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COMPLETENESS METER IN LOGISTICS SERVICE QUALITY MANAGEMENT OF TRANSPORT COMPANIES

Abstract: *The meters for measurement of the quality of logistics customer service, selected according to the specificity of logistics tasks performed by the company allow for the analysis and assessment of the subsystem of logistics customer service. In the article, the results of the research carried out in 147 companies of road cargo transport for hire or reward in the area of southern Poland, in the Silesian Voivodeship, were presented. Taking into account the survey results concerning determinants of the scope of logistics customer service in the surveyed enterprises and the results of measurement of the meters of logistics customer service, specifying its level within the surveyed entities, measurement of the relationships between selected issues of both areas was carried out. One of the most important meters of logistics customer service in the perception of transport service providers was selected, i.e. completeness meter.*

Keywords: *Completeness Meter; Logistics Customer Service; Management; Transport Company.*

1. Introduction

Logistics customer service is one of the most important concepts of modern logistics. All logistics operations are closely linked to customers, capabilities to satisfy their needs and expectations. Positive and long-standing interactions with purchasers are often the result of customer satisfaction with the quality of service provided to them, which is actually reflected in the company's profits.

Logistics customer service is an inherent component of many business operating systems of business, subjected to the performance test, understood as an opportunity to accomplish the intended objectives by the company. The application of the meters of logistics service allows for conducting an in-depth analysis and assessment of modifications in the service subsystem, among others, dealing with order

development, deliveries or communication with customers.

The objective of the article is to identify the relationships between selected determinants in the field of logistics customer service and the level of completeness meter in the group of transport companies from the area of southern Poland, i.e. the Silesian Voivodeship. The selection of determinants in the field of logistics customer service was made on the basis of the analysis of the subject literature, conducted in terms of references to the aspects of the concept of logistics customer service, which are the most important from the point of view of business practice. The location of logistics customer service in organizational structures of enterprises was taken into account as well as its components, standards, level measurement and control.

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2. Literature review

In the practice of operations of economic entities, customer service is to understand who the customer of the organization is, what makes them satisfied, what their expectations and needs are and to find the best manner to satisfy them (Price & Harrison, 2013). It can also be defined as the competency to satisfy customer requirements and expectations, particularly in relation to the place and time of deliveries ordered, using various logistics measures, including transportation, warehousing, management of inventory and information (Baraniecka & Rodawski, 2005). Due to strong connection of customer service with logistics processes taking place in the enterprise, it is often called *customer logistics*.

From the perspective of logistics, customer service mainly focuses on the actual distribution of goods, taking into account the right: status, location, quantity and time while simultaneously generating a profit (Florez-Lopez & Ramon-Jeronimo, 2012; Witkowski, 2002). According to the definition suggested by Ballou (2004), customer service is a number of interconnected logistics activities determining customer satisfaction when buying a product or service. According to Krawczyk (2011), for logistics operations, customer service should be understood as a set of all activities at the management level, associated with own preparation to accept and fulfill customer order, customer information service, creation and provision of reliability of the system of direct contact with the customer and their order as well as issuance and delivery of the product to the customer, payment service, installation and training, warranty service and opportunities to make a complaint or return, taking into account packaging management and environmental protection requirements. Therefore, it is defined as implementation of reciprocally coordinated activities/logistics services affecting customer satisfaction when buying a product, i.e. in the last operation of the sales

process, which is most frequently initiated by order placement and ended by delivery of the product to the customer. Kempny (2001) notices the essence of logistics customer service in combining the purchase of the product by the customer with simultaneous purchase of other benefits associated with it. As pinpointed by Ciesielski (2006), the product value by the customer is associated with the whole offer, thus the sum of the product value and the standard of customer service.

According to the above, logistics customer service is specified differently in a number of definitions, but all of them summarize the three approaches (Cichosz, 2005):

- from the perspective of logistics activities,
- from the perspective of standards related to the meters of the company's operations,
- from the perspective of the philosophy of business activities.

The set of criteria for assessment of the quality of logistics service is universal in its nature, however, the weight of individual criteria certainly depends on the current situation of the enterprise and the market in which it operates. According to B. J. La Londe (1985), the most important assessment criteria of logistics customer service include:

- effectiveness (flexibility and accuracy) of the company's distribution system operation,
- length of the order fulfillment cycle and task fulfillment, which intensify sales,
- pairing (harmonizing) the rate of supply with the rate of customer demand,
- customer satisfaction with the purchase of products and the way through which it is increased by raising the product value with the space and time quality.

Fulfilling the above criteria can be measured by a range of meters for assessing the quality of logistics service in the company (Chen et

al., 2009). The evaluation system which enables reliable opening mistakes and achievements is extremely important for the quality of logistics service (Kadłubek & Jereb, 2014; Nowakowska-Grunt, 2007). The parameters of assessment should be constantly adapted to the needs of the company (Nogalski & Ronkowski, 2007). The way both to specify the level of logistics customer service within the company and to monitor and control it is measurement of the quality of logistics service using appropriate logistics categories. They are, among others, reflecting events and facts in the field of enterprise management (Borowiecki & Siuta-Tokarska, 2009), expressed in adequate units of measurement, meters of logistics customer service. The main task of the meters is to register events from the logistics system which will constitute the basis for assessment of the level of customer service.

In “Logistics Terminology Dictionary” (Fertsch, 2006), the following definition of logistics measure was presented: it is the value specified in units of measure, expressing events and facts of the flow of materials and information in the logistics system of the company/supply chain. Meters are varied in terms of types, ranges and areas of impact. In logistics terms, meters empirically present some observable and measurable actual states, are expressed in relative units and are evaluative and comparative in their nature (Kisperska-Moroń, 2006).

According to Drucker (2004), if one cannot measure the specific area of the company’s activities, one cannot manage it. Also, when relating to the logistics sphere of customer service, it is necessary to define in detail what is to be the subject of measurement and what are the reasons for that (Nowicka-Skowron, 2001). After establishing the criteria and indicators to assess the service quality in relation to the specific customer or market segment, their performance is thoroughly tested. Then, the attention should be paid to their proper structure within the assumed

period of time, determination of units of physical or value measurement and formulation of the aggregation level in measuring, i.e. measurement for the entire system, where indicators express average values or measurements on a smaller scale (Jelonek et al., 2019).

The meters for measuring logistics customer service can be selected according to the specificity of the performed logistics tasks. The most fully developed is the system of measurement and assessment of logistics service of delivery and procurement in terms of management of material resources: materials, raw materials, finished products. In practice, there is a wide range of meters for assessing the results and opportunities integrating logistics functions in the area of the flow of resources (Chaberek, 2002). Among the most frequently used meters specifying the level of logistics customer service and its monitoring and control, among others, Ballou (2004), Coyle et al. (2013), Kempny (2001) list completeness meter.

Lambert et al. (2006) postulate to differentiate the meters of the quality of logistics service by the following areas: pre-transaction, transaction and post-transaction, while listing a total of 19 most important meters, presented in Figure 1.

The most typical meters of the quality of logistics service, in the opinion of Ballou (2004), Ciesielski (2006), Kempny (2001), are:

- time from the moment of placing an order to the moment of shipping a product;
- minimum order size or limits as to the items in one order, accepted by the supplier;
- share of commodity shortages in all the stock items;
- percentage share of complete orders;
- percentage share of orders fulfilled at specified intervals from the moment of accepting an order;

- percentage share of orders that can be fulfilled completely with inventories in the warehouse;
- percentage of goods that reached their destination with no damage;
- time from the moment of placing an order by the customer to the moment of delivery of products ordered;
- facilitating order placement, flexibility.

To assess the quality of logistics customer service in the company, Blanding (1982) suggests:

- meters of the order size and accuracy, i.e. the minimum order size, percentage of mistakes made in deliveries,
- meters of the degree of order compliance with the specificity of the customer, i.e. completeness,
- meters of delivery time.

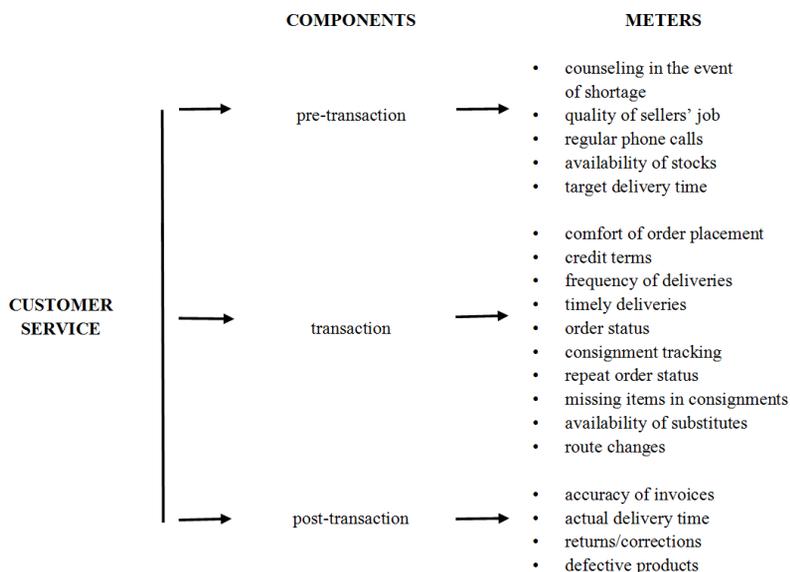


Figure 1. Exemplary Meters of the Quality of Logistics Customer Service
Source: Lambert et al. (2006)

Order completeness is defined as one of the most important components of logistics service, dependent on the availability of stocks, related to time and accuracy. It belongs to transaction components of logistics service determining an effective transaction, in line with customer expectations – from the moment of placing an order to the moment of receiving the product. Golemska (2009) interprets completeness of deliveries as the supplier's ability to completely fulfill the order and, in the event of not meeting the standards as to delivery completeness, there are the so called

underdeliveries. On the other hand, Baraniecka et al. (2005) defines the term of completeness of deliveries as the indication of the supplier's ability to fulfill the overall specification of goods ordered. In the case of a wide range of products, this is associated with the maintenance of a high level of inventories. In contrast, completeness meter reflects the percentage of orders fulfilled according to their specification (Twaróg, 2005).

To assess the level of logistics customer service within the enterprise, the comprehensive model should be adopted,

including appropriate service standards, procedures to ensure proper and steady measurement of the level and to take regulatory actions. While conducting the study of the quality of logistics service, the set of meters ought to be analyzed, among which one of the most important is completeness meter.

3. Research methodology

This study was prepared on the basis of the results of own research carried out on a group of 147 companies of road cargo transport for hire or reward in the area of the Silesian Voivodeship in southern Poland.

The applied cognitive method was the survey method, within the framework of which the categorized technique of acquiring primary information was utilized – the survey questionnaire.

The research was conducted in two stages using two different survey questionnaires.

For the purposes of the general characteristics of management of companies of road cargo transport for hire or reward in the area of the Silesian Voivodeship in southern Poland, particularly taking into account the identification of the existing scope of logistics customer service, the research using the first survey questionnaire was carried out. The questions included in the questionnaire were closed-ended questions, in which the respondent was given possible responses specified, out of which they selected one or a few options (conjunctive questions). The suggested options were constructed on the basis of the analysis of the issues discussed in the subject literature and based on the observation of practice.

The other survey questionnaire used in the research was created on the basis of 22 determinants of logistics customer service. To obtain the research material, in the survey form, the respondents were requested to answer deliberately chosen questions concerning real or estimated numbers establishing the quality of logistics customer

service from the perspective of service providers, among others, in the area of completeness of services. The questions included in the questionnaire were open-ended questions, allowing the respondent for complete freedom in giving numerical responses with specific units of measurement. All the discussed issues were to examine quantitative features, i.e. the ones of quantifiable nature.

Both survey questionnaires were filled in by 147 representatives of the surveyed road cargo transport companies of the Voivodeship. The survey forms were given directly to 19 respondents, 27 forms were sent via e-mail, whereas the representatives of another 101 entities were delivered the forms via traditional postal mail.

Taking into account the results of the survey, concerning determinants of the scope of logistics customer service in the surveyed companies of road cargo transport for hire or reward of the Silesian Voivodeship and the results of measurement of the meters of logistics customer service, specifying its level within the surveyed entities, measurement of the relationships between selected issues of both analyzes was carried out.

Among the meters of logistics customer service, one of the most important meters in the perception of transport service providers of the surveyed companies was selected, i.e. completeness meter. The data obtained from the representatives of the surveyed entities, through the analysis of the completed survey questionnaires, expressed the quality of logistics customer service within the surveyed companies in the form of intensity indicators (in percentage terms), also allowing for their ordering.

The selection of the phenomena in the area of the identification of determinants of the scope of logistics customer service in the surveyed entities, obtained as a result of the processing and analysis of the empirical material gathered on the basis of the completed survey questionnaires, was mostly determined by the availability of data in terms allowing for the

research into the existence of the relationships. Selection of the analyzed categories was, therefore, limited to the questions with hierarchically structured responses.

For research purposes, Spearman's rank correlation coefficient was used (McClave & Sincich, 2016), taking into account the fact of possessing most data in an ordinal scale (the ratings of 1-3 and 1-7). Probability values of accepting the hypothesis H_0 , on the insignificance of individual coefficients (*p-value*) and their ratings, were presented in the tables in the following part of this study, with the assumption that, with the possessed size, the sample distribution is normal (Szajt, 2014). In accordance with the preliminary

assumptions, those were found significant, for which the specified level of significance did not exceed 0.05.

4. Research results and discussion

The meter describing the quality of services in the perception of transport service providers of the surveyed companies is the meter of service completeness. Table 1, presented below, contains the results of measurement of the relationships between selected categories explained in the area of the identification of determinants of the scope of logistics customer service in the surveyed entities and the results of measurement of the meter of service completeness, specifying its quality within the surveyed entities.

Table 1. Values of Correlation Coefficients Determined for the Selected Variables and Service Completeness

Question	r_{xy}	p - value	Number of observations
Is there a cell responsible for logistics customer service isolated in the company's organizational structure?	-0.0583	0.2394	147
Are interviews with customers conducted in the company to determine the significance of the service itself and its individual components?	-0.1059	0.0983	147
If conducted, how often do interviews with customers to determine the significance of the service itself and its individual components take place?	-0.1433	0.1538	99
If conducted, is the CIT method applied for interviews with customers to determine the significance of the service itself and its individual components?	-0.2826*	0.0041	99
Are the standards for logistics customer service established in the company?	0.0375	0.6752	147
If established, do the standards for logistics customer service take into account customer expectations as to the level of this service?	-0.0967	0.3451	96
Are measurements of the level of the provided logistics service carried out among the company's customers?	-0.2629*	0.0005	147
If carried out, how often do measurements of the level of the provided logistics service among the company's customers take place?	-0.3296*	0.0252	43
If carried out, is the SERVQUAL method applied for measurements of the level of the provided logistics service among the company's customers?	-0.1785	0.0139	43
Is the level of logistics customer service controlled using the meters of this service?	-0.2023*	0.1828	147
Is the research into the level of logistics customer service provided by competitors carried out?	-0.2196*	0.0032	147

* - statistically significant value with the significance level $\alpha = 0.05$. Source: Own study

Among the selected 11 categories explained in the area of the identification of determinants of the scope of logistics customer service in the surveyed entities, included in Table 1, the statistically significant relationship with the results of measurement of the meter of service completeness was recorded for 5 variables. The data gathered for the variables indicating the statistically significant relationship with the meter of service completeness allowed for well-founded illustrating the arising relationships in the table above. Unfortunately, some of the attempts made to illustrate the indicated relationships ended in failure, mostly due to limited availability of data in terms allowing the fulfillment of assumptions made.

The meter of service completeness, indicating the ability of the service provider to meet full specification of the order placed by the customer, is the most rigorous meter of the level of availability of services. Completeness, supplemented with accuracy and timeliness of services, is the component of their reliability. If at least one item is missing in the processed order, the service is found incomplete. The result of failing to meet standards in terms of completeness of services is under deliveries.

The observation of the correlation coefficient, specifying its significance for the relationship of the meter of service completeness and the application of the CIT method in conducting interviews with customers to determine the significance of the service itself and its individual components, indicates a clear conclusion that the use of this method has a significant impact on the level of quality of service completeness. The CIT method, based on the analysis of descriptions of critical incidents of service recipients, in addition to the identification of the major components of logistics customer service, is also aimed at usability when defining the arising practical problems of the operation of logistics service in road cargo transport companies. The system of classification of critical incidents

used in this method can become the basis for specifying procedures to help reduce errors and eliminate the effects of not meeting standards in terms of service completeness.

Conducting measurements of the level of quality of the provided logistics service among customers of enterprises also remains in the relationship with the meter of service completeness. Consumer research draws attention of service providers to the most fragile components of the logistics process; therefore, their full cognition allows for elimination of deficiencies in their implementation. The aggregation of all the imperfections also indicates what overall level of quality of service completeness is offered by the service provider. It should be considered that some services can be more critical than others in forming the level of completeness. Those are less popular services and of low value but frequently ordered. All the aggregated information related to logistics service and its components, obtained straight from service recipients is only the starting point in the analyses of the level of this service, among others, in terms of service completeness. Similarly, the statistically significant relationship with completeness of transport services was indicated by the frequency of conducting measurements of the level of the provided logistics service among customers of the surveyed companies. Regularity of the research mentioned, enabling the update of information resources and plans of enterprises, has a positive impact on an increase in the degree of service completeness in the surveyed entities. The research repeated on one target sample provides an opportunity for current observation of customer preferences, facilitating the verification of management maneuvers and, consequently, orienting the image of the company as a reliable service provider.

There is also the statistically significant relationship between service completeness of services and conducting measurements of the level of their quality within the surveyed

companies using appropriate meters, for which the distribution of the obtained data is presented in Table 2.

In accordance with the indications of the Table 2, the level of quality of completeness of services provided by the surveyed entities was significantly higher in those units which controlled it. The meters of diagnosis of the level of logistics customer service within the surveyed companies of road cargo transport for hire or reward most frequently relate to the assessment of effects and opportunities integrating logistics functions in the area of customer service. The appropriate procedure for measuring the level of quality of the

components of logistics customer service may turn out to be useful also in the monitoring and control of the level of this service in enterprises. To assess the level of quality of logistics customer service within the surveyed companies, managers should adopt a comprehensive model, including the establishment of appropriate service standards, procedures to ensure the correct and steady measurement of the level of service and to take regulatory actions. At the same time, these indications should constitute the subsequent stages of development of the logistics customer service program.

Table 2. Distribution of Service Completeness Depending on the Monitoring of the Level of Quality of Logistics Customer Service Using its Meters

The level of quality of service completeness	Is the level of quality of logistics customer service controlled using meters of this service?		
	regularly	sporadically	never
90%-91%	1	4	8
92%-93%	0	5	6
94%-95%	14	19	33
96%-97%	8	16	26
98%-99%	6	1	0

Source: Own study

The logistics service program, aimed at success of both the provider and recipient of transport services, ought to be created by understanding individual requirements of customers and focusing the attention on long-term relationships between customers and service providers. High-quality service of service completeness is then not offered to all potential customers but relates only to market leaders with the greatest development prospects and profitability. Intensive cooperation should be conducted not only by understanding customer expectations but also by adapting service capacities to these needs as well as by being aware of the competitive environment. The analysis of the level of quality of logistics customer service provided by competitors also confirms the validity of conducting the relevant research, by

indicating the statistically significant relationship with the meter of completeness of services provided by the surveyed entities.

5. Conclusion

Logistics competences allow for more effective use of the company's potential inherent in its resources and logistics capabilities, determining the creation and provision of values compliant with customer expectations. It is customers and their preferences that should be the focus of interest of each organization. For enterprises, what counts is mostly the value generated by them but also a huge role is played by satisfaction with the quality allowing for winning customer loyalty.

The requirement to provide the high-quality customer service is its systematic verification. The fundamental problem which arises in relation to this issue is the proper selection of such measures which would allow the full control of all service components which are significant from the point of view of the company's customers. While assessing the service quality, one should pay attention to the meters which provide an opportunity to estimate the company's potential to fulfill orders. Logistics measures are introduced in the company mostly to conduct operational controlling, provide information on the course of events of processes and make possible improvements.

Among the meters of logistics customer service, one of those crucial for the perception of transport services providers of the surveyed enterprises is service completeness meter. This meter indicated significant statistical relationships with the selected categories explained in the area of the identification of determinants of the scope of logistics customer service in the surveyed entities, while remaining in correlation with

the five variables of the discussed subject matter.

The meter in question of the level of quality of logistics customer service in the perception of service providers was determined by the application of the Critical Incident Technique (CIT) as well as measurements of the level of the provided logistics service among customers of the surveyed companies and their competitors. Similarly, the values of correlation coefficient in relation to the frequency of customer interviews in order to determine the importance of the provided service and its individual components were statistically significant. The identification of the relationships between selected determinants of the scope of logistics customer service and the results of measurement of the selected meter of logistics customer service, specifying the level of its quality in the surveyed companies of road cargo transport for hire or reward of the Silesian Voivodeship in southern Poland, allow for the confirmation of the accomplishment of the objective of this article.

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