



IDENTIFICATION OF SECTORAL LOGISTICS SERVICE QUALITY GAPS BY APPLYING SERVQUAL METHOD

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Received 26 November 2019; revised 12 May 2020, 22 June 2020; accepted 3 July 2020

Abstract. Today, simply delivering a product to the right place at the right time is no longer enough. Customers demand more; they demand the full suite of logistics services. Customers thus seek higher-value and additional services, and more, which enable them to compete. Thus, the problem underlying analysis is customers' growing dissatisfaction with existing services and their quality. Quality of service no longer gives business entities a competitive edge. It is vital for companies to have different activities, to operate in different branches of the economy, and to work with different types of goods. However, despite these differences, they all want to obtain maximum satisfaction from logistics services. With this in mind, the purpose of this article is to present a study examining the impact of logistics service quality on the satisfaction of companies working with different categories of goods. Results indicated that different logistics service users do not have the same requirements for logistics service quality. Moreover, it was proved that SERVQUAL method is suitable for identification of sectoral value gaps, which can be applied in practice assuring competitive advantage.

Keywords: logistics, service, quality, SERVQUAL, transport company, concept, model.

Introduction

In the current business world, providing high-quality services are one of the key factors in staying in the market. Since the survival of a business depends on customers using that business's services, it is important to give customers what they want. Thus, the service provided must meet customer expectations.

At this time, there is an observable trend of declining client loyalty to one business entity. Clients these days are always looking for new, better business entities that can meet the ever-growing demands of their needs. These ever-growing customer expectations include various aspects: benefits and value for money, as well as the quality the customer seeks from the product or service. Therefore, businesses must be constantly aware of customer expectations, adapting to them, and able to meet them. The question is how to satisfy customers and meet their expectations at the lowest cost while maintaining a strong market position – a competitive advantage.

The purpose of this article is to present a study examining the impact of logistics service quality on the satisfaction of companies working with different categories of

goods. This research applies the methods of literary analysis and synthesis, and it utilizes the SERVQUAL model.

The remainder of the paper is organized as follows. The next section looks at the analysis of scientific approaches to logistics services and using the SERVQUAL model to evaluate the quality of logistics services. The subsequent section presents the methodological background of the study, explains the procedural steps followed in the construction of our framework, and presents the results found.

1. Literature review

1.1. Analysis of scientific approaches to logistics services

It is no doubt that service quality in logistics is very important topic addressed in huge amount of scientific papers (Anderson *et al.* 1994; Franceschini, Rafele 2000; Kaynak 2003; Rahman 2006; Feng *et al.* 2007; Ganesan-Lim *et al.* 2008; Hong, Lyong 2008; Baki *et al.* 2009; Juga *et al.* 2010;

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Kersten, Koch 2010; Huang *et al.* 2012; Jia *et al.* 2013; Aggarwal *et al.* 2014; Prentkovskis *et al.* 2018; Zanjirani *et al.* 2019). These authors come to a conclusion that service quality is main prerequisite to develop a successful business. Providing quality services is an opportunity to meet customer expectations and gain a competitive advantage in the market (Kaynak, Hartley 2008; Choudhury 2015; Subramanian *et al.* 2016). However, the concept of quality in logistics services is becoming more complex, which means that a high-quality product and a good marketing strategy are no longer sufficient (Grönroos 1984). As reported by Mentzer *et al.* (2001), Rahman (2006), Feng *et al.* (2007) and Agnihotri *et al.* (2016), high-quality services and continuously monitoring parameters that determine quality can improve a company's ability to meet their customers' expectations by the value created for them. The value created through logistics services is based on the customer's perceived gap between the quality of service provided and the quality of service that the customer expects (Ferreira *et al.* 2015; Blut *et al.* 2015; Agnihotri *et al.* 2016; Cepeda-Carrion *et al.* 2017; Al-Jazzazi, Sultan 2017). The smaller this gap, the greater the perceived value (Chen, C.-F., Chen, F.-S. 2010). Thus, if the quality of service the company provides meets (or exceeds) the quality of service that the customer desires and receives, the value perceived by the customer is fulfilled.

Neo *et al.* (2004) state that value is created when a logistics service provider can implement the principle of the 5Rs (Five Rights) or 7Rs (Seven Rights): deliver the right item, in the right quantity, to the right place, at the right time, to the right/correct customer, in the right/proper condition (quality), at the right/fair price. Fulfilling requirements in the provision of logistics services creates high added value. However, there are some negative aspects, as well. One example is the relationship between business partners. According to Tate (1996), traditional business-to-business relationships in the markets are transaction-based (often per transaction), while partnership-based (long-term) relationships include sharing benefits and operational intelligence, advanced planning, and easier control. In the field of logistics, it is often the case that only one or several logistics services are outsourced, rather than the whole complex. In addition, different services may be outsourced from different service providers. As a result, many transactions take place; controlling them is more complex, more time-consuming, and so on. The effectiveness of such individual services is also difficult to evaluate. As a result, there is a growing tendency to choose an entire logistics service complex from one specialized supplier (Neo *et al.* 2004). That supplier is expected to create overall value and value in all of the separate elements of services.

Evaluating (Kim *et al.* 2012) and measuring (Bienstock *et al.* 1997) the quality of logistics services itself is quite complex. There are numerous logistics services, so there are many criteria for measuring them, as well. It is particularly difficult to assess the overall quality of ser-

vice when using different service providers. According to Caplice and Sheffi (1995), logistics involve a complex of logistics activities and require a group of indicators that show the appropriate level of operational performance to measure them. Ideally, all indicators should be selected and managed as a single common framework. The results obtained in that manner may be complementary and mutually supportive, providing a coherent overall picture of the performance quality of the logistics service provider of their choice.

Franceschini, Rafele (2000) and Chen *et al.* (2009) state that there is a need to define a set of quality indicators in order to evaluate the quality of logistics service. They provide a "classic" set of indicators describing the quality of the logistics service. In their view, eight indicators are needed to measure the quality of logistics services: time, regularity, reliability, completeness, flexibility, fairness, harmlessness, and productivity. These indicators can be further subdivided.

Lao *et al.* (2011) provide another set of performance indicators that they claim may influence service quality. They identified 11 performance measurement groups (delivery timeliness, cost, total quality, inventory management, assembly accuracy, responsiveness and flexibility, error and damage assessment, time needed to accomplish a new production order, receipt/unloading and dispatch/loading, documentation management, etc.). Banomyong and Supatn (2011) analyse service quality criteria primarily related to order processing: information quality, order process, order release volume, timeliness, order accuracy, order quality, order conditions, order mismatch management, quality of staff availability.

There are many varied sets of parameters by which performance or quality of service can be assessed. Therefore, to evaluate the overall quality of logistics services, it is appropriate to group them together and consider them as a whole.

Another problem area related to service quality assessment is that in practice, only the quality of the service (perceived quality) being performed (or already performed) is usually evaluated. Meanwhile, the customer's expectations (expected quality) for a service remain unclear. Thus, the logistics service provider knows its performance level, but the provider does not know the initial factor – customer expectations. The service is provided in the way that its provider believes is best. These activities are in the reverse order. In general, quality is perceived subjectively, which makes the process of measuring quality difficult (An 2004; Hong, Lyong 2008; Huang *et al.* 2012; Agnihotri *et al.* 2016).

1.2. Analysis of SERVQUAL model application in logistics

The SERVQUAL model is used to measure and evaluate the quality of service in logistics. It is a multi-item questionnaire designed to measure customer expectations and determine customer perception of the quality of service

they receive. Its findings reveal the gap between how and to what extent the customer's perception of service quality differs from what the customer expects from the service provider. At the same time, the most relevant factors in assessing the service provider and the quality of his service are identified.

The five factors of this model are: tangibles, reliability, responsiveness, assurance, and empathy. These factors are the tools that determine how service quality is measured, as well as service quality. A significant advantage of the model is that not only is the customer's perception identified based on the SERVQUAL questionnaire, but their expectations are also illuminated (Babakus, Boller 1992; Ciavolino, Calcagni 2015).

Numerous published research papers exist (An 2004; Hong, Lyong 2008; Campos, Nóbrega 2009; Dahlgaard-Park, Dahlgaard 2010; Kansra, Jha 2016; Ali, Raza 2017; İnan *et al.* 2017) showing examples of SERVQUAL model adaptations. However, few studies use the SERVQUAL model for logistics (especially 3PL) service quality assessment (Franceschini, Rafele 2000; An 2004; Ahn *et al.* 2008; Pantouvakis *et al.* 2008; Baki *et al.* 2009; Kersten, Koch 2010; Kilibarda *et al.* 2012; Banomyong, Supatn 2011). This is especially the case when the quality of service is also linked to measuring customer satisfaction.

Pantouvakis *et al.* (2008) conducted a study aimed at determining whether the SERVQUAL model can be adapted to evaluate the perception of service quality in shipping. Based on the results obtained, the SERVQUAL model has been shown to be an effective instrument for measuring the quality of passenger transportation. Moreover, these authors aimed to find out whether it is possible to evaluate the overall perceived customer satisfaction by using the SERVQUAL model. The results showed that three factors of the SERVQUAL model (reliability, assurance, and empathy) do not seem statistically significant. The other two factors, Tangibles and Responsiveness, not only provide a slightly better explanation of customer satisfaction from the standpoint of sea-ports, but they are also statistically significant. Consequently, tangibles and responsiveness are important factors for the user when assessing the quality of service.

Franceschini and Rafele (2000) applied the SERVQUAL model to evaluate logistics services. In this study, traditional logistics indicators were first compared to a set of parameters specific to a particular leader in the logistics sector. Then, the relationships between the model set of indicators for measuring the quality of service and the factors characterizing the quality of service were investigated. Comparing these indicators showed that empathy does not generally appear in relation to any of the indicators, though in some situations, this factor's influence is very important.

Banomyong and Supatn (2011) conducted a study to illuminate the "key" criteria that determine the quality of a logistics service; they later evaluated the impact of each criterion in choosing a 3PL service provider. The results

showed that reliability and assurance are significantly related to the choice of a 3PL service provider. The most significant criterion was accuracy of documents, followed by these criteria in order of greatest to least importance: (1) providing renewable freight rates, (2) good customer service, (3) providing e-services, (4) offering consolidation services. Exporters consider accuracy of documents to be the most relevant criterion, as the documents issued by the service provider are used as formal proof of the international payment of goods, and any discrepancy would delay payment. In addition, discrepancies may result in additional charges on unpaid amounts. Finally, accurate filing and management can facilitate and ensure efficient freight flow management. Thus, these authors identified reliability as the most significant factor in logistics.

Baki *et al.* (2009) used the SERVQUAL model to evaluate a transport company's quality of service. They found that none of the criteria provided was strong, indicating that all respondents rated the expected quality of service higher than the perceived quality. Such an assessment may be based on ever-increasing customer expectations. Other authors (Ugboma *et al.* 2007) also found that customer expectations exceeded the perceived (actual) quality of service in terms of all criteria provided. When investigating the quality of service, Ugboma *et al.* (2007) found that respondents rated responsiveness and tangibles highly and empathy poorly. These authors also investigated the relationship between service quality and customer satisfaction. The results showed a very strong relationship between the core and related dimensions of service quality and satisfaction, i.e., customers who have a positive perception of the quality of service provided tend to be satisfied with the quality of performance given by ports.

In summary, all five factors of the SERVQUAL model are treated differently in different situations (studies). Some criteria are considered to be more important in one case, while other criteria are more relevant in others.

2. Methodological background

For the purpose of this research, a research model is created (Figure 1). The diagram depicts the elements to be explored: customer expectations, perceived quality, and customer satisfaction. Customers are categorized according to the type of goods they use. Overall satisfaction is determined, and satisfaction with the quality of logistics services among representatives of customers trading in different categories of goods is compared.

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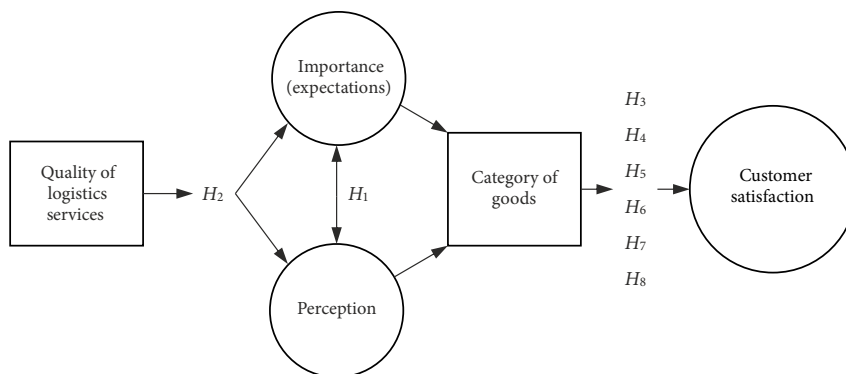


Figure 1. Schematic diagram of the research model (source: compiled by authors)

Research process is based on several hypothesis. The first hypothesis (H_1 – customer expectations are higher than the actual benefits (perception)) is raised to confirm or refute the view that customer expectations outweigh the benefits (quality) actually received from the logistics service provider. Chumpitaz Caceres and Paparoidamis (2007) found that clients with negative perceptions of service delivery tended to increase their expectations by creating a large gap, while those with positive perception tended to lower their expectations by creating a smaller gap between perception and expectation. The authors also state that most studies using the SERVQUAL model have shown that expectations-results rank quite high on the Likert scale. Another hypothesis (H_2 – reliability has the greatest impact on customer satisfaction compared with the other four factors: tangibles, responsiveness, assurance, and empathy) is raised based on the five dimensions of the SERVQUAL questionnaire. It is formulated so that the investigation will make it possible to determine which factor has the greatest influence on the quality of logistics services, thus confirming that the hypothetical factor has the greatest influence. This hypothesis demonstrates a causal relationship between the five factors on the SERVQUAL model – tangibles, reliability, response, assurance, and empathy, which will later be broken down into 22 qualitative logistics service performance indicators – and overall satisfaction with customer service. Satisfaction is measured by first assessing customer expectations of the logistics provider and then assessing the quality the customer receives. Juga *et al.* (2010) found that gap analysis using the SERVQUAL instrument provides a useful framework for evaluating the quality of 3PL services.

Despite criticism of the SERVQUAL model's effectiveness across different service areas, splitting the five dimensions of the SERVQUAL into 22 items is appropriate because it is generally agreed that, on this scale, 22 items offers a reasonably good number for evaluating overall service quality (Sureshchandar *et al.* 2002). The author also claims that the indicators mentioned are primarily related to the human element, manifesting in the service provision, and is based on tangible aspects of the service (for example, elements of design, external appearance/state of equipment, exterior/appearance of employees, etc.).

Franceschini and Rafele (2000) found that, in practice, evaluating the quality of logistics services does not use elements related to Empathy, and the use of Assurance is limited. Pantouvakis *et al.* (2008) used the SERVQUAL model to study the quality of sea-port services and found that reliability, responsiveness, and tangibles received high ratings, with the lowest rating being empathy. In addition, they found responsiveness to be less correlated with overall customer satisfaction (meaning it is less significant) than the other four factors in the SERVQUAL model.

Other hypotheses may help answer the question of whether representatives of customers trading in different categories of goods are as well-satisfied (depending on their needs) with the quality of logistics services, and whether the SERVQUAL model's factors have an equal impact on satisfaction among representatives of customers trading in different product categories:

- H_3 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of logistics services;
- H_4 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of the tangibles factor;
- H_5 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of the reliability factor;
- H_6 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of the responsiveness factor;
- H_7 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of the assurance factor;
- H_8 – representatives of customers trading in different categories of goods are not equally satisfied with the quality of the empathy factor.

One of the research methods, quantitative research, will help confirm or refute the hypotheses, meeting the purpose of the study. Respondents selected for the survey are Lithuanian companies (149) that handle different types of goods and use logistics services, meaning they entrust logistics operations to logistics companies. Based on the experience of researchers Banomyong, Supatn (2011); Pla-

koyiannaki, Zotos (2009); Mckinnon *et al.* (2007), three product groups have been chosen:

- everyday consumer goods (food, drink, clothing, household, etc.);
- luxury goods (household and computer equipment, etc.);
- construction and raw materials.

These groups of goods are quite large, contain a number of similar goods in one category, and are quite different from one another. It is believed that a greater disaggregation of commodity groups would make the differences between them less significant, while having smaller quantities and larger groups is expected to help achieve bigger differences.

A questionnaire was made to investigate the service quality of Lithuanian logistics companies. It is based on the main part of the SERVQUAL model, relying on the suitability of this scale as identified in the literature analysis. Chumpitaz Caceres and Paparoidamis (2007) found that the dimensions of the SERVQUAL model are not generic and must be tailored to a specific domain. The questionnaire consists of five parts. The first part determines whether the customer uses the services of any logistics companies at all, followed by common questions about logistics services outsourced by customers. The second part is designed to set the expectations of customers using logistics companies. The third part helps determine the customer’s perception of the quality of the logistics service. The SERVQUAL model is used to measure cus-

tomers expectations and perceptions. Each part contains 22 statements each.

As with any survey, this questionnaire has limitations. Surveys using the SERVQUAL template are long and thus less appealing to respondents than short questionnaires. Not all respondents willingly complete the questionnaire. The number of respondents surveyed, based on the estimated sample size, does not fully represent the entire population. There is a small number of companies providing a full set of logistics services in Lithuania. Service is a variable phenomenon, not a homogeneous one; studying the quality of services in a certain period cannot fully account for the quality of a continuous process and instead reflects only the current situation.

3. Analysis of survey data on logistics service quality

3.1. General analysis of respondents’ data

According to the survey, 73.1% of all participating companies hire logistics services, and 25% have their own logistics department but also hire logistics services from other companies. All respondents are included in the number of enterprises analysed. Only 19.8% of respondents buy 3PL services. Some 79% of respondents use the services of various logistics service providers. General information on the respondents in the survey is presented in Table 1.

The percent of respondents by commodity category is as follows: the largest commodity category was food

Table 1. General information about survey respondents (source: compiled by authors)

<i>Business location in the supply chain</i>			<i>How many employees work at your company?</i>		
Manufacturer	33	21.7%	0...4 employees	22	14.5%
Driver	4	2.6%	5...9 employees	31	20.4%
Supplier	36	23.7%	10...49 employees	66	43.4%
Retailer	22	14.5%	50...249 employees	24	15.8%
Wholesaler	49	32.2%	250 employees or more	9	5.9%
Service recipient (user)	5	3.3%	Total answers	152	
Other	3	2%			
Total answers	152				
<i>Most frequently outsourced services:</i>			<i>Business ownership status</i>		
Land transport (road and rail) services	128	84.2%	Totally local capital	113	74.3%
Air transport services	11	7.2%	Totally foreign capital	11	7.2%
Water transport services	13	8.6%	United (both local and foreign capital)	28	18.4%
Total answers	152		Other	0	0%
			Total answers	152	
<i>Responsibilities</i>					
Manager	73	48%			
Project manager;	22	14.5%			
Manager/director	36	23.7%			
General manager	7	4.6%			
Other	14	9.2%			
Total answers	152				

and beverage companies (13.8%), followed by representatives of other product categories (12.5%); representatives working with luxury goods (11.8%); businesses working with daily consumer goods (10.5%), and companies working with construction materials (9.2%). The other most common product categories were household appliances, household goods, medical supplies, and agricultural machinery. The product categories belonging to the product groups analysed from the list of “others” could be included in the analysis, but due to the statistical complexity, the response category of “other” was removed from the analysis.

The majority of companies participating in the survey are wholesalers (32.2%). The main mode of transportation used the most in Lithuania is by land, used by 84.2% of respondents. Most of the companies are local capital (74.3%)

that employ 10...49 people (43.4%). In terms of role at the company, it was usually the manager who answered the questionnaire (48%).

3.2. Analysis of expectations and perception

The results of the survey on respondents' expectations and the current evaluation of logistics service quality (perception) are presented in Table 2. The rating on a 5-point Likert scale ranges from 1 point (not at all important or very bad) to 5 points (very important or very good). The following table provides the mean values (descriptive) for each statement from all respondents, the sum of these mean values, the means, and the size of the gap between perception and expectation. The gap is derived from the perception values minus the expectation values.

Table 2. Mean values of expectations, perception, and gaps (source: compiled by authors)

Criterion		Mean values		
		Expectation mean	Perception mean	Gap
Tangibles				
V ₁	well-maintained, cutting-edge equipment	3.48	3.37	-0.11
V ₂	comfortable working environment and infrastructure	3.07	3.23	0.16
V ₃	neat, professional-looking staff	3.00	3.37	0.37
V ₄	clear and correct company documents	4.64	3.72	-0.92
In total		14.19	13.69	-0.50
Criterion average (= total / 4)		3.55	3.42	-0.13
Reliability				
V ₅	delivering the logistics service as promised	4.91	3.42	-1.49
V ₆	sincere employee involvement in addressing customer problems	4.40	3.58	-0.82
V ₇	performing the service well the first time	4.78	3.26	-1.52
V ₈	service performance within the scheduled timeframe	4.79	3.30	-1.49
V ₉	presentation of documents, records, and other information with no errors	4.72	3.93	-0.79
In total		23.60	17.49	-6.11
Criterion average (= total / 5)		4.72	3.50	-1.22
Responsiveness				
V ₁₀	providing information to customers on the progress of the service / service already performed	4.23	3.46	-0.77
V ₁₁	fast, accurate customer service	4.61	3.41	-1.20
V ₁₂	staff readiness and willingness to provide services	4.35	3.67	-0.68
V ₁₃	staff readiness to respond to customer requests	4.47	3.66	-0.81
In total		17.66	14.20	-3.46
Criterion average (= total / 4)		4.42	3.55	-0.87
Assurance				
V ₁₄	the ability of employees to build trust with customers	4.02	3.48	-0.54
V ₁₅	the ability of employees to make their clients feel comfortable	3.68	3.46	-0.22
V ₁₆	consistent politeness from company employees	3.77	3.68	-0.09
V ₁₇	qualified staff that can answer all customer questions	4.34	3.48	-0.86
In total		15.81	14.10	-1.71
Criterion average (= total / 4)		3.95	3.53	-0.43
Empathy				
V ₁₈	company's individual attention to customers	4.11	3.58	-0.53
V ₁₉	employee's personalized services and attention to their clients	4.09	3.53	-0.56
V ₂₀	employee's focus on customer interest	4.38	3.33	-1.05
V ₂₁	employee's understanding of customer needs	4.48	3.22	-1.26
V ₂₂	logistics company's working hours	4.23	3.72	-0.51
In total		21.29	17.38	-3.91
Criterion average (= total / 5)		4.26	3.48	-0.78

By comparing expectations and perception of all statements, we see that the customer perception of logistics companies is lower than the expectations for 20 of the statements (the values are negative). Since the perception of most claims was ranked lower than the expectations, it is possible to confirm the first hypothesis (H_1), which states that the expectations of logistics enterprises' customers are higher than the actual benefit they receive.

For each SERVQUAL criterion statement, the mean values of the expectations and perceptions of companies working with the selected product categories (everyday consumer goods, luxury goods, and construction and other raw materials) are presented in Table 3. The first column shows the mean values of expectations for companies in the everyday consumer goods category; the second column shows their current quality of logistics services.

Table 3. Mean values of expectations and perceptions of businesses dealing in everyday consumer goods, luxury goods, and construction and other raw materials (source: compiled by authors)

Criterion	Mean values						
	Everyday consumer goods		Luxury goods		Construction and other raw material		
	Expectation	Perception	Expectation	Perception	Expectation	Perception	
Tangibles							
V_1	well-maintained, cutting-edge equipment	3.77	3.56	3.95	3.00	2.78	3.38
V_2	comfortable working environment and infrastructure	3.33	3.44	3.49	2.92	2.43	3.33
V_3	neat, professional-looking staff	3.19	3.54	3.26	3.13	2.40	3.40
V_4	clear and correct company documents	4.58	3.77	4.85	3.41	4.53	3.95
	In total	14.84	14.31	15.55	12.46	12.14	14.06
	Criterion average (= total / 4)	3.72	3.58	3.89	3.12	3.04	3.51
Reliability							
V_5	delivering the logistics service as promised	4.90	3.44	4.97	3.15	4.83	3.45
V_6	sincere employee involvement in addressing customer problems	4.40	3.46	4.59	3.59	4.23	3.65
V_7	performing the service well the first time	4.75	3.06	4.87	3.18	4.80	3.35
V_8	service performance within the scheduled timeframe	4.83	3.13	4.77	3.23	4.75	3.28
V_9	presentation of documents, records, and other information with no errors	4.77	4.00	4.74	3.97	4.70	3.73
	In total	23.65	17.09	23.94	17.12	23.31	17.46
	Criterion average (= total / 5)	4.73	3.42	4.79	3.43	4.66	3.49
Responsiveness							
V_{10}	providing information to customers on the progress of the service / service already performed	4.15	3.40	4.49	3.46	4.25	3.65
V_{11}	fast, accurate customer service	4.75	3.40	4.51	3.44	4.68	3.30
V_{12}	staff readiness and willingness to provide services	4.46	3.79	4.56	3.67	4.10	3.53
V_{13}	staff readiness to respond to customer requests	4.54	3.79	4.54	3.51	4.35	3.65
	In total	17.90	14.38	18.10	14.08	17.38	14.13
	Criterion average (= total / 4)	4.48	3.59	4.53	3.52	4.35	3.53
Assurance							
V_{14}	the ability of employees to build trust with customers	4.04	3.73	4.31	2.95	3.70	3.53
V_{15}	the ability of employees to make their clients feel comfortable	3.60	3.56	4.08	3.26	3.33	3.53
V_{16}	consistent politeness from company employees	3.96	3.90	3.92	3.69	3.30	3.33
V_{17}	qualified staff that can answer all customer questions	4.42	3.63	4.54	3.13	4.13	3.48
	In total	16.02	14.82	16.85	13.03	14.46	13.87
	Criterion average (= total / 4)	4.01	3.70	4.21	3.26	3.62	3.48
Empathy							
V_{18}	company's individual attention to customers	4.27	3.60	4.23	3.51	3.93	3.68
V_{19}	employee's personalized services and attention to their clients	4.23	3.40	4.15	3.51	4.00	3.80
V_{20}	employee's focus on customer interest	4.63	3.13	4.36	3.21	4.23	3.55
V_{21}	employee's understanding of customer needs	4.71	3.25	4.49	2.82	4.36	3.33
V_{22}	logistics company's working hours	4.48	3.63	4.18	3.74	4.10	3.75
	In total	22.32	17.01	21.41	16.79	20.62	18.11
	Criterion average (= total / 5)	4.46	3.40	4.28	3.36	4.12	3.62

The results for the other two product categories are shown in the same way.

After comparing all three categories of goods, we can see that expectations for reliability are the highest ($V_5 \dots V_9$). Empathy is in second-place ($V_{18} \dots V_{22}$). The least important factor is Tangibles ($V_1 \dots V_4$). The values of the gap between expectations and perceptions are mostly negative, which means that respondents' expectations for most of the criteria on the quality of logistics services exceed the experience they have.

3.3. Analysis of SERVQUAL model factors by comparable product categories

Table 3 presents the mean values of the five factors in the SERVQUAL model: tangibles, reliability, responsiveness, assurance, and empathy. Mean values of expectations for representatives of customers trading in everyday consumer goods, luxury goods, and construction and other raw materials are presented, as are mean values of perceptions for representatives of customers trading in everyday consumer goods, luxury goods, and construction and other raw materials categories.

The higher the significance of the expectation assessment, the more important this factor is to the respondent. The greater the value for the perception factor, the higher the respondents consider the quality of logistics services they receive.

The analysis of each statement was aimed at checking whether the expectations of representatives of customers trading in everyday consumer goods, luxury goods, and construction and other raw materials categories differ significantly, to then determine the most significant factors for each of the categories of selected goods. It also examines whether there is a significant difference in the perception of respondents in the categories of the everyday consumer goods, luxury goods, and construction and other raw materials to determine which of the criteria on logistics service quality currently best suits the customer.

Table 4 presents the Sig. value of all the statements (ANOVA – ANalysis Of VAriance) for determining whether the statements are significantly different or not. A Sig. value less than 0.05 indicates a significant difference between the importance of the criteria. A Sig. value greater than 0.05 means that there is no statistically significant difference between the criteria scores.

Table 4. SERVQUAL statements Sig. values (source: compiled by authors)

Criterion		Sig. values	
		Expectations	Perception
Tangibles			
V_1	well-maintained, cutting-edge equipment	0.000	0.004
V_2	comfortable working environment and infrastructure	0.000	0.004
V_3	neat, professional-looking staff	0.000	0.079
V_4	clear and correct company documents	0.095	0.053
Reliability			
V_5	delivering the logistics service as promised	0.461	0.113
V_6	sincere employee involvement in addressing customer problems	0.216	0.818
V_7	performing the service well the first time	0.367	0.192
V_8	service performance within the scheduled timeframe	0.919	0.130
V_9	presentation of documents, records, and other information with no errors	0.875	0.276
Responsiveness			
V_{10}	providing information to customers on the progress of the service / service already performed	0.062	0.661
V_{11}	fast, accurate customer service	0.075	0.812
V_{12}	staff readiness and willingness to provide services	0.012	0.730
V_{13}	staff readiness to respond to customer requests	0.348	0.519
Assurance			
V_{14}	the ability of employees to build trust with customers	0.035	0.000
V_{15}	the ability of employees to make their clients feel comfortable	0.003	0.579
V_{16}	consistent politeness from company employees	0.005	0.009
V_{17}	qualified staff that can answer all customer questions	0.024	0.054
Empathy			
V_{18}	company's individual attention to customers	0.047	0.167
V_{19}	employee's personalized services and attention to their clients	0.161	0.163
V_{20}	employee's focus on customer interest	0.008	0.090
V_{21}	employee's understanding of customer needs	0.002	0.023
V_{22}	logistics company's working hours	0.065	0.610

3.3.1. Expectation analysis

Calculating the ANOVA, see Appendix, it was found that the expectations for reliability do not differ between customers of logistics companies ($Sig. = 0.614$, greater than 0.05). On closer inspection of the other tests, the post hoc test values showed that there is no difference in the expectations of representatives of customers trading in the categories of everyday consumer goods and luxury goods, or those in everyday consumer goods and construction and other raw materials categories, or those in luxury goods and construction and other raw materials categories (all in pairs). Table 4 also shows that the importance of statements on all five criteria are equally significant (all $Sig.$ values were greater than 0.05). The highest score (comparing not only reliability but all 22 statements) is for the statement, “delivering the logistics service as promised”.

It can thus be concluded that reliability is an equally significant factor for all representatives from all of the product categories investigated. An essential criterion for the quality of logistics services is the ability to deliver the service as promised.

Respondents' lowest expectations were in terms of tangibles. It was ranked worst by businesses in construction and other raw materials (3.04). The ANOVA values calculated showed that customer expectations for logistics companies in terms of tangibles differ significantly ($Sig. = 0.000$, less than 0.05).

Post hoc tests showed a significant difference between the consumer goods category and the category of construction and other raw materials ($Sig. = 0.000$, less than 0.05) and between the luxury goods category and the category of construction and other raw materials ($Sig. = 0.000$, less than 0.05). Representatives of customers trading in the everyday consumer goods category and the luxury goods category rated tangibles statistically equally ($Sig. = 0.866$, greater than 0.05).

The importance of the first three statements on tangibles – “well-maintained, cutting-edge equipment”, “comfortable working environment and infrastructure”, and “neat, professional-looking staff” – is significantly different. For the categories of everyday consumer goods and luxury goods, these three criteria are equally statistically significant. Their importance is less significant for the construction and other raw materials category. Only one criterion, “clear and correct company documents”, is equally important for all representatives of customers trading in the three product categories. This means that, despite the lowest expectations for tangibles, logistics companies must ensure clear, correct presentation of documents to their customers.

The values obtained for the three remaining factors follow. In all three comparative categories, customer expectations for logistics companies in terms of responsiveness do not differ ($Sig. = 0.137$, greater than 0.05). Consequently, logistics companies may respond similarly to the demands of their customers.

Customer expectations for logistics companies in terms of assurance differ significantly ($Sig. = 0.003$, less than 0.05). This factor is ranked second-lowest after tangibles. Its importance differs only between the luxury goods category and the category of construction and other raw materials ($Sig. = 0.005$, less than 0.05) (post hoc test data).

Customer expectations for logistics companies in terms of empathy differ significantly ($Sig. = 0.006$, less than 0.05). However, after checking the post hoc test data, we found that empathy is rated statistically equally among all respondents (a difference is present for respondents working in the discarded product categories).

3.3.2. Perception analysis

The data in Table 4 suggests that logistics business customers are most satisfied with the quality of the responsiveness factor. The quality of this factor satisfied respondents in the category of everyday consumer goods the most. ANOVA and other post hoc tests showed that representatives from all of the categories were statistically equally satisfied with the responsiveness factor ($Sig. = 0.976$, greater than 0.05). Individual statements related to this factor and their $Sig.$ values also indicate that respondents' satisfaction with logistics services in terms of responsiveness is statistically equal. This shows that, at this time, logistics companies can best respond to customer needs, i.e. logistics companies' employees are prepared to provide customers with services, respond to their requests, keep them informed on the progress of the services, and so on.

The second-place factor, according to the respondents' satisfaction, is assurance. This factor's quality was also most highly-rated by respondents from the category of everyday consumer goods. Respondents' satisfaction with this factor differed significantly ($Sig. = 0.034$, less than 0.05). The values from the two tests, Bonferroni and Games-Howell, showed that satisfaction with this factor among respondents from the categories of everyday consumer goods and luxury goods was statistically significantly different ($Sig. = 0.041$ and $Sig. = 0.048$, less than 0.05). Representatives from the other categories are equally statistically satisfied with the quality of this factor.

Respondents are relatively satisfied with two criteria regarding assurance. Luxury companies are the least satisfied with employees' ability to establish a sense of trust with their customers. Thus, when it comes to working with luxury goods, assurance is a crucial factor in the quality of logistics services.

Logistics companies' customers are least satisfied with the quality of the tangibles factor. However, this factor's importance to respondents in terms of expectations is also the least significant, which may mean they are less likely to value their satisfaction. The least satisfaction with this factor was found among companies engaged in luxury goods. Logistics companies should, therefore, pay more attention to their existing infrastructure, work environment, and staff and improve the quality of these indicators.

Respondents' satisfaction with tangibles differed significantly ($Sig. = 0.009$, less than 0.05). However, differences in satisfaction are only found between the categories of everyday consumer goods and luxury goods ($Sig. = 0.012$, less than 0.05) (post hoc test data). According to separate criteria for the tangibles factor, respondents are not equally satisfied with the following criteria, which determine the quality of logistics services: "well-maintained, cutting-edge equipment" and "comfortable working environment and infrastructure". Businesses working with luxury goods are the least satisfied with the quality of these two criteria. Thus, to satisfy companies working in luxury goods, logistics service providers need to have modern equipment, as well as a working environment and infrastructure that corresponds to customer needs.

Respondents' satisfaction with the quality of the remaining two factors, reliability and empathy, is not statistically different ($Sig. = 0.314$ and $Sig. = 0.212$, greater than 0.05).

3.3.3. Gap analysis

Figure 2 shows the mean values of the gaps between expectations and perceptions for each factor of the SERVQUAL model. If the value is negative, then customer expectations exceed the quality of service currently received. If the value is positive, customer needs are met in a manner that surpasses expectations (or ranking of importance).

The largest gap between the three categories of goods compared was between customer expectations and perceptions in terms of reliability in logistics services. The overall difference between representatives' expectations and perceptions in all three product categories is -3.85 .

As a result, the study identifies the largest gap between the logistics service providers' ability and customer needs in the following areas: delivering the logistics service as promised, performing the service well the first time, and doing so within the scheduled timeframe. These criteria were the least satisfying. Respondents were satisfied with only one of the criteria for quality of the logistics services: "presentation of documents, records, and other informa-

tion with no errors". This means that logistics companies provide their customers with correct and error-free documentation.

The smallest gap between customer expectations and perceptions in logistics services quality is in tangibles. As shows the Table 5, the lowest level of satisfaction with this factor is in the luxury goods category (-0.77). However, companies working with construction and other raw materials identified this single factor as surpassing their expectations in terms of satisfaction (0.48). Thus, for companies working in construction and other raw materials, the relevant criteria, "well-maintained, cutting-edge equipment", "comfortable working environment and infrastructure", and "neat, professional-looking staff" are the least important factors in determining the quality of logistics services.

The remaining three factors, responsiveness, assurance, and empathy, all have negative values, meaning that logistics companies are unable to meet the needs of these customers fully.

More significant observations include the quality of the two assurance criteria: "the ability of employees to make their clients feel comfortable" and "consistent politeness from company employees". These criteria were more satisfying than expected among companies in the construction and other raw materials category. Hence, courtesy among employees and their ability to create a sense of comfort are of little importance to companies in the category of construction and other raw materials. This is unlike companies in the luxury goods category, which consider the ability to build trust in logistics companies in order to outsource storage, transportation, etc. of expensive goods as very important.

Quality for one of the empathy factors, "understanding customer needs", is equally statistically significant to all representatives of customers trading in the comparative product categories. In addition, the gap size between expectations and perceptions in terms of this factor's quality is the greatest. As such, logistics companies are unable to understand and meet all customer needs fully.

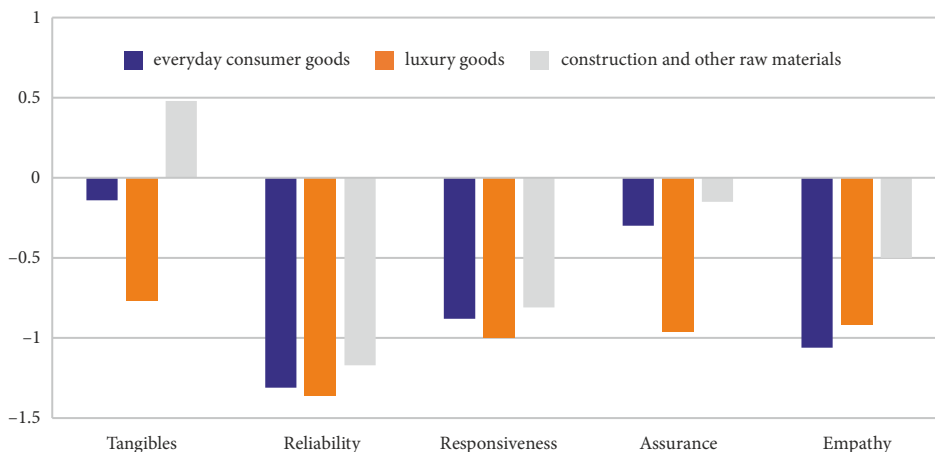


Figure 2. Mean values of the gaps by product category (source: compiled by authors)

Table 5. SERVQUAL criteria meaning (total and average) (source: compiled by authors)

Criteria	Gap		
	Everyday consumer goods	Luxury goods	Construction and other raw materials
Tangibles	-0.14	-0.77	0.48
Reliability	-1.31	-1.36	-1.17
Responsiveness	-0.88	-1.01	-0.81
Assurance	-0.30	-0.96	-0.15
Empathy	-1.06	-0.92	-0.50
In total:	-3.69	-5.02	-2.15
Average:	-0.74	-1.00	-0.43

The study found the largest gap between expectations and reported perceptions among the representatives of customers in the luxury goods category (-5.02). This shows that their satisfaction with the quality of logistics services is the lowest, compared to their own expectations.

The smallest gap was found between customer representatives from the category of construction and other raw materials (-2.15). This shows that their satisfaction with the quality of logistics services is the highest, compared to their own expectations.

From this analysis, we can confirm that the third hypothesis (H_3) is accurate: representatives of customers trading in different categories of goods are not equally satisfied with the quality of logistics services. Therefore, logistics companies do indeed need to tailor their services to the needs of companies in different product categories.

Other hypotheses that have been confirmed:

- H_4 : representatives of customers trading in different categories of goods are not equally satisfied with the quality of the tangibles factor;
- H_7 : representatives of customers trading in different categories of goods are not equally satisfied with the quality of the assurance factor.

Hypotheses rejected:

- H_5 : representatives of customers trading in different categories of goods are not equally satisfied with the quality of the reliability factor. Consequently, respondents' satisfaction with the quality of the reliability factor is not statistically different (or their satisfaction is statistically equal) among the representatives of all three categories of goods compared;
- H_6 : representatives of customers trading in different categories of goods are not equally satisfied with the quality of the responsiveness factor. Consequently, the respondents' satisfaction with the quality of the responsiveness factor is not statistically different (or their satisfaction is statistically equal) among the representatives of all three categories of goods compared;
- H_8 : representatives of customers trading in different categories of goods are not equally satisfied with the quality of the empathy factor. Consequently, respondents' satisfaction with the quality of the empathy factor is not statistically different (or their satisfaction is statistically equal) among the representatives of all three categories of goods compared.

3.3.4. Overall importance of logistics services

During the survey, respondents were asked to collectively evaluate five logistics service quality criteria: “good/clear visibility of logistics service elements”, “logistics service provider’s ability to deliver the promised service on time the first time”, “the ability of the logistics service provider’s staff to serve the client and deliver service urgently”, “the logistics service provider’s ability to establish a sense of trust and confidence”, “caring and individual attention of the logistics company staff to each customer”. The rating ranged from 1 (least important) to 5 (most important). Figure 3 and Table 6 presents the results of this evaluation. Only the most important rating, 5 points, is analysed. Figure 3 shows the number of respondents from each product category who rated each statement by 5 points. Table 6 represents these values converted into percentages.

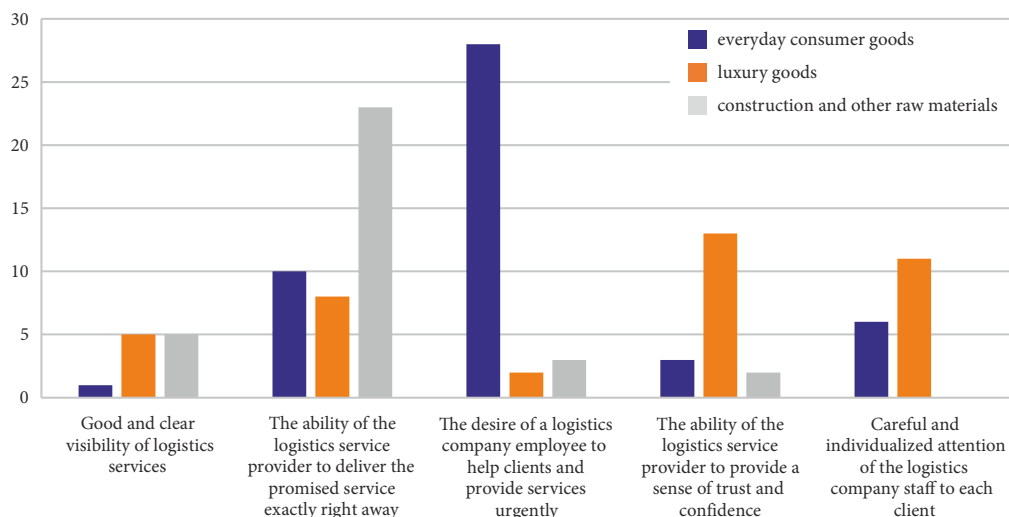


Figure 3. Overall ranking of logistics service criteria by importance (source: compiled by authors)

The Kruskal–Wallis test examined whether there was a difference in the assessment of each item in the comparative product categories. Respondents equally statistically rated “good/clear visibility of logistic service elements” (*Sig.* = 0.053, greater than 0.05) and “caring and individual attention of the logistics company staff for each customer” (*Sig.* = 0.154, greater than 0.05).

The importance of three criteria – “the logistics service provider’s ability to deliver the promised service on time the first time”; “the ability of the logistics service provider’s

staff to serve the client and deliver service urgently”, and “the logistics service provider’s ability to establish a sense of trust and confidence” – was statistically different among respondents.

Table 7 shows the values obtained by averaging the significance and importance of each gap in the SERVQUAL model. For example, the first value, –0.003, was obtained by multiplying the mean of the gap and the importance as a percentage ($-0.14 \cdot 2.1\% = -0.003\%$).

Table 6. Overall ranking of logistics service criteria by importance (percentage) (source: compiled by authors)

Criterion	Most important (5) [%]			
	Everyday consumer goods	Luxury goods	Construction and other raw materials	The overall importance of the criterion
Good/clear visibility of logistics service elements	2.1	12.8	12.5	9.1
Logistics service provider’s ability to deliver the promised service on time the first time	20.8	20.5	57.5	32.9
Ability of the logistics service provider’s staff to serve the client and deliver service urgently.	58.3	5.2	7.5	23.7
Logistics service provider’s ability to establish a sense of trust and confidence	6.3	33.3	5.0	14.9
Caring and individual attention of the logistics company staff for each customer	12.5	28.2	17.5	19.4
In total	100.0	100.0	100.0	100.0

Table 7. “Weights” for average gap values and overall values for logistics service quality (source: compiled by authors)

Criterion	Most important (5)								
	Everyday consumer goods			Luxury goods			Construction and other raw material		
	Importance [%]	Gap average	Value	Importance [%]	Gap average	Meaning	Importance [%]	Gap average	Value
Good/clear visibility of logistics service elements	2.1	–0.14	–0.003	12.8	–0.77	–0.099	12.5%	0.48	0.060
Logistics service provider’s ability to deliver the promised service on time the first time	20.8	–1.31	–0.273	20.5	–1.36	–0.280	57.5%	–1.17	–0.673
Ability of the logistics service provider’s staff to serve the client and deliver service urgently	58.3	–0.88	–0.513	5.2	–1.01	–0.052	7.5	–0.81	–0.061
Logistics service provider’s ability to establish a sense of trust and confidence.	6.3	–0.30	–0.019	33.3	–0.96	–0.318	5.0	–0.15	–0.007
Caring and individual attention of the logistics company staff for each customer	12.5	–1.06	–0.133	28.2	–0.92	–0.261	17.5	–0.50	–0.088
In total	100.0	–3.69	–0.941	100.0	–5.02	–1.009	100.0	–2.15	–0.769

With a significance of -0.513 , the responsiveness factor is the most important for the everyday consumer goods category. For the luxury goods category, it is the factor of assurance with a significance of -0.318 . Respondents in the category of construction and other raw materials consider reliability to be the most important factor with a significance of -0.673 .

By comparing all five criteria – tangibles, reliability, responsiveness, assurance, and empathy – we can see that reliability is the most important factor for the quality of logistics services among logistics companies' customers with an overall ranking of 32.9% (Table 6). The least significant factor is Tangibles, with a ranking of 9.1%.

Conclusions and suggestions

In order to evaluate the quality of logistics services in Lithuanian companies, a survey was conducted to determine the expectations of logistics companies' customers and their satisfaction with the quality of services. The quality of five factors from the SERVQUAL model – tangibles, reliability, responsiveness, assurance, and empathy – were surveyed among respondents from three product categories: everyday consumer goods, luxury goods, and construction and other raw materials.

The investigation found that logistics companies' customers have the highest expectations for reliability and the lowest for tangibles. Logistics companies' customers are also most satisfied with the quality of reliability. This means that even if companies that outsource logistics services to third parties have the highest demands for reliability, they still rank their satisfaction with reliability the highest.

When the expectations for service quality were compared, it was found that logistics companies' customers rank their expectations for all factors above the quality actually obtained. This means that logistics companies are not able to meet all customer needs fully.

After analysing the overall assessment data for tangibles, it was found that clear, correct presentation of documents has the greatest impact on the quality of logistics services. In terms of reliability, the logistics company's ability to perform the service well the first time, in the timeframe given, and as promised was found to be most important to the logistics outsourcing company. Analysis of the responsiveness factor showed that logistics companies' customers consider being provided with service quickly and accurately is of the utmost importance. Analysis of evaluation data on the assurance factor shows that the quality of logistics services is primarily influenced by the logistics company's personnel being qualified and able to answer all of the customer's questions. After evaluating the empathy factor, it was found that respondents value logistics companies' employees who understand their customers' needs.

In order to determine which of the SERVQUAL model's five factors is most important in assessing the quality of the logistics service, an overall analysis of the logistics service evaluation was conducted for each category of goods. The results were compared to the gap values, and the most important factors for customer satisfaction were obtained. The willingness of the logistics company's employees to assist their customers and provide their services promptly (that is, responsiveness) was identified as a key element for the everyday consumer goods category. For the luxury goods category, the most important factor was assurance – having confidence in the logistics company. Representatives from the category of construction and other raw materials want all materials to be delivered on time the first time, as promised (reliability).

By comparing all five factors from the SERVQUAL model – tangibles, reliability, responsiveness, assurance, and empathy – reliability was found to be the most important factor in the overall quality of logistics services among all logistics companies' customers. Thus, logistics companies should focus on improving the reliability of their services to best meet the needs of their different customers.

To conclude with, the results of the conducted study are important from the point of view of methodological knowledge and practical application. Application of SERVQUAL methodology in case of multitude companies reveals sectoral competitiveness and attractiveness of logistics services to different categories of customers. Based on that, strategic decisions related to expansion of logistics services to target markets can be implemented. The same studies conducted periodically would show exact changes in customer's expectations, and even in current conditions of world-wide pandemic would reveal new customer's expectations towards the logistics services they are looking for.

Author contributions

Ieva Meidutė-Kavaliauskienė and Virgilija Vasilienė-Vasiliauskienė conceived the study and were responsible for the design and development of the data analysis.

Ieva Meidutė-Kavaliauskienė, Aidis Vasilis Vasiliauskas and Virgilija Vasilienė-Vasiliauskienė were responsible for data collection and analysis.

Virgilija Vasilienė-Vasiliauskienė was responsible for data interpretation.

Ieva Meidutė-Kavaliauskienė wrote the first draft of the article.

Virgilija Vasilienė-Vasiliauskienė was responsible for investigation and resources.

Virgilija Vasilienė-Vasiliauskienė and Ieva Meidutė-Kavaliauskienė were responsible for writing – review and editing.

Appendix. ANOVA results

		Sum of squares	df	Mean square	F	Sig.
Tangibles (E)	between groups	16.772	4	4.193	9.003	0.000
	within groups	67.063	144	0.466		
	total	83.835	148			
Reliability (E)	between groups	0.393	4	0.098	0.670	0.614
	within groups	21.121	144	0.147		
	total	21.514	148			
Responsiveness (E)	between groups	1.694	4	0.424	1.774	0.137
	within groups	34.382	144	0.239		
	total	36.076	148			
Assurance (E)	between groups	7.640	4	1.910	4.219	0.003
	within groups	65.195	144	0.453		
	total	72.835	148			
Empathy (E)	between groups	4.233	4	1.058	3.811	0.006
	within groups	39.983	144	0.278		
	total	44.216	148			
Tangibles (P)	between groups	5.905	4	1.476	3.493	0.009
	within groups	60.856	144	0.423		
	total	66.761	148			
Reliability (P)	between groups	2.817	4	0.704	1.199	0.314
	within groups	84.588	144	0.587		
	total	87.405	148			
Responsiveness (P)	between groups	0.289	4	0.072	0.118	0.976
	within groups	88.209	144	0.613		
	total	88.497	148			
Assurance (P)	between groups	5.253	4	1.313	2.674	0.034
	within groups	70.715	144	0.491		
	total	75.968	148			
Empathy (P)	between groups	2.944	4	0.736	1.477	0.212
	within groups	71.734	144	0.498		
	total	74.678	148			

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