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Neo-institutional perception of the multidimensionality of modern logistics

Neo-instytucjonalne postrzeganie wielowymiarowości współczesnej logistyki

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Abstract. This article is an analytical study of the changing nature of modern logistics. The aim of the considerations undertaken is to identify the essence and nature of the contemporary multidimensionality of logistics from the point of view of science and economic practice. The research problem is whether institutional economics at the current stage of its development is up to the task resulting from the aim of the considerations undertaken? Finding an answer to the problem question should be helped by the achievements of new institutional economics It is reasonable to pose the hypothesis: "The multidimensionality of contemporary logistics is a response to the civilisational challenges of the modern world. An effective approach in recognising it is to identify it through the paradigm of institutional economics evoking its structural elements, i.e. "social ceremonies"; "technologies"; "philosophy" and "environment" surrounded by a "security belt". The research methods to achieve this aim are the analysis of the literature on the subject as well as of economic practice, and its synthesis of conclusions allowing a characterisation of the multidimensionality of contemporary logistics, based on a set of essential determinants assigned to them. The picture identified in this way makes it possible to see both its positive sides and its negative sides, and to indicate the place of logistics in economic practice now and in the future. This approach should also make it possible, on the basis of past experience, to develop research arguments for logistics theory and directives for shaping economic practice for the present and the future.
Keywords: multidimensionality of logistics, social ceremonies, technology, philosophy, environ

Abstrakt. Artykuł stanowi analityczne studium zmian charakteru współczesnej logistyki. Celem podjętych rozważań jest rozpoznanie istoty i charakteru współczesnej wielowymiarowości logistyki z punktu widzenia nauki oraz praktyki gospodarczej. Problemem badawczym jest pytanie: Czy ekonomia instytucjonalna na obecnym etapie jej rozwoju jest w stanie sprostać zadaniu wynikającego z celu podjętych rozważań? Znalezieniu odpowiedzi na pytanie problemowe powinien pomóc dorobek nowej ekonomii instytucjonalnej. Zasadnym jest postawienie hipotezy: Wielowymiarowość współczesnej logistyki jest odzewem na wyzwania cywilizacyjne współczesnego świata. Skutecznym podejściem w jej rozpoznaniu jest identyfikacja przez pryzmat paradygmatu ekonomiki instytucjonalnej przywołującej jej elementy strukturalne, to jest „ceremonie społeczne"; „technologie"; „filozofię" oraz „środowisko" otoczonych „pasem bezpieczeństwa". Metodami badawczymi pozwalającymi osiągnąć założony cel jest analiza literatury przedmiotu, jak i praktyki gospodarczej oraz synteza jej wniosków pozwalająca na dokonanie charakterystyki wielowymiarowości współczesnej logistyki, w oparciu o przypisany im zbiór zasadniczych wyznaczników. Tak zidentyfikowany jej obraz pozwala dostrzec zarówno obok pozytywnych stron także negatywne strony oraz wskazać na miejsce logistyki w praktyce gospodarczej obecnie, jak i w przyszłości. Takie podejście powinno również pozwolić w oparciu o doświadczenia z przeszłości, wypracować także argumenty badawcze dla teorii logistyki, a także dyrektywy kształtowania praktyki gospodarczej dla teraźniejszości oraz przyszłości.
Słowa kluczowe: wielowymiarowość logistyki, ceremonie społeczne, technologia, filozofia, środowisko

Introduction

The practice of economic life, as evidenced by its analysis, proves that today we are dealing with increasing changes in the nature of modern logistics - both civil (economic, security) and military (military, defense). A legitimate follow-up question is: what rationale determined the crystallization of modern multidimensionality of logistics both as a discipline of knowledge and a set of practical activities? (Multidimensionality, 2016) The problematic dimension of this question, justifies the thesis that this process is a response to the civilization challenges of the modern world (Krzykowski, 2020, pp. 60-80; Dziurny, 2020, pp. 137-272). Recognizing them requires an appropriate approach and interpretation. To the greatest extent, the achievements of the new institutional economics may prove helpful in this task.

The rationale for an institutional view of logistics

In its conceptual and analytical framework, the new institutional economics invokes the notion of the category of "social institutions" understood as "dominant ways of thinking that take into account particular social conditions, particular functions of individuals and communities. [...] habits of thought or ways of apprehending phenomena - which guide human life, come from the past. They are products of the past, adapted to the conditions of the time, and are therefore never in complete harmony with the demands of the present" (Veblen, 1971, p. 171). They reflect the man-made constraints that shape political, economic and social interactions, which are both informal constraints such as sanctions, taboos, customs, traditions and codes of conduct and formal constraints, which are constitutions, laws, property rights.

Recognizing the contemporary multidimensional picture of logistics development, according to the paradigm of new institutional economics, enriched by the environment of "culture" seen as an organized system of human behavior, in which there is an institutional (ceremonial) area on the one hand, and a technological area on the other (C.E. Ayres) (Stankiewicz, 2014, p. 21) makes it possible to see that any economic system - including logistics - remains under constant pressure, on the one hand from the forces of various institutions (legends, customs, social hierarchy), and on the other hand from incentives generated by technology. In doing so, it relies on four institutions: the balance of power, the gold standard, the self--regulating market and the liberal state. As such, it recognizes the dangers revealed on the level of self-interest versus social interest (Stankiewicz, 1998, pp. 494-495), as well as the methodological achievements of K. R. Poper, T. S. Kuhn and I. Lakatos (Stankiewicz,1998, pp. 22-27). It allows us to distinguish in its structure a "hard core" forming a set of fundamental and conditionally unquestionable assumptions whose contents are subject to slow changes; and a "protective belt" which consists of auxiliary hypotheses, modified according to the needs of the basis of the scientific research program (Stankiewicz, 1998, pp. 494-495).

Institutional multidimensionality of "logistics"

The considerations cited with regard to the issue of the multidimensionality of logistics, entitle us to consider it through the prism of the structural elements of the paradigm of the new institutional economics, namely "social ceremonies"; "technology"; "philosophy" and "environment". In doing so, it should be recognized that each of these structural elements has its own "safety belt" that is its environment and characterizes its essential determinants.

Social ceremonies

The first structural element of the multidimensionality of logistics are social ceremonies described by the determinants: institutions - useful and non-useful, beliefs and values. Their recognition is possible by revealing the four sides of logistics: etymology, perception, definition and methodology.

First in the area of social ceremonies are those issues that are related to the identification of logistics as a science as well as an economic practice. Its picture is imposed by the etymology of the term logistics itself, which in each of the world's languages emphasizes a different side of its essence, although they are far from similar. It has its historical perspective on the one hand, and its modern perception on the other. Greek roots indicate that the term logistics is derived from the categories

Logos (word, speech, reason, reckoning, utterance, message, story, book, calculus, thought, opinion, proof, value) (Kopalinski, 1971, p. 449); Logiamos (calculation, reckoning, consideration); Logistikon (power of reason, reason); or Logistike (art of reckoning, art of calculation) (Abt, Wozniak, 1993, p. 18). The etymology of these terms exposes the power of reason, sanity, the art of counting and calculating, the value of evidence and calculating. A similar understanding of the term logistics is revealed by its etymology in English, French, German, as well as Polish.

Perception, on the other hand, boils down to two streams: military and economic, viewed in both theoretical and practical dimensions. In the military view, the subject of logistics studies are money streams, armaments, as well as material streams related to meeting the needs of the military (Yalowiec, Płaczek, 2016, pp. 73-87). On the other hand, in economic terms, the subject of logistics inquiry, is the functioning of the logistics chain (Skowronek, Saryusz-Wolski, 2012, pp. 45-50).

Despite the dynamic development of logistics, the achievement of the desired results in practice from the implementation of logistics system solutions, still has not allowed to clarify many theoretical problems in this area. It has not been possible to unify the position on the concept of logistics. Some authors consider logistics to be a science, others are of a different opinion. Logistics policy and strategy have been treated very modestly in the literature. Instead, more attention has been paid to the formulation of logistics principles - both in the civilian and military spheres. They have been and are being created with the progressive development of logistics and the deepening nature of its multidimensionality (Stankiewicz, 1995; Grzybowska 2009, pp. 30-33).

Another side of the perception of the multidimensionality of logistics is its definition. The first attempts at it took place as early as ancient times - both in Europe and Asia (Sun Tzu, Sun Pin, 2004, pp. 66-67). They were linked to the war that mankind has been waging among themselves since time immemorial. It turned out that the basic prerequisite for offensive (aggressive) as well as defensive actions is the standard satisfaction of the material and other needs of the warring armies. These undertakings in the past, as well as today, fall within the scope of interest of logistics. They took into account both conquest and defense needs. They were aimed at the economic and organizational problems of warfare, life and operation of armies, but also at the construction of economic and defense infrastructure, exploratory expeditions or transportation. The term was referred not only to rear operations, but also included all deeds concerning the optimization of troops' crossing of space, management of resources and information (Skarzynski, 2008, pp. 66-67).

The development of logistics in the military economy of the armed forces went from "dormancy" to development. This situation applied to all countries of the world, including Poland. In the economy of the Polish Armed Forces from the early 1990s, a clear orientation towards logistics emerged. This was a different approach from that before and after World War II. General theoretical problems concerning

military economy were resolved in works on war economics and military economy, and those concerning the threat of war and war were resolved in war (defense) economics. Regardless, theoretical economic issues were dealt with in branch economics. Theoretical work was also undertaken on tool disciplines: planning, control, systems analysis and others. Solutions to military economics from the command and control period were adequate to the requirements of the time.

The intensive development of logistics in the military at the beginning of the 1990s was determined by the need to adapt the solutions of the economic system of the Polish Armed Forces to those of the North Atlantic Alliance countries, in connection with Poland's planned entry into NATO. These premises caused intensive development of logistics, which found expression: in the implementation of comprehensive logistics at all levels of command (management) and in the establishment of logistics training structures in military education. Another impetus for the development of logistics was the participation of the Polish Armed Forces in international military operations in Iraq and Afghanistan. Also contributing to its development were the solutions that were forced by the Covid -19 pandemic. Currently, such a premise is the logistical tasks associated with the implementation of humanitarian and military aid to Ukraine.

Logistics is a theoretical as well as a practical problem, locating itself in the area of military as well as civilian economy. At present, two views of theorists on logistics can be distinguished. Some believe that it is only a method of achieving a specific, efficient operation - others that it is a scientific discipline. Most authors of definitions of logistics emphasize that logistics is a science. They define logistics as a science, science and art (e.g., Skowronek, Saryusz-Wolski, 2012 pp. 16-17; et al.), or a kind of philosophy of practical management, or science and art of practical operation (e.g., Szymonik, Stanislawski, 2023, pp. 1-10).

Analysis of the cited definitions of logistics makes it possible to distinguish three concepts of logistics that are not only not mutually exclusive, but complementary, viz:

- the first, that logistics is "the processes of physical flow of material goods - raw materials, materials, semi-finished goods, finished goods - within an enterprise, as well as between enterprises - and the flows of information streams reflecting material processes and used in controlling these processes." (Skowronek., Saryusz-Wolski, 2012, p. 17);
- the second, that logistics is „a certain concept, a philosophy of managing real processes (flow of goods), based on an integrated, systemic view of these processes." (Skowronek., Saryusz-Wolski, 2012, p. 17);
- the third, that logistics is „a field of economic knowledge that studies the regularities and phenomena of the flow of goods and information in the economy, as well as in their individual links" (Skowronek., Saryusz-Wolski, 2012, p. 17).

The multidimensionality of logistics is also emphasized by its - methodological side. It is an aftermath of the invocation of methodological pluralism referring to a set of different and constantly new questions, consequently leading to the questioning of existing paradigms (Jeszka, 2014, pp. 13-37). The perception of logistics as a science involves the need to have its methodological apparatus, that is, a formula of its own: the subject (object) of research, the subject of research, and the ability to carry out a certain policy, to perform the right functions, to have for itself, as a science, certain principles. These processes are also accompanied by the variability of logistics terminology (Kisperska-Moroń, Krzyżaniak, 2009, p. 120).

Logistics has its own object (subject) of study. These are the flows of supply streams in the logistics chain (materials, parts, assemblies, components, goods, products, etc.). However, it should be noted that the scope of the object of logistics is defined differently by different authors. However, it is necessary to strive for a common position, because it has both theoretical and practical significance. Theoretical because it establishes the scope of logistics research, and practical because it establishes the scope of responsibility for the implementation of certain objects (tasks) and the achievement of business results (volume, type, quality, time, costs and economic effects) (Kisperska-Moroń, Krzyżaniak, 2009, p. 125).

Taking a holistic view of the subject of logistics inquiry, it should be emphasized that it is the logistics chain, which includes: physical flow streams (procurement - supply, operation - all processes from the moment technology enters the system to its exit), infrastructure, transportation (movement of physical goods and personnel stock), energy; services; information and IT; money supply; and personnel supply. This means that logistics encompasses basic economic problems, the solutions to which determine how efficiently it performs its tasks.

The subject of logistics is a matter of organizational structures. This means that we can speak of them only in those military and economic links in which it occurs. In the military sphere, it is constituted by the Functional System of Logistics of the Polish Armed Forces, the organizer of which is the head of the P-4 Board of the General Staff of the Polish Armed Forces, which manages the following subsystems: command, material, technical, transport and movement of troops, medical; the area of task execution by the host country HNS and the area of mobilization of the economy and strategic reserves (Kazmierczak, 2018; System, 2019). On the other hand, in the sphere of the civilian economy, the subjects of logistics are): the managers of the plants (companies) where logistics occurs; the managers of the logistics cells and the logistics base; the managers of the functional cells; the community of the plant (company) participating in the implementation of logistics processes; and other subjects of the civilian economy (Skowronek, Saryusz-Wolski, 2012, p. 35).

The indicated subjects as well as the subjects of inquiry in the civilian as well as military areas direct them to the plane of security of logistics processes. This situation, in turn, gives rise to the need to see, on the one hand, the integration of

the activities that comprise them (Nyszk, Smyk, 2014), and, on the other hand, the need to develop and adhere to in the concrete realities of the activities of logistics subjects the engineering of security logistics management - containing in itself the forms: defense, military, crisis management and business (Stęplewski, 2019, pp. 9-32; Szymonik, Stanislawski, 2023, p. 1-10).

Technologies

Another structural element of the multidimensionality of logistics are "technologies" described by such determinants as tools and qualifications. They prescribe combining theoretical knowledge in the field of logistics with practical knowledge, in which engineering achievements dominate. At the same time, this implies the need to deepen knowledge of logistics processes, primarily their distinction, coordination and modeling, as well as the security of their implementation.

The physical platform that integrates all logistics processes is modern technology and engineering, i.e. logistics infrastructure, which includes, technical logistics systems. This means that the essence of logistics as a science of efficient spatio-temporal flows of various goods, as well as media between different points of operational space is the strong links of logistics with the theory of operational research, applied computer science, the virtual world of Internet technologies, as well as the organizational-functional unity of material goods flows and information streams controlling these flows (Ficoń, 2008, p. 5).

Globally looking at the development of logistics, it can be said that it has the character of a response to the challenges that arise in the modern world both in the sphere of the military economy and the civilian economy. They raise issues of its security from the point of view of normative requirements and functioning under conditions of risk and uncertainty (Stęplewski, 2019, pp. 95-144). However, an analysis of the evolution of logistics also indicates that its current development is in the nature of a certain fashion that emerged in the decade of the 1950s and continues to this day (Golembska, 1994, p. 9).

Logistics begins with the purchase of goods, raw materials, services, information and methods, instruments of operation including guidance. It encompasses all subsequent functions of an enterprise, such as purchasing, research and development, production with its various phases. It also has a significant impact on personnel management, financing processes, and then finds expression in the sphere of sales and reaches all the way to the customer. The set of logistics activities can include: forecasting of supplies, warehousing and inventory management, supplying workplaces with materials, raw materials, components, etc., packaging and packaging, transportation, management of packaging and production waste, service, as well as collection, processing and distribution of information related to these activities.

Logistics has become not only a control technique, but, like rationalization, a way of methodical and systemic thinking. It is an instrument for optimizing quantities, values and units of time (Mankowski, 2014, p. 15). The cited features indicate the interdisciplinary and integrative nature of logistics as a science, taking into account in theory and in practice the previous achievements of other sciences as well (Slusarczyk, Kot 2013, p. 84). This is also confirmed by its functional segments, aimed at ensuring the efficiency of the functioning of business entities on a macro and micro scale, taking into account the requirements of the consumer and producer, taking into account: quantity, type, quality, time, costs and prices of products and services provided (Wasyłko, 2000, p. 28).

The interdisciplinary approach to logistics in the modern market economy should be understood as the control of the entire supply chain at the micro- and macroeconomic levels, linking the achievement of such an intention to the spatio--temporal integration of global and regional) and synchronization of all economic and social multistreams. Following this approach, a distinction is increasingly being made, in addition to local logistics, to international logistics in the dimension of regional logistics and global logistics (Plakek, 2000, pp. 575-585). It is revealed at many levels, creating a kind of pyramid of logistics, which, however, can only have a model character oriented to the efficiency of logistics activities (Skowronek, Saryusz-Wolski, 2011, p. 154).

Environment

The third structural element of multidimensional logistics is "environment" concretized by such determinants as flora, soil, fauna, climate. As far as multidimensional logistics is concerned, it is the nearer and farther environment.

In the area of the closer environment, the determinant of space perceived geographically should be noticed first. Refer to it the location of warehouses, logistics centers and transportation systems. The location of a warehouse should be considered as one of the most important strategic decisions. It is made on the basis of a numerous set of criteria taking into account both quantitative and qualitative data (Richards, 2016, pp. 12-16). In turn, the location of logistics centers is closely related to it. If the location of warehouses is largely a tactical issue, the location of centers is a strategic one. The selection of the location of a logistics center requires a multi-stage site selection (Murpy P. R. jr, Wood D. F, 2011. pp. 225-226).

Another determinant of the multidimensionality of logistics is the logistics transportation system whose essence is to overcome space-time, connect producers and consumers and enable the circulation of goods. These activities are possible on the basis of transportation means and the transportation network. In its essence it is very diverse, because: road, rail, inland waterway, air; sea and pipeline (Krawczyk, 2011, pp. 273-274).

It plays an important role in logistics processes. It conditions the physical movement of raw materials, materials and goods in accordance with economic needs; influences the efficiency and reliability of physical flows throughout the logistics supply chain; and generates significant costs, which are, along with storage costs, dominant items in the cost structure (Ficoń, 2008, pp. 57-58).

In the area of the environment closer to the environment, climate change, air pollution, noise, vibration should also be viewed. All of these factors can create premises for generating logistics costs. They also disturb the balance of the environment. Ideas for solving this issue focus on the ideas of production waste reuse and so-called reverse logistics. These situations must direct the attention of the multidimensionality of logistics to the issues of environmentalism seen through the prism of the determinant of environmental protection in relation to waste management and emissions and pollutants. Environmental hazards are also a matter of transporting hazardous materials (preparation substances). They also pose a threat to human health and safety (Grzybowska, 2009, pp. 387-390).

On the other hand, in the area of the downstream environment one should notice the business environment. However, it is not geographical but economic in nature. It began to be shaped with the development of logistics in the area of the national economy which were a derivative of system changes and political transformation. Its development was also influenced by other factors, namely: the need for a decisive improvement of the economy operating under the conditions of the market game.

The identification of logistics needs, as a challenge for business, falls within the area of the approach emphasizing that logistics is the art of overall management on an enterprise scale. In practice, this approach means the proximity of recognizing logistics as a scientific discipline, but under certain conditions. Following this, the following are legitimate: viewing logistics as a management system (holistic enterprise; processes and potential); exposing the two functions of management (planning and control); lacking a motivational function with emphasis on economic and financial instruments; sometimes omitting the organizational function of logistics; coupling the flow of physical resources with the flow of information.

The generator of logistics needs is the progressive processes of globalization and regionalization. They are able to unite it at the level of consumer market - producer market. Their generation as well as development is fostered by the progress of civilization, the expression of which is the expanding field of electronic economy (e-Economy, e-Business), electronic commerce (e-Commerce), electronic marketing (e-Marketing), or electronic logistics (e-Logistics) (Grabińska, Pawełoszek, Ziora, 2020, pp. 22-53).

Nowadays, logistics needs are generated primarily by the criterion of business efficiency and effectiveness. It has become a strategy to minimize warehouse inventories at the expense of increased intensity of supply deliveries. This means an increase in the importance of the paradigm of rationality of the logistics chain, and consequently the construction of efficient logistics systems at all levels of economic activity.

Philosophy of logistics

The next structural element of the multidimensionality of logistics is the "philosophy" which is described by the determinants of social legitimacy, participatory democracy and sufficiency, tied together by instrumentalism, which welds together its next three elements, namely social legitimacy, participatory democracy and sufficiency. Each of these formulates specific requirements for logistical processes. Instrumentalism in relation to the multidimensionality of logistics must be seen as a contemporary philosophical direction that is a variation of pragmatism. It should be seen as a practical view of the theory of logistics knowledge and all human activity in the area of logistics in the broadest sense aimed at adapting to and mastering the environment.

Philosophy - viewed through the prism of instrumentalism - is social legitimacy understood by it as legimitization and authorization to take certain actions by the authority and society represented by the basic economic actors linked by the logistics chain. It is derived from state law, although it will also be influenced by cultural changes and changes in the meaning of pre-existing criteria (derived from tradition or custom), as well as the mandate of those exercising power based on the mandate of the election result. It is reinforced by such characteristics as traditionalism, affective faith, rational faith due to values, and faith in legitimacy. In terms of multidimensional logistics, it means the legitimacy of the state to shape logistics policy and strategy, which also involves the formation of appropriate technical and logistics infrastructure treated as a public good.

Social legitimacy is also the process of authorizing the delegation of authority vested in the state to the business entities directly involved in logistics processes. Its expression is legitimacy with regard to logistics activities based on the power of agreement between the parties involved; on the imposition of their solutions or on the principle of submission. The legitimacy for this is ultimately based not on democratic forms of political will formation, but on the premises of the legitimate exercise of political power (Stankiewicz, 1988).

With regard to multidimensional logistics, social legitimacy is succored by participatory democracy, which must be seen as a decision-making process that refers to the principles of direct and indirect (representative) democracy. Its essence is decision-making in a collective manner. Everyone has the right to participate, and decisions are made in an open and close to legitimacy manner. It works well for local and labor governments. This idea seems transposable to a limited extent to entities operating in the main strings of the logistics chain. To a far greater extent, it applies to the community functioning in the area of operation of logistics entities. It can boil down to the possibility of its participation in the shaping of logistics infrastructure and processes, as well as in decision-making that concerns such

matters as budget planning, taxes, local fees and investments. Forms of participatory democracy coexist with state and local government structures. They are expressed, among other things, in the need for private investors representing logistics entities to obtain the consent of local residents for their investments.

Sufficiency, on the other hand, as a determinant of philosophy, should be understood as the compatibility of four "institutions": the balance of power, the gold standard, the self-fulfilling market and the liberal state. It is indispensable due to the conflict between the self-interested economy and the public interest. In doing so, the market should be regarded as an institution inherent to man but as a reflection of exchange in the form of "reciprocation." These issues lend themselves to a multidimensional view of logistics.

An attempt to assess the image of multidimensionality of modern logistics

The analysis of logistics at the contemporary stage of its development, seems to pay homage to the principle that it functions more in the real world than in the minds of logisticians-scientists. There seems to be a fostering of a dismissive attitude toward theoretical generalizations of logistics practice. This is often due to the conviction that logistics does not need thorough generalizations of knowledge about real logistics systems, or allows them to function without such knowledge. This is an approach that cannot be accepted, because if the substrate for the functioning of logistics is the real market economy, this means that it functions on the basis of its institutions. Since there is no single type of market economy, this means that the institutions of logistics will vary depending on the model of the market economy. Following this dilemma is the search for proposals to change the approach to logistics, and consequently the search for alternatives to the current perception and study of logistics processes.

Among the many currents of modern economic thought, a helpful approach to understanding the contemporary picture of logistics with a pro-development dynamism is the new institutional economics, which focuses on the study of the relationship between economic outcomes and the institutional conditions of behavior and the institutional environment. It attaches great importance to legal and organizational conditions and the stability of routinized activities. It appears to be methodologically mature enough to contribute to the formulation of a new view of the contemporary multidimensional picture of logistics. Many of its generalizations can be successfully used in creating the foundations of a new approach to logistics theory and practice (Rudolf, 2012, p. 13).

The multidimensionality of logistics implies the need for a theory that underpins what is already in practice, one that combines economic and managerial knowledge with technical knowledge, as well as with security and defense sciences. It should focus more broadly on:

- enterprises as economic entities which, being in the network of the logistics chain, are burdened with various conditions for their realization of specific logistics processes - from certainty through risk to uncertainty;
- logistics processes in the context of: customer acquisition, demand information gathering, production planning, purchasing, supply, production and internal distribution to their own distribution centers and distribution to customers;
- the design of logistics networks identifying their strengths and weaknesses for different operational strategies in terms of route flexibility, delivery time and quality, mitigating the effects of disruptions, taking into account the criteria of efficiency versus delivery quality, flexibility and resilience (Esmizadeh, Parasat 2020, pp. 174-197);
- optimization of the processes of logistics decisions made on the basis of information - current and nearer and farther future, as well as forecasting - with varying degrees of reliability (Dunke, Nickel,2020, p. 87);
- improvement of logistics efficiency (Juniper 2017, pp. 11-55);
- international logistics processes as a consequence of globalization and regionalization of logistics (Golembska, 2014; Krzyszkowski, 2020, pp. 127-180);
- Logistics economics in the context of: logistics accounting identified through the prism of revenue, costs and financial result; assets of a logistics enterprise, their records, inventory and rules for carrying out; principles of logistics, statistical and accounting records and financial reporting (Andrzejczyk, Pawlowski, 2013, pp. 139-254);
- transport systems in the context of: technical infrastructure, technical and operational characteristics of the systems, infrastructural and technical limitations of transport means, regulations on requirements for transport means, selection of transport means for specific transport tasks (Abt, 1996);
- spatial logistics attached to spatial information systems based on GIS technology in relation to mapping systems, geographic data modeling, visualization and spatial modeling of logistics relationships (Kauf, Tłuczak, 2014, pp. 11-25; Longley, Goodchild, Maguire, Rhind, 2006);
- warehousing systems in the context of: the role of the warehouse and its manager in the supply chain, warehouse equipment from the point of view of storage, manipulation and individual warehouse processes, cost management and cost calculation, engineering and operation of modern warehouses, and the use of information and telematry systems to control product and

information flows in logistics systems, automation, computer software, and health and safety of warehouse employees (Richards, 2016, pp. 1-55; Informatics, 2016; Krzyżaniak, Niemczyk, Majewski, Andrzejczyk, 2013);
- logistics strategies in the context of instruments (methods, tools) for achieving logistics goals, the choice of which is determined by the conditions of operation of the enterprise in a specific environment, competitive position, the degree of modernity of technical and organizational solutions and management style;
- expanding the areas of logistics management quality (Zimon, 2013, pp. 41-76), safety (Szymonik, Stanislawski, 2023, pp. 1-10; Stachowiak, 2012, pp. 62-63) marketing (Rojek D. 2011, pp. 112-117);
- logistics planning and forecasting in the context of planning methods covering processes from demand information acquisition to material demand planning, production and distribution, as well as principles of transition from plans to implementation (Sliwczynski, 2009, pp. 104-126);
- logistics decision-making and risk management in the logistics chain under conditions of uncertainty and risk;
- development and operation of Logistics Centers (Bartosiewicz, Oziębło, Zachara, 2018, pp. 9-48);
- the provision of logistics services by external entities on an outsourced basis, allowing to manage logistics service chains more efficiently (Smyk, 2016, pp. 9-31) and to minimize total logistics costs (Ślusarczyk, Kot, 2013, pp. 7-10);
- the use of quantitative methods, operational research and game theory, in the planning and forecasting of economic activities in logistics networks, their spatial configuration and the management of logistics projects (Pisz, Łapuńska, 2015, pp. 56);
- supervision and control (controlling) of the course and evaluation of logistics processes (Wasylko, 2000, Kozlowski, 2020);
- expanding and revising the fields of national security logistics (Logistics 2018; Yalovsky, 2020; Kler, 2021) and military logistics (Yalovsky, Lapuńska, 2016, pp. 73-87) as a response to the contemporary political and military challenges of the world;
- intensifying the training of modern logistics managers (Kisperska-Moroń, Krzyżaniak, 2009; Truś, Januła, 2010; Krzyżaniak, Niemczyk, Majewski, Andrzejczyk, 2013; Richards, 2016).

The indicated areas of inquiry and action with regard to the multidimensionality of logistics in the real world reveal many puzzles and mysteries of the future, which often face barriers to the possibilities of our knowledge and imagination. These are compounded by images of states and processes that, on the one hand, must be perceived and treated as experience, but on the other hand as facts to which one must not succumb to boundless fascination. Not only scientists, but

also politicians and economic practitioners must be aware of these relationships. It should be remembered, however, that it is impossible to maintain the current path of development of logistics, because its multidimensionality requires a vision of such a path of development, which would allow to ensure improvement of its efficiency and effectiveness.

Conclusions

The considerations undertaken and carried out authorize a number of conclusions.

The first. The literature on the subject, as well as the analysis of the phenomena of the practice of economic life proves that we are dealing with increasing changes in the nature of modern logistics, giving it a multidimensional character. This is determined by arguments from the past, as well as from the present and the future formulating the civilization challenges of the modern world. Recognizing them requires an appropriate approach and interpretation. This occurs in a situation that pays homage to the principle that logistics functions more in the real world than in the minds of logistics scientists. Thus, in practice, we are sometimes faced with a dismissive attitude to theoretical generalizations of logistics practice.

Second. It may prove most useful in identifying and characterizing contemporary multidimensional logistics to use the achievements of the new institutional economics to create the foundations of a new approach to logistics theory and practice. However, this requires sanctioning the social rules of the economic game and identifying opportunities for the use of institutions in the processes of economic choices that arise from the unpredictability of the choices of society and the state. In the real world, this appears through the prism of the limitations of our knowledge and imagination. Awareness of these interrelationships must not only be held by scientists, but also by politicians and economic practitioners. Indeed, the reality of the modern world contributing to the formation of a multidimensional perception of logistics has given rise to a whole set of situational arrangements forcing the rapid approximation of science to economic reality, and the need to organize the acquired knowledge and use it in practice.

Third. Considering the multidimensionality of logistics through the prism of the structural elements of the new institutional economics paradigm, each of which has its own "safety belt" which is its environment and characterizes its essential determinants, that is, "social ceremonies" described by determinants: institutions, beliefs and values; "technology" described by the determinants: tools and qualifications; "environment" concretized by the determinants: flora, soil, fauna, climate; and "philosophy" described by the determinants of social legitimacy; participatory democracy and sufficiency, proves to be an apt research approach. It allows one to see both alongside the positive sides of its image and its negative sides.

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