engineering enterprises, it is determined to ensure the renewal and modernization of production capacities, which is complicated by the financial and economic policies of the country as a whole. Therefore, ensuring the competitiveness of engineering enterprises depends on building effective organizational and economic mechanisms for operational activities. A key element of the operational activities of machine-building enterprises is logistics activities. Therefore, the issues of establishing the organizational and economic support of the logistics systems of the machine-building complex are of high relevance. The separate functions of logistics activity as the operational process of economic entities are defined in the article. Separate elements of logistics activity are described and structured, and defined as a single operating system. The algorithm for the building of the organizational and economic mechanism for providing the logistics system was determined taking into account the specifics of the machine-building complex.

Keywords: Transport; Innovative technologies; National economy; Management mechanisms; Establishment.

JEL Classification: M11, M21, L91

Received: April 28, 2021 Accepted: June 01, 2021





Volumen 39-6, July 2021 // ISSN: 1133-3197

Apoyo Organizativo y Económico a las Actividades Logísticas de las Empresas de Construcción de Maquinaria

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RESUMEN

En el artículo se estudian las formas de construir un mecanismo organizativo y económico eficaz para gestionar las actividades logísticas de las empresas de construcción de maquinaria. Se ofrece una definición teórica de los conceptos de actividad logística y sistema logístico, teniendo en cuenta su complejidad y naturaleza multidimensional. Los conceptos se definen teniendo en cuenta las particularidades de las empresas industriales. Se analizó el desarrollo del sector de la ingeniería de la economía nacional. Se determinó que el complejo de la construcción de maquinaria está en crisis, lo que se asocia a la pérdida de vínculos entre la cooperación de la producción, y a la necesidad de entrar en los nuevos mercados de la Unión Europea, cuyos estándares no se corresponden con los indicadores de calidad de los productos manufacturados de la construcción de maquinaria. En consecuencia, entre las prioridades de las empresas de ingeniería, se determina asegurar la renovación y modernización de las capacidades de producción, lo que se complica por las políticas financieras y económicas del país en su conjunto. Por lo tanto, garantizar la competitividad de las empresas de ingeniería depende de la creación de mecanismos organizativos y económicos eficaces para las actividades operativas. Un elemento clave de las actividades operativas de las empresas de construcción de maquinaria son las actividades logísticas. Por lo tanto, las cuestiones de establecer el apoyo organizativo y económico de los sistemas logísticos del complejo de construcción de maquinaria son de gran relevancia. En el artículo se definen las distintas funciones de la actividad logística como proceso operativo de las entidades económicas. Se describen y estructuran los elementos separados de la actividad logística y se definen como un sistema operativo único. El algoritmo para la construcción del mecanismo organizativo y económico para proporcionar el sistema logístico se determinó teniendo en cuenta las especificidades del complejo de construcción de maquinaria.

Palabras clave: Transporte; Tecnologías innovadoras; Economía nacional; Mecanismos de gestion; Establecimiento.

JEL Classification: M11, M21, L91

Recibido: 28 de Abril de 2021 Aceptado: 01 de Junio de 2021

1. Introduction

In the context of transformational processes of the national economy and changes in global trends in social development, there is an increase in the digitalization and informatization of all business processes. First of all, this trend should concern industries that have a high innovative component, to which machine-building directly belongs. However, in the context of the economic crisis and the restructuring of production links, domestic enterprises often do not have time to reorient themselves in accordance with the requirements of society, innovative technologies that determine the competitiveness of the enterprise in the modern conditions of the innovative market (Chaika, 2021). Competitiveness issues determine the organizational and economic justification of the machinebuilding enterprises performance (Dyussembekova and Yessimzhanova, 2018; Belousov et al., 2018). So, the projection of an effective system of organizational and economic support of business processes is relevant and requires further research. New requirements of competitive market have determined priorities of organizational and economic management systems. One of the key elements of the organizational and economic systems of machine-building enterprises is logistics. A relevant issue is the creation of a balanced logistics system, taking into account the prospects for its potential development (Achkevych and Chuba, 2018; Sultanbekov and Nazarova, 2019).

The issues of building organizational and economic mechanisms for ensuring the processes of logistics activity, taking into account the relevance of this issue, were developed in the works of many scientists. In particular, V. V. Dykan (2013) developed the issues of building a logistics system taking into account the specifics of machine-building enterprises in the monograph. N. Ye Kalycheva and Yu. A. Kopachevska (2018) devoted their research to logistics processes in the small business system. The authors S. Matviy and N. Chukhray (2016) investigated the development of business processes of enterprises taking into account operational tasks, including the development of logistics activities. L. M. Taranyuk (2013) defined the mechanisms for evaluating the operational processes of enterprises taking into account their complexity and systematics. K. S. Myronenko and S. V. Filyppova (2016) determined the tools for the development of business processes at enterprises by designing and implementing organizational and economic management mechanisms. O. V. Krupa (2013) identified possibilities of application of outsourcing processes in formation of ways to increase efficiency of logistics activities of enterprises. However, despite the authors' attention to this issue, the formation of an integrated approach to the design of the system of organizational and economic support for the logistics processes of machine-building enterprises remains uncertain.

The purpose of this article is to determine the methods of formation of optimal organizational and economic systems of logistics activity taking into account the specifics of the machine-building industry. In order to achieve the purpose, set out in the article, the following objectives are defined and investigated:

1. to analyze theoretical and methodological approaches to the definition of the concept and structuring of the category of logistics activities of machine-building enterprises;

2. to develop an algorithm for the building of a system of organizational and economic support for the logistics activities of machine-building enterprises;

3. to identify ways to improve the efficiency of the logistics activities of machine-building enterprises by analyzing the criteria of organizational and economic support.

2. Materials and methods

Logistics can be broadly defined as a system of comprehensive measures to establish supply, marketing, transportation, storage and customer service processes. At the same time, it is necessary to take into account the processes of organizing logistics activities and its economic basis. Analyzing the establishment of the logistics system of the enterprise taking into account the specifics of mechanical engineering, you can determine the following logistics units organized in the structure (Figure 1).

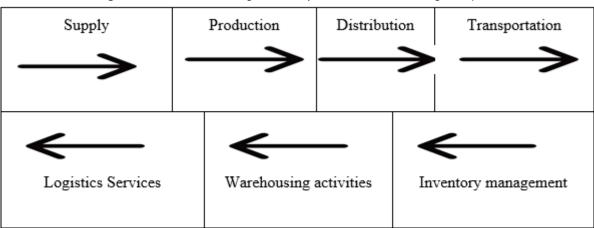


Figure 1. Elements of the logistic activity of the machine-building enterprise

Source Dykan 2013.

Additional income from the logistics activities of a machine-building enterprise can be obtained in two ways: firstly, it is an improvement in the quality of service to consumers, and secondly, by reducing the operational costs of conducting logistics activities. Cost rationalization can be carried out by improving the efficiency of production, distribution, transportation, delivery and other logistics units (Kalycheva and Kopachevska, 2018; Novikov and Iniesta, 2019).

The analysis of logistics activities at the enterprise should be comprehensive, that is, include not only determining the possibilities for cost rationalization, but also finding ways to maintain the efficiency and quality of the delivery of logistics services (Makhnitskaya and Shalbolova, 2012; Pinkovetskaia et al., 2020). Therefore, it is necessary to maintain a balance between rational spending on logistics activities, and the quality of delivery of logistics services. In the view of the above, it is useful to introduce the concept of logistics efficiency (Saparbayev et al., 2020; Lapidus and Yves, 2018). The logistics efficiency can be assessed in two ways. First, by determining its performance, that is, determining the total amount of product pass in the capacity of the system itself. Second, a reliability indicator that determines the possibility of efficient operation of the logistics system under various conditions and external factors that can affect its operation (Lendiel, 2018; Borodin et al., 2019).

To determine the processes of ensuring the efficiency of logistics systems of machine-building enterprises, it is useful to analyze the latest trends and tendencies in their development. National industrial complexes are currently facing an economic crisis, as there is a lack of funding for the modernization and renewal of industrial capacities of economic entities. The obsolescence of business methods, depreciation and obsolescence of machines and mechanisms of industrial production, the need to re-equip technical and technological systems, caused threats of risk in conditions of economic instability (Tastulekov et al., 2019; Topchiy and Bolotova, 2020). After the breakdown of cooperative links, national machine-building enterprises were faced with the need to find new markets. The inconsistency of quality indicators and standards for the production of engineering products with European Union standards has identified problems in finding new markets and target audiences (Katranov and Lapidus, 2018; Klimina et al., 2019). The lack of opportunities for updating industrial capacities has led to the need for re-equipment of production, its modernization. Today, most machine-building enterprises in Ukraine are in a state of crisis or stagnation, which is associated not only with the need to modernize production, but also with the need to streamline operational processes and conduct economic activities. With the transition to market conditions of competition and informatization of the business space in modern enterprises, new requirements are set down to ensure the effectiveness of their work (Azam and Qureshi, 2021; Zhigir, 2020).

Thus, a topical issue is the search for ways to ensure the effective re-equipment of machine-building enterprises, primarily due to the rationalization of the processes of organizational and economic support of logistics activities, as the basic operational process in production at machine-building enterprises. Thus, external and internal factors affecting the efficiency of organizational and economic

mechanisms of logistics activities of engineering enterprises are determined. It should be stated that logistics activities can be organized at a machine-building enterprise both independently and by using the capacities of other enterprises on contractual terms (Ermilova and Ushakov, 2019; Zhigir, 2021). The management decision to determine the possibilities for the implementation of logistics activities on the basis of own capacities, or using third-party entities, should be carried out by making a management decision based on the analysis of the operational situation and the implementation of forecasts for the future. To determine how to manage logistics operations, it is useful to enter the following algorithm for evaluating the logistics environment (Matviy and Chukhray, 2016; Taranyuk, 2013):

- 1. benchmarking;
- 2. sociological surveys and analysis of statistical data;
- 3. application of methods of strategic analysis;
- 4. general audit of business processes.

Requirements for determining the effectiveness of logistics management in accordance with the evaluation carried out according to the proposed methods may be as follows (Myronenko and Filyppova, 2016):

- 1. economic efficiency;
- 2. level of uniformity in different operational processes;
- 3. taking into account the specifics of the industry;
- 4. practical significance of the results.

Having determined the methodology for assessing the effectiveness of logistics activities and the requirements for these methodologies, it is possible to study the issue of developing organizational and economic mechanisms for logistics activities.

3. Results and discussion

The development of the organizational and economic mechanism is based on the identification of hierarchical structures and systems of interaction and information exchange in the implementation of operational processes, which should be confirmed by the economic sustainability of the enterprise to conduct economic activities. The organizational component of the operating system determines the capabilities of the enterprise to realize the operational and strategic objectives and purposes of the enterprise. The economic component determines the potential for achieving the purposes and objectives of the enterprise by determining the financial potential, opportunities for ensuring the financial sustainability of financial transactions, both in current activities and in the future. Thus, the organizational and economic mechanism is a system for realizing the capabilities of the enterprise. The purpose of the development of the organizational and economic mechanism of logistic activity is to identify individual elements of logistics and their processing from the point of view of introduction into operational processes, ensure efficiency and determine opportunities, including economic and financial, for their implementation (Krupa, 2013).

By accumulating the described methods of assessing the efficiency of logistics activities, and certain foundations for building organizational and economic mechanisms, we can present the following scheme for implementing the organizational and economic principles of managing the logistics activities of machine-building enterprises (Figure 2).

By defining the processes of logistics activity, it is possible to distinguish the specific purposes of strategic development of enterprises that lie in the plane of logistics processes development (Kalycheva and Ye, 2014; Dmytriyev and Kurylova, 2013):

1. design a rational logistics system that aims to provide supply planning, warehousing, transportation and distribution, identify possible adjustments, and enable operational automated

intervention in the logistics system to be undertaken in response to changes in external or internal factors;

- 2. technological and technical equipment of the logistics system;
- 3. rationalization of the organizational structure of the logistics system;
- 4. economic justification for the implementation of the logistics system in operational processes.

The achievement of certain objectives of the logistics system operation is possible provided that the following objectives are achieved:

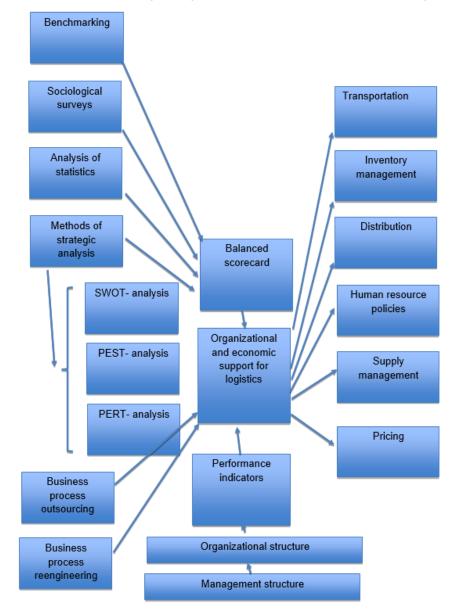
1. provision of operational processes that determine the possibility of achieving the final strategic development purposes by implementing the functions of the logistics system;

2. ensuring the increase of distribution volumes by increasing the efficiency of the organization of the logistics system;

3. rationalization of industrial capacities of warehouses and capacities for marketing of finished products;

4. focus on specific distribution results, directing various areas of logistics activities and operational processes to these purposes (Yershova and Ye, 2016).

Figure 2. Processes of constructing the organizational and economic mechanism of logistics activity



To ensure the realization of the purposes and objectives of logistics activities, it is necessary to ensure management decisions, as a result of the analysis of problematic aspects, evaluation of statistical data, previous experience, identification of prospects, priorities for enterprise development, analysis of available and hidden resource capacities, which can be used to ensure efficient logistics activities, and identification of methodological ways, tools and algorithm for implementing the logistics activity system at a specific enterprise. The development of this algorithm schematically could be represented by the following diagram (Figure 3) (Nepomnyashchyy et al., 2020).

Figure 3. Algorithm for development of organizational and economic mechanism of logistics management

Information support	Monitoring of indicators
statistical data analysis	quality control of service provision
market analysis	determination of completeness of service provision
analysis of potential resources	after-sales service
projected figures	cost-revenue control
Determining the impact of the external environment	Management systems effectiveness analysis
definition of impact parameters	economic indicators
measurement of indicators	organizational indicators
analysis of planned and actual indicators and their impact on operational processes	technical indicators
identification of opportunities to adjust current activities to changes in the external environment	marketing indicators
Logistics system simulation	Monitoring and control
defining the goals	analysis of parameter indicators
objectives development	monitoring
description of criteria	determining compliance of planned and actual indicators
distribution of authority and responsibilities	making adjustments

Consider this algorithm in more detail. The first step of the algorithm is to determine the rationality of expenses. In addition to ensuring that production costs are rational, it is useful to analyze additional costs as well as personnel activities in terms of the effectiveness of the assessment by implementing the above analysis methods. The next stage is the creation of an organizational mechanism, that is, the identification of the hierarchy, as well as the organizational structure, and the ways of exchanging information, document flow, the determination of those responsible for carrying out certain operational processes and the like (Burmaka et al., 2020; Sych et al., 2020; Romanenko, 2016; Lelechenko et al., 2020). The basis for creating the organizational mechanism of the operating system is the organizational structure of the enterprise. The initial data for this analysis is the analysis of the personnel structure of the enterprise, which consists in determining the competence and qualifications, the number of personnel of the relevant specialties, the number of wages, the productivity of the enterprise, as well as a number of other indicators that determine the effectiveness of personnel management activities (Popova et al., 2021).

The next stage of the analysis is to determine production costs and find ways to rationalize these costs, that is, reduce them with constant indicators of product quality, rationalize operating costs, as well as determine the need for personnel and salary, which allows to streamline logistics processes, as well as reduce the cost of products, including taking into account the cost of logistics operations (Diegtiar, 2020). The next element of the analysis is the finished product storage system. It is useful to determine the need to analyze the available premises for storing finished products and raw materials. The analysis should be carried out taking into account the forecast of changes in exchange rates, requirements for the supply of materials for production, as well as the determination of the projected cost of distribution of products in the market (Kuzmenko et al., 2020; Zablotskyi et al., 2019) Once these figures have been defined, it is necessary to balance the number of storage spaces according to the market needs and possible operational distribution of finished products. An important element at this stage of the analysis is the control of the stock of finished products, as well as the control of the stock of materials from which these products are produced. Based on the analysis, it is possible to develop a plan, as well as a logistics strategy, which determines the development of logistics in a machine-building enterprise in the long term. Strategic and operational planning helps improve the coordination and management of logistics functions (Orlova et al., 2019a; Ignatyevs et al., 2018; Orlova et al., 2019b).

4. Conclusions

The article considered the issues of introducing innovative solutions in the economic sector, which are the most technologically intensive and the development of which involves the search and acceptance of management decisions of a technical nature. It is to this category of enterprises that mechanical engineering enterprises belong. First of all, these changes should relate to the issues of rationalizing the logistics processes of machine-building enterprises. The article developed, described and analyzed an algorithm for constructing a logistics system for a machine-building enterprise. This algorithm helps to determine the effectiveness of the logistics system, as well as to develop and implement management solutions for the introduction of organizational and economic mechanisms for managing logistics activities in order to ensure its efficiency by implementing three key stages. Firstly, analysis of the specifics of principles, trends and tendencies in the implementation of the logistics function taking into account the specifics of machine-building enterprises. Secondly, to assess the costs of providing a management and personnel structure to determine how to rationalize the costs and revenues of an enterprise by reviewing the current status of inventory and warehouse management logistics activities. The next stage is a comprehensive assessment of the organizational and economic system of logistics management based on indicators defined as the priority of assessing the efficiency of the logistics system of a machine-building enterprise.

The priorities of further research include the determination of parameters for assessing the organizational and economic mechanisms of logistics activities of machine-building enterprises based on the developed algorithm for their implementation. Parameters for assessing the organizational and

economic mechanisms of the logistics activities of machine-building enterprises are necessary to ensure an effective monitoring system for all operational processes, as well as to achieve the strategic goals of the enterprise in the conditions of unstable financial and economic conditions for the operation of the algorithm for building a logistics system.

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