The next direction of 3PL development will be based on the so-called convergence of services. Similar to the converged services in the telecommunications market, where voice, video, data, Internet and television services are integrated in one telecommunications channel, and as a result, in one service, the 3PL market seeks the convergence of logistics services. Traditional co-production services are added to traditional transportation, forwarding and storage services, which are necessary in the case of a shift in the point of distribution and implementation of customization, that is, the individualization of the product and any actions regulating the product and delivery in compliance with the quality, packaging, labeling, transportation and documentation requirements (including certificates, permits, licenses, etc.).

It should be noted that the above directions of developing 3PL activities are related to the organization of a network of cooperating logistics service providers, provision of services and integration of different economic systems of manufacturers, distributors and retailers. The achieved effects of the described areas of change may differ from those anticipated due to observed gap in IT technology, which is the difference between the IT capabilities of 3PL and increased customer expectations, as well as the financial crisis and the dynamic transformation of enterprise ownership.

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PRODUCTIVITY OF LOGISTICS BUSINESS PROCESSES IN THE CONDITIONS OF SUSTAINABLE DEVELOPMENT OF ECONOMIC SYSTEMS

Kalischuк E.L., Nebelyuk V.V.

Annotation. The article considers the issues of ensuring the effectiveness of logistics business processes in supply chains. The authors propose methods for determining the effectiveness of management according to the principles of sustainable development of the International Standard ISO 9004:2018 series.

The object of the study is logistics business processes in economic systems. Management results are identified by measuring and self-evaluating the levels of manageability of business processes. The focus is on the «quality loop» and the evaluation of its components in the field of «procurement» and «implementation».

In the process of measuring the reserves of a sustainable effect, the costs necessary for the formation of forces for the development of logistics functions and the commercial effect are compared. The method of evaluating the effectiveness of business processes is demonstrated on the performance indicators of a logistics company and a regional logistics system.

Keywords: productivity, sustainable management, logistics functions, self-assessment, manageability level, economic system.

Introduction. The object of the research is the methods of managing logistics business processes and determining their effectiveness in economic systems. Innovative approaches to business process management in the context of Industry «4.0» form new methods for evaluating production performance. The new National Strategy for Sustainable Development of the Republic of Belarus, as a series of five-year projects for the future until 2025-35, etc., contains the main integral indicator «quality of life». The paper suggests approaches to solving the tasks defined in the Set of Measures, such as programs for the introduction into practice of methods and mechanisms that ensure the improvement of management in organizations and sectors of the country's economy, as coordinated with the challenges of the external and internal environment. The tools that will provide a timely «targeted» response to changes are presented, will allow to implement forecasting and prevention of negative processes associated with the loss of stability and, as a result, the competitiveness of the organization.

In the course of the work, key studies in the field of modern management in the field of logistics are highlighted, taking into account the international standard ISO 9000 series, in particular the works of D. V. Antipov., Vysotsky O. A., Sedegov R. S., Bazilevich V. D., Ivutya Garchuk I. M., Danilova N. S., Narushevich S. A., Uvarov S. A., Trifilova, A. A., Slonimskaya, M. A., Budrin, A. G., Lafta D. K., Bagiev, G. L., Deming E., Fayol A., Duncan J., Kotler F., Dichtel E., Hershgen H. Bauersox D. J., Kloss D. J., Vumek J. P., Jones D. T., Agarkov, A. P., Grigoriev L. Yu., Koryshev I. I. and others.

The purpose of the research is to form approaches to assessing the results of managing logistics functions in economic systems. The relevance of the direction is associated with the deepening of the integration of logistics functions (LF) with the complex of special management functions (SFM) and the demand for the management of innovative processes, as well as due to the need to take into account the effects of a dynamically changing economic environment.

The practical state of issues in this area requires a new look at the methods of assessing the level of sustainable development of economic systems in the field of logistics, according to the International Standard ISO 9004: 2018 series, which proposes «self-testing and implementation of the business excellence model» [1].

Methods. The methods of measuring the processes of managing logistics functions in the organization and in the regional logistics system were chosen by the authors according to the ISO 9004:2018 «feedback law», the practice of «learning lessons» and «The theory of measuring the manageability of economic activities of enterprises» by Professor O. A. Vysotsky [2].

The measurement of logistics functions (LF) was performed based on the analysis of components in two directions: 1) evaluation in the field of procurement and 2) evaluation in the field of implementation. The diagnosis of LF is carried out on the basis of an analysis of the staffing table and further expert survey. The processing of the obtained results of the expert survey is carried out using the method of group parameter estimation (MGEP). It is carried out by calculating the arithmetic mean of the evaluation results of each member of the expert group. Obtaining a group assessment when measuring the parameters of a special function on a quantitative scale (from 0 to 10 points) with a result of up to 85-90% [3, 4].

The work involves processing the results of diagnostics of the levels of controllability of the LF through the evaluation of common control functions and special control functions – CFM and SFM. The analysis of the potential increase in the manageability levels of logistics functions allows us to determine the starting point of the development of management processes and the productivity of the planned actions.

Features of processing and summarizing the results of the examination.

In this paper, the authors address the goals and objectives formulated in the program «A set of measures to stimulate the introduction of advanced methods and modern international quality management systems (IQMS) into the country's economy» of the Republic of Belarus, where the key goals are:

1) improving the quality of manufactured products – (IQMP) - ISO 9001,

2) Improving the competitiveness of organizations – (ICO) - ISO 9004,

3) improving the stability of the country's economy (ISEC).

The management of the organization's sustainable development (MSD) is in the range of the manageability level of 85-95 % or 95-90 % of the LM [5]. The management of the sustainable development of the economic system should be carried out taking into account the dynamics of economic activity.

The paper suggests approaches to solving the tasks defined in the Set of Measures, such as programs for the introduction into practice of methods and mechanisms that ensure the improvement of management in organizations and sectors of the country's economy, as coordinated with the challenges of the external and internal environment.

The initial information is the results of an expert survey. The numerical data contained in the questionnaires and expressing the opinions of the interviewed experts on the parameters characterizing the level of development of special management functions – the logistics functions «procurement» and «implementation» – were processed and generalized. The purpose of processing is to obtain new information contained in a hidden form in expert assessments.

The data is processed in accordance with the ISO 9004 series standard version 2018 and ISO 10014-2008. The obtained increments of the manageability level ΔLM allow us to determine the list of actions and measures that contribute to achieving the necessary LMi. Special attention is paid to specific assessments – indicators of the effectiveness of the program's activities.

Recommendations are made on how to implement the program's activities at each specific time interval, for each specific special management function in the field of «procurement» and «implementation», for each specific position. Achievement of work – with a given amount of costs, it becomes possible to see, analyze and evaluate the advantages and disadvantages of the work performed at the time of diagnosis [6].

Results and Discussion.

As the results of the study, the methods of estimating the necessary costs to ensure an increase in the level of manageability in the field of logistics – «implementation» are presented. The methods of diagnostics of the management system for the sustainable socio-economic development of the organization are applied (SMSSEDO) [7]. Work in the field of logistics and measuring the effectiveness of logistics function management processes.

International standards of the quality management system form the principles of modern management. The new management models are based on a systematic approach. The sustainable development of the system is a process of continuous, balanced socio-economic development. ISO – тhe International Organization for Standardization develops technical standards for all business areas and industries.

IS QMS is based on fundamental certification models [8]:

1) ISO 9001 – Quality assurance model at the development stages (during production, design, installation and maintenance);

2) ISO 9002 – Quality assurance model at the production and installation stages;

3) ISO 9003 – Quality assurance model at the stage of control and testing of finished products.

4) ISO 9004 – 2008 «Management for achieving the sustainable success of the organization».

5) ISO 9004 – 2018 «Quality management. The quality of the organization. A guide to achieving the sustainable success of an organization».

Special attention is currently being paid to the ISO 9004 series. It regulates the management of sustainable socio-economic development (MSSED) of business entities. This standard reveals the following concepts: the business envi-

ronment of the organization (BEO), sustainable success of the organization (SSO), monitoring measurements and technologies (MMT), interested parties (Stakeholders), needs and expectations (N&E), human resource management (MHR), competence of personnel (CP) et al. The ISO 9004: 2018 series standard is a guiding document.

The main feature of ISO 9004:2018 is three key concepts (opinion of the expert organizers of the working group I. Sheps and A. Ezrahovich) [9]:

1. The quality of an organization is the degree to which the needs and expectations of consumers and other stakeholders are met to achieve sustainable success.

2. Interested parties – individuals or organizations that can influence decision – making-stakeholders.

3. Sustained success (SS); sustainable development (SD) – the organization achieves the goal for a long period of time, stable financial and economic indicators.

IS QMS ISO 9004-2018: sustainable development management system (SDMS) should ensure the sustainable development of the quality of life of stakeholders. The international standard ISO 9004 explains the competitiveness of business entities as a method of «learning lessons». The method requires the integration of individual performers with the organization's capabilities in the areas of «procurement» and «implementation». Recommended: accelerate the process of implementing the new generation ISO 9004 series (2018); it is necessary to establish feedback with all interested parties – suppliers, staff, customers; systematically conduct internal audit based on expert surveys; document all production processes, draw up process passports.

In the conditions of uncertainty of the competitive environment and dynamically integrated markets, the role of feedbacks and the need to effectively manage them increases. According to MS ISO 9004:2010, «the organization should promote improvements and innovations through training», which implies: «integration of the capabilities of individual performers with the capabilities of the organization» – combining knowledge, thinking models, behavioral models of people with the values of the organization. The competitiveness of the organization is based on the phenomenon of leadership and is embodied in the process of social influence based on the practice of «learning lessons» [1].

An example of the functioning of the system of «learning lessons and spreading knowledge» is shown in Figure 1.

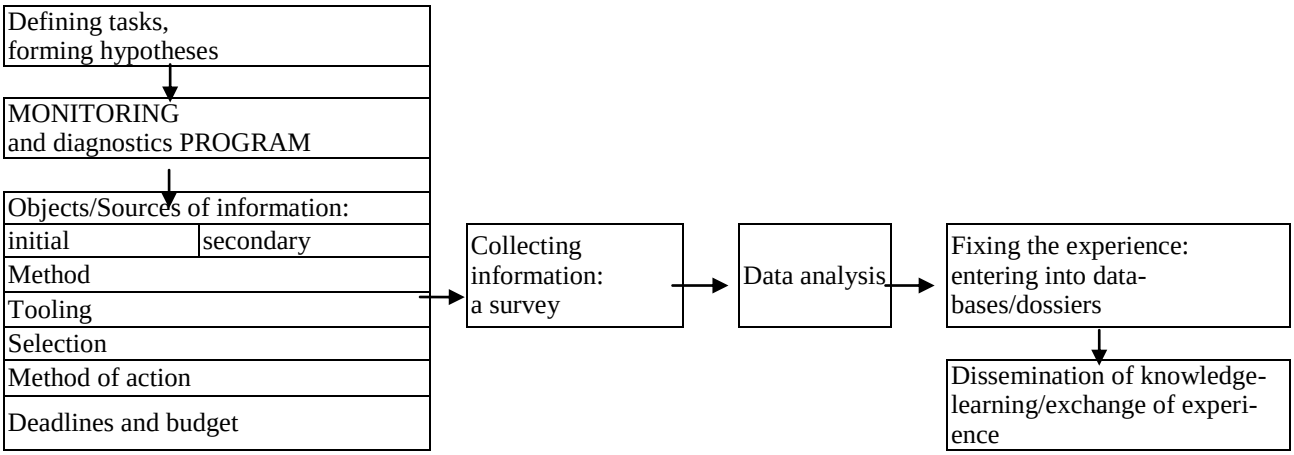

Figure 1 – Case study of the functioning of the system of «learning lessons and spreading knowledge»

In practice, «learning lessons» requires the creation of a database. Filling the database with information is provided by marketing, and the choice of data for management decisions is determined by the logistics functions «procurement» and «implementation». The accumulation and timely access to such knowledge increases the ability of an organization to manage its risks and sustainable success in economic systems.

In the world practice, new technologies for managing logistics functions take into account the requirements of the international standard ISO 9004:2018 «Management for achieving sustainable success of an organization». This standard offers a new approach – it forms the following processes: 1) monitoring and review of the business environment; 2) identification of new characteristics and indicators in the information space; 3) identification of stakeholders; identification of the output data of processes; 4) assessment of current capabilities and resources; 5) clarification of new indicators that allow for an increase in competitiveness [1].

The productivity of the management of logistics functions.

The management process is considered as the activity of management entities united in a system (line and functional managers, other management personnel); activities aimed at achieving the goals of the team and covering all eight special management functions (SMF):

1) organization policy;
2) human resource management;
3) production management;
4) marketing function;
5) the implementation function is assigned to sales managers;
6) procurement function – assigned to supply managers;
7) financial management;
8) the function of the quality management system (QMS).

The management process implies consistent actions to achieve any result in management. At the same time, the organization's management system is a set of actions necessary for coordinating the joint activities of people – it is a set of links that carry out management, and connections between them. The state of dynamic equilibrium of any system should be achieved through regulatory influence, development and implementation of commands that eliminate the deviation of parameters in business processes from their planned values.

In the innovative concepts of business process management, a special place is given to leadership as the basic principle of management, which, according to the provisions of ISO 9004: 2015, «ensures the unity of the goal and direction of activity and creates conditions in which employees interact to achieve the organization's goals in the field of quality».

Diagnostics of the management of the sustainable development of a production organization covers eighteen management functions. They include: 1) special management functions (SMF), 2) common (general) management functions (CMF) [10]. Conducting diagnostics requires measuring all indicators at a specific time.

Next, it is possible: 1) development of process passports, 2) adjustment of job descriptions, 3) definition of a program for the formation of sustainable development of logistics management functions. The work carried out will allow us to draw conclusions – on which components of the logistics management functions (LFM) «procurement» and «implementation» the organization occupies a leading position, which factors form the competitiveness of the enterprise or require correction [11, 12].

1. Determination of the effectiveness of the stabilization of the logistics function «implementation» of one of the leading organizations of the Brest region in the food industry [13, 14].

The data were obtained on the basis of diagnostics level of manageability (LM) of special control functions (SMF): the sum of ∑LM (SMF) is 658 %; the average revenue from sales (ARS) for the month is 111 568 917 rubles; the relative value of 1% (RV) of the manageability level by the logistics function «implementation» is determined by:

$$RV\ 1\%\ LM = ARSm / \sum LM\ GMF \quad (1)$$

The specific value of 1% LM was 169 557, 625 rubles. Taking into account the relative value of one percent of the controllability level, we will calculate the effectiveness – the increase in RV per month from each SMF.

Table 1 – Program productivity: the increase ARS in per month from each SMF based on the diagnosis level of 1% manageability (LM) of special control functions (SMF)

SMF	LMΔt0, %	Δ, rubles.
1. Organization policy	82	169 557, 625 * 82% = 13 903 725,2
2. Marketing function	84	169 557, 625 * 82% = 14 343 840, 5
3. The implementation	88	169 557, 625 * 82% = 14 921 071
4. Procurement	74	169 557, 625 * 82% = 12 547 264,2
5. Financial	74	169 557, 625 * 82% = 12 547 264,2
6. The function of the quality management system (QMS)	86	169 557, 625 * 82% = 14 581 955,7
7. Human resource management	82	169 557, 625 * 82% = 13 903 725,2
8. Production	88	169 557, 625 * 82% = 14 921 071
The sum of ∑	685	111 568 917

Further, the increase of each SMF to a LM equal to 90% is determined, since at 100% full utilization of production capacities increases equipment wear, energy costs and the risk of equipment failures increase. The aggregate of increments will (∑ΔLM) be 62%, which means that the average revenue from sales for the month will increase and the increase will be:

$$\Delta = RV1\%\ LM * 62\%, \quad (2)$$

where Δ – the increase relative value in per month, .ubles/

The increase in average sales revenue will be 10 513 812, 75 руб. At the same time, the result at the final time after the events are held and the level of manageability is reached by 90% will be:

$$ARS\ (t1) = ARS\ (t0) + \Delta, \quad (3)$$

where ARS (t0) – average sales revenue for the month at the initial moment, rubles;

ARS (t1) – average sales revenue for the month at the end time, rubles.

As a result: the effectiveness of business processes related to the management of the logistics function «implementation» is presented in the form of average sales revenue for the month. If the level of manageability of the LF «implementation» is 90 %, it will amount to 122 082 729, 75 rubles.

2. Determination of the effectiveness of the stabilization of the logistics function «implementation» as an indicator of the efficiency of business processes in the regional logistics system.

To determine the commercial effect, the increase in the gross regional product (GRP) is calculated – the result of stabilization of the logistics function «implementation» [15, 16].

The gross regional product (GRP) of the Brest region in 2018 amounted to 11341,1 million rubles and 8203,7 rubles per capita. The totality of all levels of management of the main functions of the LF "implementation" according to the results of diagnostics was 427 %. The relative value of 1% of the manageability level of the logistics function «implementation» is determined in the regional logistics system:

$$RV\ 1\%\ LM = GRP / \sum ОФУ, \quad (4)$$

where ∑LM GMF is the set of all levels of management of the main functions of the LF «implementation».

The relative value of 1% LM was 11341,1 / 427 % = 26,55 million rubles. Based on the GRP data for 1 % of the LM LF «implementation», we will calculate the GRP from each GMF «implementation» in the regional logistics system.

Table 2 – Results of the GRP increase from the increase in the LM of the LF «implementation» to 70 %

GMF	GRP from each GMF, million rubles	Increase in ΔLM LF «implementation» for each of the GMF
1. Planning	26,55*73 = 1938,15	70 – 73 = -3 %
2. Organization, decision-making	26,55*62 = 1646,1	70 – 62 = 8 %
3. Motivation, stimulation	26,55*61 = 1619,55	70 – 61 = 9 %
4. Control, monitoring	26,55*68 = 1805,4	70 – 68 = 2 %
5. Accounting	26,55*62 = 1646,1	70 – 62 = 8 %
6. Analysis and evaluation	26,55*53 = 1407,15	70 – 55 = 15 %
7. Coordination, adjustmen	26,55*48 = 1274,4	70 – 48 = 22 %
The sum of ∑	11341,1	61 %

The aggregate of potential increments of manageability levels (∑ΔLM) of the LF «implementation» will be 61%. The efficiency of managing «implementation» in the logistics system of the region when entering the zone of normal operation will amount to 1619,55 million rubles.

At the same time, the level of manageability of the regional logistics system in the zone of normal operation, equal to 70%+ , will determine the GRP according to formula 3, where In (t0) – GRP at the initial moment, In (t1) – GRP at the final moment.

As a result: the effectiveness of business processes related to the management of the logistics function «implementation» in the regional logistics system is presented in the form of a gross regional product. With the level of manageability of the LF «implementation» at 70 %, the effectiveness will be 11341,1 + 1619,55 = 12960,65 million rubles, and, consequently, the gross regional product will increase by 3572,91 million rubles.

Thus, due to the proper performance of the main functions in the field of «procurement» and «implementation», the logistics functions of the regional logistics system are stabilized at the appropriate level.

Conclusions.

1. Innovative approaches to business process management in the context of Industry "4.0" form new methods for evaluating production performance. In the innovative concepts of business process management, a special place is given to leadership as the basic principle of management, which, according to the provisions of ISO 9004: 2015, «ensures the unity of the goal and direction of activity and creates conditions in which employees interact to achieve the organization's goals in the field of quality».

2. The sustainable success of business entities is associated with the use of an integrated management system, which contributes to the formation of a balanced quality structure of the organization. To do this, it is necessary that the ISM is not implemented artificially, but is based on real processes – practice and self-assessment of interaction with stakeholders. As a result: the effectiveness of business processes related to the management of the logistics function «implementation» is presented in the form of average sales revenue for the month. As a result: the effectiveness of business processes related to the management of the logistics function «implementation» in the regional logistics system is presented in the form of a gross regional product.

3. Based on the concept of international standards, the management of sustainable socio-economic development of an organization in modern conditions should be considered as a process that forms the movement of an organization in a given direction in the conditions of uncertainty of the economic activity environment.

4. It should be noted that there is not enough depth of implementation of ISO 9004 quality standards in the economic activities of organizations in the Republic of Belarus – the currently implemented version of the quality management system standards (QMS) from 2010.

5. The theoretical significance of the research results lies in the fact that the conclusions and recommendations are aimed at solving the scientific problem – determining the effectiveness of business processes in logistics systems in conditions of sustainable development.

The authors draw attention to the need to follow the principles of achieving sustainable success in the field of logistics, according to the ISO 9000 QMS:

a) determine the satisfaction of the needs and expectations of all stakeholders in a balanced manner;

b) establish mutually beneficial relationships with suppliers, partners and other interested parties;

c) use a variety of approaches, including monitoring, to ensure a balance between the differing needs and expectations of stakeholders;

d) provide an opportunity for managers and employees of the organization to «learn lessons» and exchange experience to maintain the viability of the organization.

6. Increasing the potential management efficiency requires a coordinated configuration of the main and special management functions. Obtaining additional income can be ensured through the interaction of all interested parties. An increase in the average revenue from sales or gross regional product implies the implementation of innovative approaches to assessing and analyzing the effectiveness of management, taking into account the level of development of logistics functions.

The conclusions and recommendations made based on the results of the study will allow the production enterprises of the Republic of Belarus to increase the efficiency of logistics activities.

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