Differentiation of logistics services on the basis ABC analysis

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Abstract. The creation of a well-defined strategy and tactics of logistics services for various groups of customers with the definition of the range of services is extremely important for a service producer in terms of its competitiveness and market stability. The purpose of the study is to propose a method for classifying logistics services based on the use of ABC analysis, which allows Pareto to distribute services according to their degree of influence on the cost of production, which will enable the formation of an effective system of logistics services. A method for the classification of logistics services is proposed. The implementation of the proposed method made it possible to determine the types of services that should be differentiated.

1 Introduction

The current stage of economic development is characterized by a radical change in the business model. New economic conditions are replacing the high growth rates of sales and profits, the market power of suppliers, mergers and acquisitions, and low competition [1]. The conditions in which power is concentrated in the hands of customers, barriers to entry for new players are reduced, differences between suppliers are becoming less obvious, and the issues of maintaining previous market positions, finding new sources of growth, ways to keep existing customers and attract new ones are becoming especially acute [2]. The technologically simpler the composition of the material flow, the more substitutes with identical consumer properties, the farther along the supply chain the company from the final distribution link, the more critical it becomes to find a way to differentiate the company in a highly competitive market. An important role in this is played by the logistics service.

In these conditions, the service sector is becoming increasingly developed. Increased competition, as well as various processes associated with the integration of participants in

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the supply chain determine an increase in demand for services [3]. Currently, in a number of industries (automotive, electrical engineering, etc.), the main profits are formed not in the production sector, but in the provision of various kinds of services to consumers. In this regard, the concept of integrated supply has become widespread in the modern economy. In these conditions, the organization should be ready to offer consumers not only high-quality goods as such in its material form, but surround it with a complex of various kinds of services. At the same time, consumers often themselves dictate the composition and quality of services, the required level of service. The most important criterion for the successful operation of service enterprises is the profit indicator per each service provided to consumers. Using this approach allows service companies to increase the attractiveness of the services offered and, consequently, to compete more successfully in the market, since the costs associated with the delivery, preparation of products for production consumption, as well as operating costs, information services, etc. often make up a significant share in the cost of finished products. All of the above determines the relevance of the research topic.

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2 Literature review

Changes in the structure of the market and market relations at present have led to the transformation of the very concept of "service". In a generalized sense, a service is an action that benefits the consumer. "This is any event or benefit that one party can offer to the other and which is basically intangible" [4]. Thus, the performance of the service may or may not be associated with tangible goods. A service as a product of labor has a use value and this predetermines its commodity character, which is expressed in the ability to be sold to consumers as a kind of product.

Among many services provided to individual and institutional customers, a logistics service has gained significance in recent years [5]. The literature on sources contains many definitions of logistics services, but there is no universal explanation for this concept. Until the late eighties, a traditional transport sector functioned divided into transport as well as forwarding and mail branches. In the nineties, logistics service operators began to create the so-called logistics service packages involving storage services, stock management and additional services, e.g. packaging or labelling. The end of the nineties saw the development of, a concept of managing and optimising supply chains and supply networks based on close-knit cooperation of logistics operators with manufacturing and trading enterprises [5]. Logistics services of that time began to take the form of individualized logistics services, and their development became more and more focused, for example, through the use of integrated ICT systems [6], [7].

Researchers describe the concept of "logistics services" in different ways, focusing on its various aspects (Table 1).

Table 1. Developing definitions and concept of logistics services.

Sources	Definition
Jurik, T. [8]	A logistics service is a combination of intangible logistics operations that ensure maximum satisfaction of consumer demand in the process of managing material, financial and information flows, in the most cost-effective way.

Meidutė-Kavaliauskienė, I., Aranskis, A., & Litvinenko, M. [9]	Logistics service quality is the result received comparing customers' expectations with customers' perception of service quality.
Rydzkowski, W. [10]	A logistics service means performing activities involving the execution of one or many logistics functions towards the ordering party by the service provider, based on contractual provisions. The components of a logistics service are transport, forwarding and logistics as well as additional services.
Srivastav, S. K., & Chandra, S. [11]	Logistics services can be described as services involved in the processes related to planning, implementation and controlling of the flow of materials/goods, services, information, and funds between the point of origin and the point of destination to meet customer requirements in an efficient and effective manner.
Jeszka, A. M. [12]	Logistics services entail gainfully provided services of forwarding, transport, storage as well as related services and those supporting the process of the commodity flow between various foci of the supply chain.
Rosa, G., Jedliński, M., & Chrąchol-Barczyk, U. [13]	A logistics service means an activity aimed at satisfying logistics the needs of business entities and people.
Trajkov, A., & Biljan, J. [14]	Logistic service is a certain set of services that are provided to the consumer directly in the process of delivery of goods, which is the last stage of the movement of material flow in the logistics chain.
Knofius, N., Van der Heijden, M. C., & Zijm, W. H. [15]	After-sales logistics service this is warranty service, obligations for the consideration of customer complaints, exchange, return for revision, etc.

Summarizing the opinions of scientists, we can conclude that, logistics service is a set of services that are provided during the execution and execution of an order, purchase, delivery and further service of goods. The practical significance of the formation of a logistics service system is reflected in a number of scientific papers, which, however, explore this topic quite fragmentarily. As a rule, they consider one of the aspects of a logistic service: the structure of a logistic service or its characteristics, the perception of a logistic service by consumers or methods of measuring it, etc. Despite the presence of scientific interest in the study as a whole, currently the unresolved part is the problem of formation of a logistics service system. On this basis, there is a need for a more detailed research of the organizational and methodological approach to the formation of a logistics service system.

3 Methodology

3.1 Formation of a logistics services subsystem and customer service management

For the consumer of services, the most important parameter is the cost of the service, as well as the nomenclature and reliability of the logistics service.

To solve these issues in the process of forming a subsystem of logistics services, the following algorithm of actions can be used:

- segmentation of the market for logistics services and consumer groups by cost, quality requirements, nomenclature, assortment, volumes of economic activity, territorial attribute;

- development of projects for the functioning of the logistics service system in various conditions on the basis of: determining priorities in service; fixing the structure of the complex of services, as well as the list of possible additional services that can be offered to different groups of consumers;

- an objective assessment of the quality of the services offered, determining a compromise between the quality of service and the costs of its implementation;

- standardization of the services offered and determination of the possible unification of services in various market segments;

- the establishment of various levels of service depending on consumer groups, their needs, solvency and the volume of services purchased;

- coordination of the required amount of resources, their structure and territorial location to ensure reliable after-sales service;

- the formation of information systems for feedback from consumers of services, the use of "quick response logistics" to consumer requests;

- determination of competitive prices for logistics services;

- monitoring the functioning of the service system [16].

The main task in the process of creating a service system is to segment the market for logistics services by consumer groups, the volume and cost of the service, territorial characteristics, etc. As practice shows, world-leading companies deliberately choose consumers whom they would like to serve and establish the level of services for each individual group. This choice is often made based on a careful assessment of the costs associated with attracting and retaining consumers. The presence of distinct consumer segments helps companies determine the circle of customers with whom they intend to work in the future [17,18,19].

Such work can be carried out using of economic analysis – "ABC". Based on the results of the analysis, a service strategy for different groups of consumers is formed and, as a result, a complex of the most popular types of services that are most demanded for customers and profitable for the company is offered.

In addition to this industry, the analysis of the competitiveness and economic profit of Kazakhstan poultry companies and methods of commercialization of green technologies were considered [20,21].

3.2 "ABC" Analysis

The ABC analysis method, also called the Pareto rule or the 80/20 rule, is widely used in the management of logistics systems to optimize product mix and regulate inventory levels. According to the Pareto Rule, only a fifth (20%) of the total number of objects gives approximately 80% of the results. The contribution of the last 80% of the objects is only 20% of the total result. Therefore, when deciding on outsourcing and finding a reliable supplier of logistics services, it is advisable to classify them according to the degree of formation of value added in the entire supply chain.

The application of the ABC analysis method in the management of the logistics service system is based on the division of the entire range of costs for logistics services in order to reduce their impact on production costs. Next, subdivide all items of the nomenclature into three groups – A, B and C. The distribution of logistics services is proposed to be performed according to the scheme defined in table 2.

Table 2. Percentages of classification groups A, B and C of logistics services [17].

Group	Share in the number of	Share in the formation of	Characteristics of classification groups of logistic services

	management objects,%	value in the supply chain,%	
A	20	80	A special group of services that have the maximum impact on the cost of finished products. Services that should be outsourced if they are not a core competency for the enterprise.
B	30	15	Services with an average contribution to the cost of finished products. The feasibility of outsourcing them is determined by the level of service, competence and strategic guidelines of enterprises in the supply chain.
C	50	5	The largest group of services. It has a slight effect on the cost of finished products. The decision on outsourcing is made based on specific conditions for the functioning of enterprises. Management should be focused on the development of promising types of services.

The classification of services based on the ABC-analysis method is more appropriate to carry out on the basis of the analytical method, the mechanism of which is as follows [17]:

1. Identification of the costs of a logistics service for the entire range of services N and the determination of the tariff c_i for the i-th service. q_i – the number of services provided for this type in the supply chain during the considered time interval.

$$C_i = c_i \times q_i \qquad (1)$$

2. C_i logistics service cost ranking in descending order:

$$C_a \geq C_b \geq \cdots \geq C_i \geq \cdots \geq C_m \qquad (2)$$

3. Rationing indicators, for the convenience of calculations, by entering the relative values of the considered cost indicators q_i (in percent):

$$q_i = {C_i}\Big/{\sum_{i=1}^{N} C_i} \times 100\% \qquad (3)$$

4. Summation of q_i values by cumulative $q_{\Sigma i} = \sum q_i$ for selection of analytical dependence:

$$q_{\Sigma i} = f(a_p, x) \qquad (4)$$

where, a_p – coefficients,

x – service number in the stock group, $x = \overline{1, N}$.

Based on the application of this methodological approach to the classification of logistics services, it is possible to increase the effectiveness of differentiation of logistics services.

4 Results and discussion

Testing of the proposed method of classification of logistics services was tested according to the data of JSC Russian Railways Logistics. ABC analysis was carried out in several stages:

1. Sorting data in MS Excel using the "Data" menu - the "Sort" command.
2. Calculation of the total cost of logistics services.
3. Determination of the share of costs for each logistics service in their total volume.
4. Determination of the accumulated share.
5. The distribution of services in groups A, B and C.

The calculation results are presented in table 3.

Table 3. Results of the ABC analysis of logistics services.

Service description	Share in the total price	Accumulated share	Group
Product distribution	13%	13%	
Storage of pallet spaces	10%	24%	
Cargo escort	9%	34%	
Order administration	8%	44%	
Pallet formation during unloading	8%	52%	A
Assembly and packaging of the order	7%	60%	
Filmage (packaging pallets with stretch pellicle)	7%	66%	
Ships charter and freight forwarding	6%	71%	
Finding a carriage in the warehouse compartment	5%	76%	
Pallet unloading or loading (mechanized)	4%	80%	
Packaging	4%	84%	
Accreditation in customs	4%	86%	
Preparation of a logistic audit report	3%	89%	B
Customs transit support	3%	91%	
Registration in the nomenclature department	3%	93%	
Cargo insurance	2%	94%	
Consultation on issues of foreign economic activity	1%	96%	
Transport by road	1%	97%	C
Sticker gluing	1%	97%	
Transportation by rail	1%	100%	
Total	**100%**	**-**	**-**

Table 4 presents the classification of logistics services of JSC Russian Railways Logistics, distributed by groups A, B and C.

Table 4. Classification groups.

Group	Service
A	Product distribution, storage of pallet spaces, cargo escort, order administration, pallet formation during unloading, assembly and packaging of the order, filmage (packaging pallets with stretch pellicle), ships charter and freight forwarding, finding a carriage in the warehouse compartment
B	Pallet unloading or loading (mechanized), packaging, accreditation in customs, preparation of a logistic audit report, customs transit support, registration in the nomenclature department, cargo insurance
C	Consultation on issues of foreign economic activity, transport by road, sticker gluing, transportation by rail

5 Conclusion

Thus, the proposed methodological approach to the classification of logistics services allows us to justify the management decision in the differentiation of logistics services. As a result of adaptation of the classic ABC analysis, classification groups of logistics services were formed.

The main advantages of ABC classification are:

- Sufficient simplicity and speed of calculations, since ABC analysis does not require the introduction of special information systems and databases and can be provided on the basis of standard software (for example, in MS Excel tables).

- Reliability of the results obtained during the analysis, which are stable over time and allow you to manage the logistics service system, focusing on key competencies and important business processes that bring additional value to the supply chain. It is advisable to invest resources released as a result of outsourcing non-core business processes into strategically important innovative production and management technologies.

- The proposed methodological approach is universal. It can be used at enterprises of any legal form in various types of economic activity.

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