МЕНЕДЖМЕНТ

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FORMATION OF A SYSTEM OF PERFORMANCE INDICATORS FOR LOGISTICS IN E-COMMERCE

Urgency of the research. *At the present stage of the electronic commerce development there is an active Internet trading expansion. However, the analysis of logistics services market demonstrates the lack of formed and well-defined list of operations provided by this service, and consequently, of the logistics services quality standards in this area.*

Target setting. *It is important for enterprises to evaluate logistics activities concerning the objective, reasonable, balanced indicators. The formation of the logistics indicators system of the enterprise logistics effectiveness concerning an electronic commerce in terms of a customer is the most important link of these chains and the basis of research issues in this area.*

Actual scientific researches and issues analysis. *The works of such domestic scientists as M. Y. Hryhorak, E. V. Krykavskyi, L. V. Frolova and others are devoted to a theory and practice aspects concerning the research of logistics activities results and the effectiveness of supply chain management.*

Uninvestigated parts of general matters defining. *At present, an insufficient attention is paid to the peculiarities of organization of the logistics indicators system of an electronic commerce enterprise. This is what determines the relevance of the research and its main goal.*

The research objective. *The task is to definite the main approaches to the evaluation of the logistics activity of an electronic commerce enterprise, and to form the indicators system for assessing its efficiency.*

The statement of basic materials. *In this article the approaches to the estimation of the logistics efficiency of the electronic commerce enterprises are considered. The necessity to form an integrated, customer-oriented system of indicators for evaluating the effectiveness of the supply chain management, the directions and issues of its construction at the present stage of the electronic commerce development is substantiated.*

Conclusions. *A methodical approach to assessing the logistics efficiency of an electronic commerce enterprise is formed on the basis of assessing the customer service logistics at the last stage of the supply chain and evaluating the logistics costs of the enterprise.*

Keywords: *logistics efficiency; e-commerce logistics; indicators of logistics efficiency; logistics costs.*

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ФОРМУВАННЯ СИСТЕМИ ПОКАЗНИКІВ ЕФЕКТИВНОСТІ ЛОГІСТИЧНОЇ ДІЯЛЬНОСТІ В ЕЛЕКТРОННІЙ ТОРГІВЛІ

Актуальність теми дослідження. *На сучасному етапі розвитку електронної торгівлі спостерігається активне розширення ринку інтернет-торгівлі. Проте аналіз ринку логістичних послуг демонструє відсутність сформованого та чітко визначеного переліку операцій, передбачених послугою, а отже і стандартів якості надання логістичних послуг в цій сфері.*

Постановка проблеми. *Підприємствам важливо оцінювати логістичну діяльність за об'єктивними, обґрунтованими, збалансованими показниками. Питання формування системи показників результативності логістичної діяльності підприємства електронної торгівлі є найважливішою, з точки зору споживача ланкою цих ланцюгів і основою проблематики досліджень за даним напрямом.*

Аналіз останніх досліджень і публікацій. *Аспектам теорії і практики дослідження результатів логістичної діяльності та ефективності управління ланцюгами поставок присвячено праці таких вітчизняних учених, як М. Ю. Григорак, Є. В. Крикавський, Л. В. Фролова та ін.*

Виділення недосліджених частин загальної проблеми. *На даний час недостатньо уваги приділено особливостям організації системи показників логістичної діяльності підприємств електронної торгівлі. Саме це, обумовлює актуальність дослідження та визначає його головну мету.*

Постановка завдання. *Визначення основних підходів до оцінювання логістичної діяльності підприємства електронної торгівлі, та формування системи показників оцінки ефективності логістичної діяльності підприємства електронної торгівлі.*

Виклад основного матеріалу. *У статті розглянуто підходи до оцінювання ефективності логістичної діяльності підприємств електронної торгівлі. Обґрунтовано необхідність формування інтегрованої, орієнтованої на споживача системи показників оцінювання ефективності управління ланцюгом поставок, визначено напрями та проблеми її побудови на сучасному етапі розвитку електронної торгівлі.*

Висновки. *Методичний підхід до оцінювання ефективності логістичної діяльності підприємства електронної торгівлі сформований на базі оцінки логістичного обслуговування споживача на останній ланці ланцюга поставок та оцінки логістичних витрат підприємства.*

Ключові слова: *ефективність логістики; логістика електронної торгівлі; показники ефективності логістичної діяльності; логістичні витрати.*

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Urgency of the research. At the current stage of development of e-commerce in Ukraine there is an active expansion of the Internet trade market, so in 2015, the growth rate was 32%; in 2016 the

growth is 36%, and the volume is almost 1,5 billion euros [1]. According to the demand of consumers, more and more companies are trying to find their niche in e-commerce, respectively, these trends affect the tangent areas. The need to find new opportunities to meet the needs of consumers, forcing the market to move forward, stimulates the adoption of new strategic decisions. According to Ukraine E-commerce Expert, the share of Internet commerce companies among the clients of logistics companies is 70% [2]. Ukrainian logistic operators offer a relatively new service - fullfilment, which provides a complex of logistics operations to provide goods from suppliers to customers in electronic commerce. However, at this stage, the analysis of the logistics services market demonstrates the absence of a formed and well-defined list of operations provided by the service, and therefore the quality standards of logistics services in this area, which determines the relevance of this study. E-commerce companies, working with logistics operators, often do not have the ability to comprehensively and reliably evaluate the efficiency, effectiveness of logistics activities of e-commerce. Most studies lead efficiency to reduce logistics costs, without taking into account the impact on the perception of logistics services by the buyer of other no less important factors.

Target setting. Simultaneously with the development of retail trade in Ukraine, the role of e-commerce is growing. However, the main indicators of the e-trade market of Ukraine are significantly lagging behind the indicators of the European Union countries, both in terms of volumes, business models of doing business and in the development of infrastructure. Such tendencies in the field of retail trade have affected the organization of logistics activities of enterprises participating in the business. Therefore, at the present stage of development, it is important to properly evaluate logistics activities according to objective, well-founded, balanced indicators. The question of the logistics activities effectiveness indicators system formation of the e-commerce company operating in the supply chain of goods is the most important link of these chains and is the basis of research problems in this direction from the point of view of the consumer.

Actual scientific researches and issues analysis. During the last decade, considerable experience in improving the general principles and mechanisms of enterprises with the use of logistics has been gained. The works of such domestic scientists as M. Yu. Hryhorak [3], Ye. V. Krykavskyi [4], L. V. Frolova et al are devoted to various aspects of the theory and practice of the logistic activity and the efficiency results research of supply chain management. The main attention of these scientists is given to the general theory of the performance and effectiveness of logistics activities, the logistics costs level assessment, the formation of logistics activities operational indicators system. The question of indicators for assessing the logistics system creation of the enterprise and the management of supply chains is fragmentary. The formation of the e-commerce companies logistics activities efficiency indicators system still out of the attention of domestic scientists, although the market transformation of the economy requires new approaches to managing these enterprises.

Uninvestigated parts of general matters defining. In modern science a lot of attention is paid to the research of the trade enterprises logistics, both domestic and foreign scientists, but not enough attention is paid to the peculiarities of the enterprises logistics activities system indicators organization to such a specific trading system as electronic commerce. This is what determines the relevance of the research and defines its main goal.

The research objective. The purpose of the study is to identify the main approaches to assessing logistics activities of the e-commerce company operating in the supply chain of goods, as well as the development of a system of indicators which helps to assess the e-commerce company logistics activities effectiveness in terms of quality assurance of logistics services for the consumer.

The statement of basic materials. Determining the effectiveness of logistics is one of the main tasks while forming strategies. Most scientists consider the concept of "logistics system efficiency" even when it comes to assessing supply chains, logistics or even logistics costs, so let's first consider the definition of "logistics efficiency". In the study of the author [5, p. 276], the following definition was proposed: "The logistics system efficiency is the ratio between the target (aimed) indicator of the result of the system's operation and the actual implementation; it is an indicator that characterizes the quality of the system's operation at a given level of total costs". Efficiency is meant to be the measure of completeness and quality of problem solving, the implementation of the system of its purpose.

Y. V. Krykavskyy [4] gives the following definition: "... in the broad sense, while operating qualitative indicators, we can speak about the logistics systems effectiveness as a function of the profit level depending on the logistics services level". The authors of scientific work [6, pp. 20-21] emphasize that the criterion of the efficiency of the logistics system of the company lies in maximizing profits per logistics costs unit in condition of the required quality of service is provided that means full implementation of contractual obligations.

Thus, the efficiency of logistics is a system of indicators that would characterize the quality of the logistics system operation at a given level of general logistics costs", where the system of indicators means the completeness and quality of the tasks solution, the implementation of the logistics system purpose. This is the relation between the sample (given) indicator and the actual result.

The problem of the logistics chains management efficiency evaluation is reflected in the results of D. Bowersox research [7, pp. 593-613]. The author distinguishes the following categories of logistics indicators: costs; customer service; productivity; asset valuation; quality. In turn, these categories can be grouped into two sets of indicators: quantitative and qualitative. For detailed analysis and evaluation of the efficiency of logistics it is appropriate to use both quantitative and qualitative indicators. In turn, quantitative indicators can include a number of coefficients, indicators, which are usually grouped in such a way to show the specific characteristics of the operation.

At the present stage of logistic activity development, it is considered to be the most expedient to evaluate the efficiency of indicators set that reflect its quality at a given level of costs. In this regard, the following approaches to assessing the efficiency of logistics chains are distinguished:

- indicators of the efficiency of operation and management of logistics activities (logistics costs, logistic cycle duration, turnover of facilities, degree of risk associated with traffic flows, system performance, level of use of financial resources);
- indicators characterizing the efficiency of the individual logistic links of the supply chain operation (composition, inventory management, etc.);
- assessment of the efficiency of logistics management from the consumer's point of view (speed of the order, reliability of the seller, the ability to change the purchased products parameters, ability to satisfy demand, the possibility of return).

Since the modern market is a consumer's market, it is considered appropriate to study the effectiveness of managing logistics activities, starting with the participant who is closest to the end user. So, in the framework of this study, we are talking about the evaluation of the effectiveness of e-commerce companies, where the end user is the consumer, from this position the efficiency of the supply chain is expressed in a two-dimensional system of indicators - the quality of logistics services and the price of logistics services. The formation of these parameters occurs during the movement of goods throughout the supply chain, but the comparison of the actual level of logistics service with the expected level (in accordance with the fifth service gap according to the GAP-model [8]) is based, first of all, on the consumer's perception of the last link chain supply. Determine the complex of logistics enterprises, processes and services, evaluation of the quality of logistic service which is available to the end user in the supply chain with the concepts of "last mile". This term is already used in the practical field, but at present time there is no scientific definition and analysis of such a concept essence.

Last mile is a link in the supply chain of the e-commerce company, which is directly followed by the end user and according to the results of logistic activity, the consumer assesses logistics services that he receives from both his supplier and the entire supply chain.

The last mile consists of a set of infrastructure units and management tools that create a logistics system for e-commerce consumers.

The formation of the logistics service at the last links of the supply chain requires from e-commerce company a complex integration with both suppliers of goods and logistics providers that provide warehousing operations and delivery of goods to customers.

Let's dwell on the indicators of service, namely the parameters for measuring the quality of logistics activities at the "last mile". An important requirement for assessing the efficiency of the supply chain operation from a consumer perspective is an integrated approach to the creation of a model.

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In order to take into account the mutual influence of logistics services partial indicators on the general level, it is proposed to use a multiplicative model of a logistic services level complex indicator of the consumer by the e-commerce company.

$$LLS_{scm} = LLS_{LastMile} = LS_{OT} \cdot LS_{IF} \cdot LS_{TDC} \quad (1)$$

where LLS_{scm} – the level of the supply chain logistics from the end user's point of view;
$LLS_{LastMile}$ – the level of logistics services in the chain of "last mile" supply chain;
LS_{OT} – indicator of the order fulfillment timeliness (On Time);
LS_{IF} – indicator of the order completion (In Full);
LS_{TDC} – delivery (receipt) total cost compliance rate of the order expected (Total Delivery Cost).

Thus, we can provide a general indicator of the logistic service of consumers in electronic commerce.

The comprehensive index of logistics services is detailed in a three-dimensional system for evaluating the timeliness, completeness and cost of fulfilling a customer's order. Each of the partial service indicators shows the effectiveness of the logistics operations of the e-commerce company at the stage of customer's logistic service and is conditioned by a set of factors on which this performance depends (Tab. 1).

Table 1

Communication of service indicators of logistics service evaluation with factors determining the level of evaluation

Service evaluation indicators	Factors determining the indicator assessment level
Indicator of the order fulfillment timeliness (On Time)	Delivery routes Use of storage facilities Warehouse type Inland transportation Ordering system Number of warehouses own and leased Integration of the main business processes in the logistics chain Information efficiency
Indicator of the order completion (In Full)	The structure of the logistics chain Type of logistics intermediaries Model of inventory management Forecasting demand Stock classification system Long-term partnerships with suppliers
Delivery (receipt) total cost compliance rate of the order expected (Total Delivery Cost)	Cost management for: - supply - distribution - transportation - warehousing - information support for the supply chain Form of management of logistic chains Planning and forecasting in the operation of logistic chains Outsourcing in logistics chains The use of information technology in the management of logistics chains

In addition, the level of each partial service indicator is associated with a number of logistics operations in the supply chain, which evaluation can be carried out according to operational logistics performance indicators for all supply chain enterprises.

To assess the logistics effectiveness in e-commerce, it is necessary to compare the assessment of the logistics service with the logistics cost estimation.

An important element of the system for assessing the effectiveness of the logistics business of e-commerce can be a criterion for the minimum total cost of the supply chain for the i-th operation, j-th function, k-th order, which can be represented as follows:

$$E = \sum C_{i,j,k} / \sum Q_{i,j,k} \quad (2)$$

where: $C_{i,j,k}$ - logistic costs for i-th operation, j-th function, k-th order;

$Q_{i,j,k}$ – the volume of logistics services for the i-th operation, j-th function, k-th order.

Based on the level of consumers' logistics services provided by e-commerce, the ILE logistics performance index can be represented as follows:

$$ILE = LLS_{LastMile} / E = \frac{LS_{OT} \cdot LS_{IF} \cdot LS_{TDC}}{\sum C_{i,j,k} / \sum Q_{i,j,k}}, \quad (3)$$

The index of logistics efficiency is measured in relative terms that will allow not only to evaluate the logistics activities of the enterprise, but also to compare this assessment with other enterprises in the market or in the supply chain.

Conclusions. The methodical approach to assessing the effectiveness of logistics activities of the e-commerce company on the basis of evaluation of consumer logistics services at the last link in the supply chain and estimates logistics costs of the enterprise which will allow taking into account the degree of consumer satisfaction with logistics services in addition to assessing the efficiency and effectiveness of logistics operations at the enterprise is proposed. The main advantage of the proposed approach is taking into account the assessment of logistics services from the consumer's point of view, which extends the objectivity boundary of assessing the effectiveness of logistics activities from purely internal indicators of logistics operations and the level of logistics costs to the logistics system of the e-commerce company and its consumers.

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