

Prospects for the development of the logistics system and its structural elements

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Abstract

The purpose of the study is to carry out a critical analysis of the elements of the logistics system of a modern enterprise, identify their functional characteristics and connections, and develop proposals for the stages of forming an improved model of the logistics system. The article highlights the issues related to the specifics of the formation of an effective logistics system of the enterprise by its constituent elements. It has been proven that the modern design of the logistics system should have not only traditional, but also innovative elements for high-quality performance of logistics functions. On the basis of the conducted analysis, the use of the graphic method and generalization, the relevant structural elements of the logistics system were identified. The role of the stimulating function of management in the matter of encouraging logistics workers to perform their duties in a high-quality manner is defined. In this context, the experience of Poland is given as an example. Comparing the salary level of employees at different levels of procurement and logistics departments, identifying the advantages of their functional powers and status made it possible to develop directions for improving internal and external relations to ensure mutual positive influence and achieve the effect of synergy. Taking this into account, a scheme of stages of the formation of an improved logistics system has been developed. Based on the results of the analysis, a conclusion was made regarding the expediency of using traditional and innovative logistics tools, as well as modern dominants associated with the use of technical achievements. The application of the author's proposals will make it possible to form a high-quality logistics system of a modern enterprise on a practical level. This will ultimately have a positive effect on the management of logistics processes and ensure better efficiency and effectiveness of the enterprise.

Keywords: logistics system; management; optimization of logistics activities; efficiency; quality; structural elements; improvement; stages; stimulation.

1. Introduction

The modern activity of business entities requires the use of effective approaches for product promotion. This is due not only to the rapid growth of production volumes, the expansion of the assortment and quality parameters, but also to the active development of information presentation technologies. Enterprises that are able to quickly respond to market requests and inform about their own production innovations and products are automatically included in the more successful, profitable and competitive ones.

The functioning of economic entities in today's dynamic economic environment requires the active use of all available and innovative levers of activity optimization to maintain competitiveness in the market. Such levers include the improvement of the

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management information base in general, as well as assets (resources) in particular, and the rationalization of production and sales processes, and a number of other important areas of ensuring the growth of activity efficiency [Khvyshchun N.V., 2016].

In any sector of the national economy, today, as in recent years, there is a tendency of insufficiency and lack of funds, therefore the question of optimization as one of the levers of increasing the efficiency of management is extremely relevant. The introduction of appropriate mechanisms significantly affects the organization of activity and its effectiveness, but the desire for improvement currently does not fully meet the existing realities and demands, including modern management. Such specific systems, which ensure the interaction of business entities with counterparties and within their own organizational structure for coordinated activity, especially suffer from a lack of clear and detailed recommendations.

2. Literature review

The problem of optimization of the logistics system, as well as various directions of implementation of this task, were studied by many scientists. Scientists and practitioners strive for the formation of an effective, efficient and maximally optimized logistics system. This is an important goal of modern research, which is emphasized by many researchers. Among them are L.I. Bolibruch, V.V. Weinbereger, Y.I. A. Gurich, M.V. Zhelikhovska, G.V. Kostyuk, E.V. Krykavskiy, S.M. Lyholat and many others.

They made a significant contribution to the development of both the logistics concept itself and its components. At the same time, significant changes are taking place in the construction models of modern logistics systems.

Kostyuk G.V., Gurich Yu.A., Weinbereger V.V., for example, offer a conceptual model of the formation of a logistics system, which consists of a complex of interconnected spheres of activity to ensure cross-functional integration of material flow management at enterprises. At the same time, they distinguish 5 stages: 1) development of a tree of goals and objectives of the enterprise; 2) analysis of the existing logistics chain; 3) determination of the necessary structure and content of the integrated material flow management process; 4) improvement of (stockpiles) management; 5) evaluation of the efficiency of the logistics system [Kostiuk H.V., Hurych Yu.A., Veinbereher V.V., 2016].

In general, the above-mentioned authors combined in their studies the depiction of stages with the use of conventional signs and signs for building a block diagram. This approach quite original allows solving the problem of transition from one stage to another and creates the impression of applying the algorithm of forming a logistics system.

Zhelikhovska M.V. proposes to represent the logistics system of the enterprise as a set of subsystems between which there are interconnections and which perform certain functions. Its subsystems are: supply, production, transportation, sales, storage. «The logistics system is characterized by internal and external connections that have interactive properties and according to their functional characteristics are classified as material, monetary and informational. The interaction of the elements of the logistics system, realized through these connections, determines its integration properties. The specific properties of the logistics system are: complexity, dynamism, adaptability, openness, relative isolation, stochasticity» [1, p. 51].

Despite the generally good state of logistics of Ukrainian enterprises, it should be recognized that their «logistics system has its own characteristics and has a certain general structure. Among the main features, the most important is that the logistics system of the enterprise is primarily determined by production and functions according to the rhythms of this subsystem» [2, p. 42]. Accordingly, the formation of logistics systems is subject not only to general, but also to specific rules and approaches specific to a specific business entity.

At the same time, a significant role (especially for transport enterprises) is played by the system of state support for the development of logistics [4, p. 291].

In addition, in most works of modern authors [Zhelikhovska M., 2022; Kostyuk H.V., Hurych Yu.A., Veinbereher V.V., 2016; Smyrnova N.V., 2018; Taranenko Yu., 2015; Khvyshchun N.V., 2016; Shyshkin V.O., Overchenko A.I., 2015; Diehlmann F., Lüttenberg M., Verdonck L., Wiens M., Zienau A., Schultmann F., 2021; Lewi D., Davies E.H. and Anyanwu O., 2021] stages of logistics system formation are considered from the standpoint of the logic of conducting research, analytical, and organizational work. At the same time, it is important to evaluate both the initial conditions and the newly created system itself. Regarding the first, influencing factors are important, and the designed logistics system is evaluated from the point of view of efficiency.

3. The identification of previously unresolved issues and the formulation of research hypotheses

It is appropriate to point out the general positive direction and relevance of the development of the application of logistic approaches in the management of the activities of organizations. But it should also be recognized that despite the lively interest of modern scientists in these issues, agreeing with the proposals expressed regarding the possible directions of improvement of the principles of logistics, it is advisable to substantiate in more detail the ways of their practical implementation, to generalize the principles and stages of the task of creating an effective logistics system, as well as to analyze the specifics requirements for workers in this field and their wages.

The purpose of the research and preparation of the article is to conduct a critical analysis of the elements of the logistics system of a modern enterprise, identify their functional characteristics and connections, and develop proposals for the stages of forming an improved model of the logistics system.

4. Research methodology and methods

The article is devoted to the problem of forming an effective logistics system of the enterprise, which would have all the necessary elements for high-quality performance of logistics functions. Analysis, evaluation, generalization and other methods were used in the research process. In particular, thanks to the application of analysis, the use of a graphic method and generalization, the constructive elements of the logistics system were identified, the role of the stimulating function of management in the issue of wages of logistics workers (on the example of Poland). Comparing the salary level of employees at different levels of procurement and logistics departments, identifying the advantages of their functional powers and status made it possible to develop directions for improving internal and external relations to ensure mutual positive influence and achieve the effect of synergy.

Taking this into account, thanks to modeling, a scheme of the stages of the formation of an improved logistics system was built. Based on the results of the analysis, a conclusion was made regarding the expediency of using traditional and innovative logistics tools, as well as modern dominants associated with the use of technical achievements.

The application of the author's proposals will make it possible to form a high-quality logistics system of a modern enterprise on a practical level. This will ultimately have a positive effect on the management of logistics processes and ensure better efficiency and effectiveness of the enterprise.

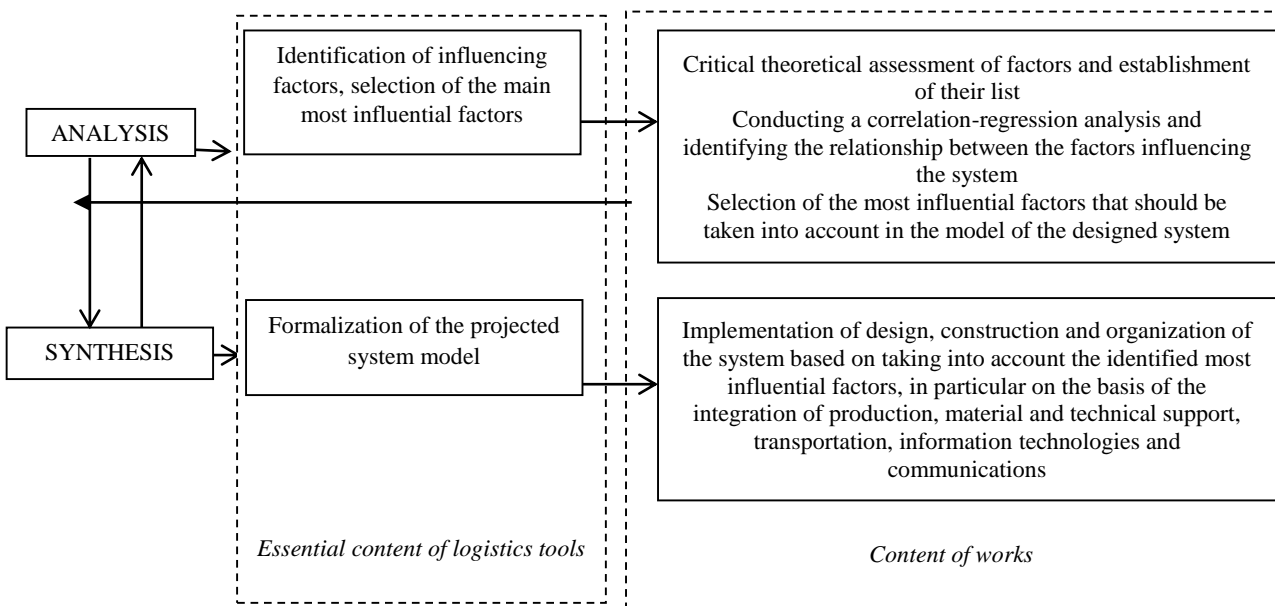
5. Main results

In modern conditions, the creation of an effective and efficient logistics system, in addition to taking into account classical principles and rules, should include an assessment of existing technical solutions for the implementation of logistical approaches in management.

Being a complete, complex system that does not just act as a way to reduce costs, but acts as the basis for optimizing all processes that take place in the enterprise, logistics is based on the application of a number of tools. The main ones are analysis and synthesis. These logistic tools, provided they are applied to any studied system, allow building an optimally balanced mechanism of activity. This is ensured by the fact that, thanks to the analysis, it is possible to identify the factors affecting the processes of the analyzed system, to use their quantitative assessment regarding the impact and interaction with each other and on the system itself in general. At the same time, an important characteristic of the evaluation process itself is the possibility, or rather even the expediency, of choosing the most influential factors and ignoring (abstracting) the least influential factors [Taranenko Yu., 2015].

In fact, this fact itself already contains logistic characteristics, because it also takes into account optimization points. True, these points relate to the optimization of the calculation process itself. For specialists who conduct such an analysis, it is important to identify the influencing factors as correctly as possible. Almost the entire further result depends on this, since formalized optimized models are synthesized based on the results of the data analysis.

That is, the next important tool of the logistic approach – synthesis, is used for the development of systems of higher efficiency and quality and provides new, improved parameters of the designed system in the process of development (and under the condition of approval – and functioning) of this formalized model. At the same time, the designed new model will combine only key factors in the dynamics of development of the logistic system (Fig. 2).

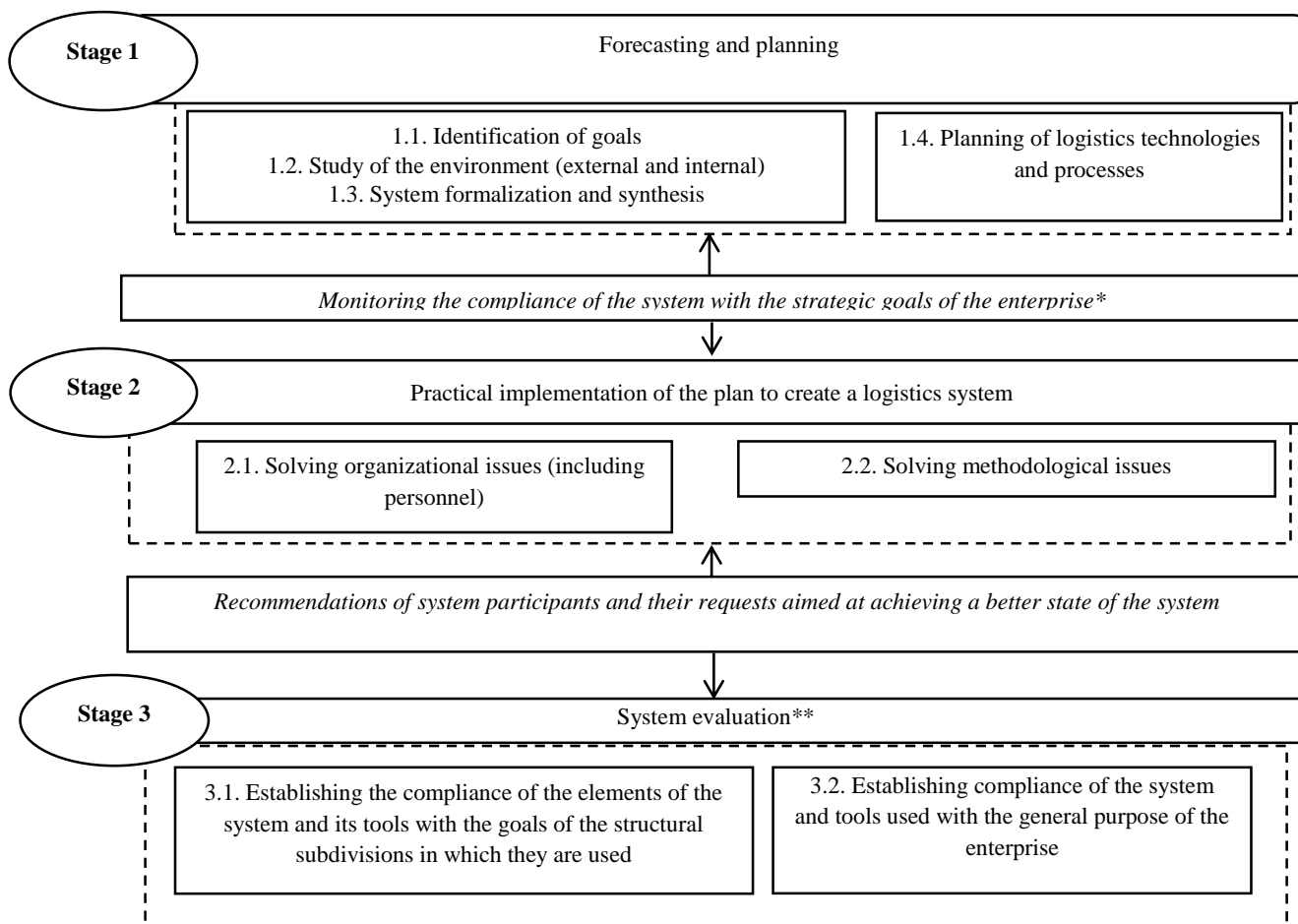


Source: Author's generalization

Fig. 2. Constitutive elements of logistic, their content characteristics and relationship

Implementation of the application process of the main tools of logistics shown in fig. 1 requires appropriate training of specialists with relevant competencies. But, before moving on to this important issue (the final result of running an activity or business as a whole largely depends on the qualifications of employees in the field of logistics), it is worth solving the problem of creating an effective logistics system.

Taking into account the existing proposals and the practice of forming a logistics system, the most common stages (stages) of its organization are design, planning (they can be combined due to certain meaningful similarities), implementation and evaluation. Each of them is characterized by the presence of mandatory components (elements) that ensure the performance of relevant tasks and the achievement of set goals, as well as the general goal of forming a logistics system (Fig. 3).



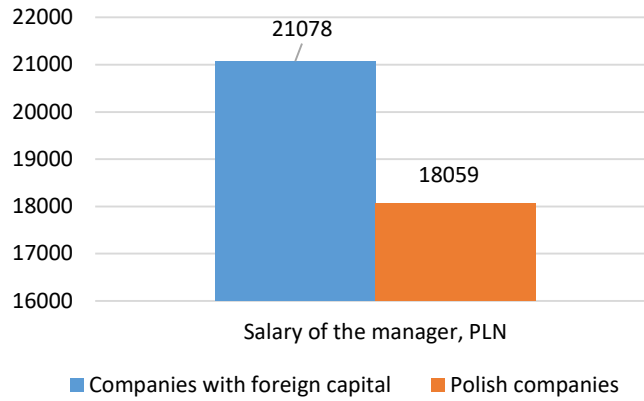
Note: * confirmation of trust; ** after the implementation of the system and some period of its operation, opportunities for improvement may appear; generalization of the author of the article

Fig. 3. Stages of logistics system formation

Of course, highlighted in fig. The 3 stages can be detailed more thoroughly and can include the author's visions. From the point of view of practice and professional judgments of managers and designers of the logistics system, this is completely objective. However, the proposed sequence is adapted to the formation of a general idea of the stages of creating a logistics system and can be supplemented and detailed with all classic and innovative elements for a better understanding of the entire represented process.

It should be noted that each link of the logistics chain has its own specific components, but all of them in one way or another require the presence of performers - specialists of the appropriate profile and level. The most common is logistics in trade organizations (although it is no less important for any other business entities). Likewise, the largest number of relevant institutions is concentrated in trade. As a rule, logistics issues are solved by a company specialist, or, if it is a sufficiently powerful trading company, by an entire department. It should be noted that an employee who performs logistics tasks and uses its tools due to his own role and weight for companies is a fairly highly paid person.

For example, in the Republic of Poland, depending on the origin of the company's capital, the salary of a logistics specialist usually varies greatly, and the salaries of the heads of relevant departments range from 18,000 to 21,000. zlotys That is, belonging to one or another group of enterprises significantly affects the size of the employee's remuneration, especially in the higher echelons of the organization. In the procurement and logistics division, directors of companies dominated by foreign capital have much higher salaries (Fig. 4).



Source: systematized on [Adamczyk S., 2018]

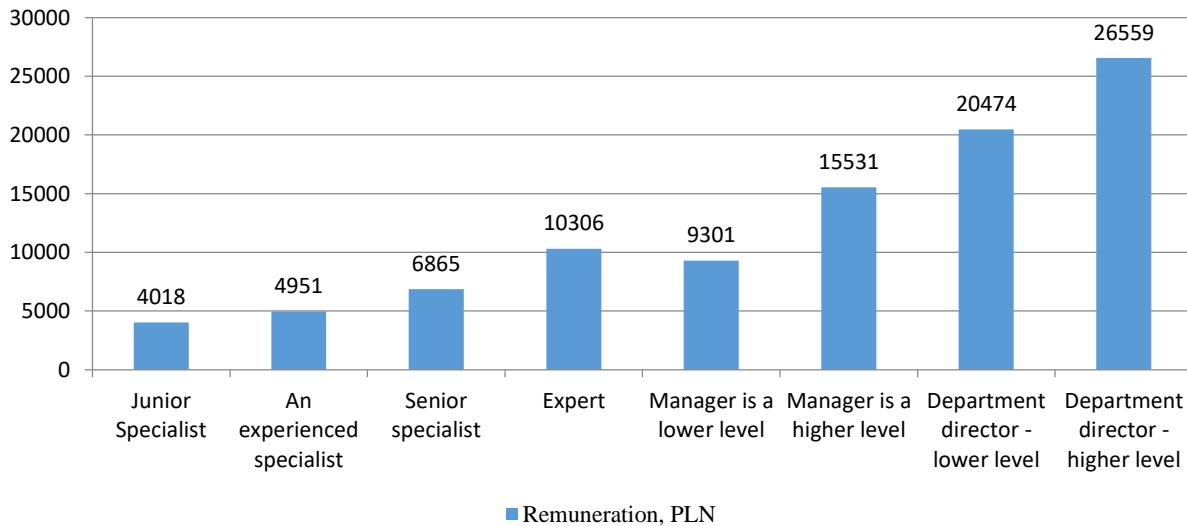
Fig. 4. Median remuneration to managers (directors) of the procurement and logistics department in companies with Polish and foreign capital (gross, Polish zlotys)

For Ukraine, this practice also takes place. Usually, the salary of specialists in companies with foreign capital is at least a third higher than in Ukrainian ones. This is due to at least two main reasons. First of all, due to careful competitive recruitment, the highest-class specialists get to work in foreign companies. Secondly, usually both the scope of activity and the geography of distribution (realization) of products cover significant territories, including deliveries to other countries.

The dependence of the wages of workers in the field of logistics on their qualifications and experience is an objective process inherent in the market economy. In Ukraine, as evidenced by the monitoring of vacancies on leading sites, it is also widespread. For example, the salary of a logistician in different regions varies from 7 to 20 thousand UAH, and the head of the logistics department from 20 to 30 thousand UAH.

Therefore, the statement of Adamchuk S. should be recognized as absolutely fair, who notes that «along with the increase in experience, duties and responsibilities, the amount of the reward increases». The difference in wages in the field of logistics in the Republic of Poland, according to the above-mentioned author, «between a junior specialist and a senior is PLN 2,847. Directors of the highest level receive the highest salary – PLN 26,559» [Adamczyk S., 2018].

The same publication provides more detailed data on the amount of remuneration (salary) for specialists engaged in logistics operations (Fig. 5).



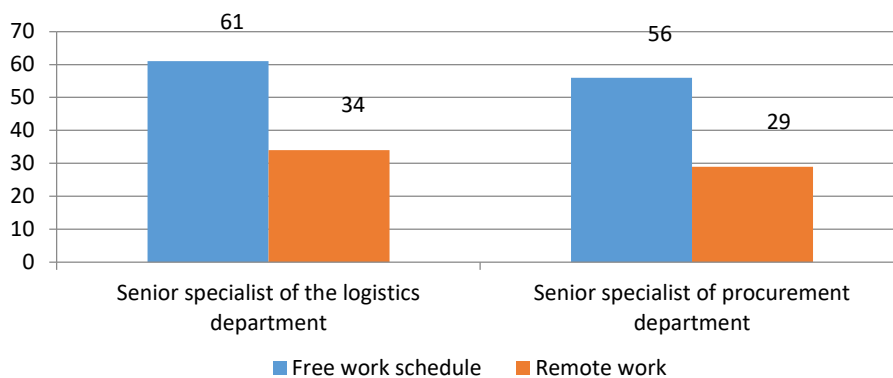
Source: systematized on [Adamczyk S., 2018]

Notes: source – Sedlak & Sedlak 2018 salary report; Explanation of concepts: Manager – lower level: manages a subordinate team of employees (or a process) and is responsible for their results. He implements company policy within a certain division. Senior Manager: Manages a subordinate team of employees (personally or through lower-level managers) and is responsible for the performance of the subordinate department and for managing complex processes. He implements company policy in the department and can influence its formation. Division Director – Lower Level: Manages a subordinate team of executives. It implements the company's long-term strategy within a certain division and can influence its formation. Responsible for the distribution of responsibilities in one large unit or several smaller ones. Division director – higher level: leads a subordinate team of directors or managers, forms the company's long-term strategy within the given division. Responsible for activities in all business units of a large or medium-sized company (organization)

Fig. 5. Salary level of employee's procurement and logistics departments (gross, Polish zlotys)

They testify not only to the dependence on the level of qualification and responsibility, but also indicate the importance of the management levels at which they are applied. The higher the managerial logistics level, the more significant the difference in wages. In this case, the reason is the degree of responsibility, the scope of exercised powers, their territorial distribution (in many cases, the existing formation of departments remote from the main office) and many other factors. The modern development of logistics activity is characterized by the presence of some features that appeared thanks to modern information technologies. The latter enable employees to perform their professional activities remotely and have a flexible work schedule.

The chart below provides an analysis of two benefits that are offered to employees in purchasing and logistics, among others. In particular, according to Adamchuk S., in the field of logistics and procurement, «more than half of the employees can take advantage of flexible working hours – this type of benefits is most often offered to senior logistics specialists» (61 %). The latter also most often have the opportunity to work remotely (34 %) (Fig. 6).

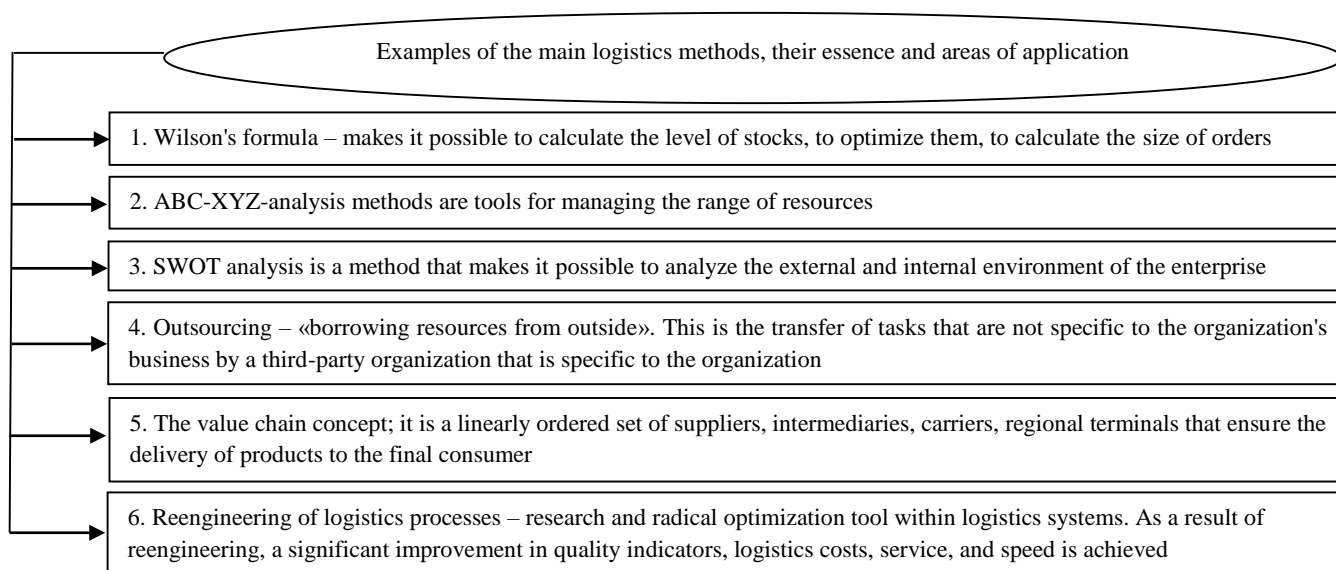


Source: systematized on [Adamczyk S., 2018]

Fig. 6. The main advantages of the work of employees in the field of logistics and procurement in modern conditions

Logistics tools are being developed accordingly. Their classic composition is complemented by new options that significantly expand logistics functions. The possibilities of conducting control using the capabilities of software products and available technical means (including, in particular, navigational ones, related to artificial intelligence and others) are especially updated. High-quality implementation of logistics and ensuring its good performance is possible under the condition of a successful combination of specific elements. V.O. Shishkin, A.I. Overchenko rightly claim that «logistics measures make it possible to improve internal and external relations in such a way as to ensure the positive mutual influence of individual elements and achieve the effect of synergy. That is why successful enterprises try to automate not individual processes, but connected chains (supply management, sales, finance, investment and innovation activities), which contributes to the formation of complex management solutions» [9, p. 65].

Therefore, the traditional toolkit represented by Savenko I.I. and Sedikov D.V. (Fig. 7) in IT conditions acquire not only new process qualities (they can be implemented thanks to the appropriate software), but can also be significantly supplemented by other methods and techniques.



Source: systematized on [5, p. 46]

Fig. 7. Traditional logistic tools

A significant part of modern logistics solutions, built on the use of IT, already widely uses artificial intelligence. For example, this approach is used to monitor the performance of agricultural work, control the operation of machinery [6].

With this in mind, modern logistics acquires features of intellectuality and turns from a simple exchange of goods or information into a system aimed at the future (anticipation). In addition, thanks to IT, individual logistics solutions and perfect synchronization of all processes became possible. In this way, each organization receives its unique competitive advantages.

In general, artificial intelligence and data analysis, which are used in modern conditions to coordinate the available capabilities of the enterprise for the proper functioning of all its links in a single chain, are the most common logistics tools. In recent years, applications of artificial intelligence and data analytics have been identified as predictive logistics.

6. Concluding remarks

Our research was aimed at conducting a critical analysis of the elements of the logistics system of a modern enterprise, identifying their functional characteristics and connections. On this basis, it was planned to develop proposals for the stages of forming an improved model of the logistics system. The hypothesis of this study was that in modern conditions there are new elements that should be used in the logistics system. They make it possible to improve quality and efficiency logistics system.

A critical analysis of the goals of logistics systems and their functioning confirms the hypothesis that there are opportunities to introduce new elements of logistics systems that will contribute to their improvement and better functioning.

Further research should be related to the expansion and activation of the introduction of new logistics tools and elements. First of all, they are related to the use of modern information technologies.

Argumentation of the expediency of the need for such developments is: incomplete coverage of all processes taking place at enterprises by the logistics toolkit; low level of efficiency of economic entities; lack of scientific and practical developments on logistics problems in them; increased tension in the provision of resources of the appropriate composition for the needs of the activity; availability of improvement and optimization reserves in this field.

References:

1. Zhelikhovska, M. (2022), «Modeling the logistics system of the enterprise and the conditions of the digital economy», *Visnyk Khmelnytskoho natsionalnoho universytetu*, No. 4, pp. 50–55, doi: 10.31891/2307-5740-2022-308-4-8.
2. Kozlova, I. (2022), «Analysis of the state of logistics management in Ukraine», *Ekonomichnyi analiz*, Vol 32, No. 1, pp. 39–46.
3. Kostiuk, H.V., Hurych, Yu.A. and Veinbereher, V.V. (2016), Conceptual foundations of the formation of the logistics system of the enterprise, *Efektivna ekonomika*, No. 12, [Online], available at: <http://www.economy.nayka.com.ua/?op=1&z=5318>
4. Krykavskiy, Ye.V., Lykholat, S.M., Bolibrukh, L.I. et al. (2022), «State financial support for the modernization of the logistics system of Ukraine», *Finansovo-kredytna diialnist: problemy teorii ta praktyky*, No. 2 (43), pp. 288–295.
5. Savenko, I.I. and Sedikov, D.V. (2020), «Logistics management as a tool for optimizing logistics costs», *Ekonomika kharchovoi promyslovosti*, Vol. 12, No. 3, pp. 42–50.
6. Smyrnova, N.V. (2018), «Digitalization as the main direction of innovative development of logistics», *Visnyk sotsialno-ekonomichnykh doslidzhen*, No. 4 (68), pp. 169–180.
7. Taranenko, Yu. (2015), «The economic essence and significance of logistics for enterprise activity», *Ekonomika & derzhava*, No. 5, pp. 131–135.
8. Khvyshchun, N.V. (2016), «Logistics components of increasing the competitiveness of the enterprise», *Lohistyka: teoriia ta praktyka*, No. 1, pp. 126–134.
9. Shyshkin, V.O. and Overchenko, A.I. (2015), «Implementation of a logistics strategy as a condition for the effective functioning of a production enterprise», *Teoretychni i praktychni aspekty ekonomiky ta intelektualnoi vlasnosti*, No. 2 (3), pp. 62–68, [Online], available at: http://nbuv.gov.ua/UJRN/Tpaeiv_2015_3_2_11
10. Adamczyk, S. (2018), «Wysokość wynagrodzenia pracowników w pionie zakupów i logistyki o różnych poziomach doświadczenia», *Interia. Biznes. Praca*, [Online], available at: <https://biznes.interia.pl/praca/news-zarobki-pracownikow-w-pionie-zakupow-i-logistyki-w-2018-r,nId,3089832>
11. Diehlmann, F., Lüttenberg, M., Verdonck, L. et al. (2021), «Public-private collaborations in emergency logistics: A framework based on logistical and game-theoretical concepts», *Safety Science*, No. 141.
12. Lewi, D., Davies, E.H. and Anyanwu, O. (2021), «The new normal: Smartphone technology and its impact on the logistics of healthcare», *Molecular Genetics and Metabolism*, Vol. 132 (2), 64 p.