
**Evaluation of Logistics Service Quality Using the Zone of Tolerance (ZOT) Method:
An Empirical Study of a Local Logistics Transportation Company in Makassar,
Indonesia**

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Abstract

As a maritime country, Indonesia requires an integrated logistics transportation system to support both domestic and international trade activities. This study aims to evaluate logistics service quality in a local logistics transportation company in Makassar using the Zone of Tolerance (ZOT) approach. The study investigates customer satisfaction levels, maps service quality attributes, and identifies attributes experiencing stagnation or decline in service quality. The research adopts a quantitative approach through questionnaire distribution based on SERVQUAL dimensions, namely tangibles, reliability, responsiveness, assurance, and empathy. The instrument measures perceived service, desired service, adequate service, and the importance level of each service attribute. Data were analyzed using the Zone of Tolerance (ZOT) method through the calculation of Measure of Service Adequacy (MSA), Measure of Service Superiority (MSS), and ZOT values. The findings indicate that thirteen service attributes have met customer expectations or are within the tolerance zone, while seven attributes remain below the minimum acceptable service level and require immediate improvement. The priority attributes include cleanliness and comfort of facilities, employee appearance, completeness of office equipment, packaging availability, shipment coverage area, tracing facilities, and communication accessibility. The study highlights the importance of continuous service quality improvement to enhance customer satisfaction and competitiveness in the increasingly dynamic logistics industry.

INTRODUCTION

As a maritime nation, Indonesia requires the support of an integrated logistics transportation system. This condition underlies the issuance of Presidential Regulation No. 26 of 2012 concerning the Development of the National Logistics System. One of the important points emphasized in the regulation is the development of integrated logistics transportation service systems and logistics service providers that are locally integrated and globally connected (Government of Indonesia, 2012). This issue is highly important because logistics transportation services play a vital role in the circulation of both domestic and international trade. Transportation services connect local and global supply chains.

To support the vision of Indonesia Logistics 2025, which aims to establish a logistics system that is locally integrated and globally connected to improve national competitiveness and social welfare, one of the primary missions emphasized is the development of high-quality and world-class logistics transportation services. In this regard, it is necessary to conduct a comprehensive and integrated evaluation of the current logistics transportation service system, considering that logistics service performance in developing countries generally lags behind that of developed nations.

In conducting this comprehensive study, the research framework is constructed through detailed and distributed analyses beginning from the lowest structural level as a roadmap to comprehensively identify existing problems. One of these

fragmented studies is the evaluation of local logistics transportation service industries as the foundational structure for systematically identifying logistics service problems. Measuring service quality performance in the service industry presents its own challenges due to continuously changing customer preferences over time. Problems arise when companies fail to identify and map service quality weaknesses, such as determining the extent to which service quality attributes provide customer satisfaction and identifying which attributes require improvement.

Several issues that require confirmation include clean and comfortable service facilities, limited packing capacity, restricted shipment coverage areas, and the absence of tracing facilities. Problems and challenges related to logistics service performance are crucial to anticipate because customer behavior has changed significantly. Customers can now access detailed information regarding products and services openly and compare them in real time (Ocicka & Raźniewska, 2016). Consequently, logistics transportation service industries are encouraged to continuously evaluate and improve their service performance in order to enhance competitiveness and growth opportunities.

Customers play an important role in evaluating service performance because they directly interact with and empirically experience the service quality delivered. Naturally, diverse perceptions arise among users due to human subjectivity. In response to this issue, service evaluation studies, particularly in logistics transportation

services, may be conducted using various approaches and methodologies.

This study presents an empirical investigation of a local logistics transportation company in Makassar that has operated for more than twenty years and currently handles more than three hundred service transactions. The study formulates several research questions, including: (1) How satisfied are customers with the services provided? (2) How are service quality attributes mapped? and (3) Which service quality attributes experience stagnation or decline? These research problems are reflected in the study objectives, namely: mapping service quality levels, identifying service attributes that fail to meet customer expectations, and formulating responsive recommendations for service quality improvement in accordance with current developments.

This study was developed through a literature review related to the research object and relevant methodologies for constructing problems and developing solutions. Studies concerning Logistics Service Quality (LSQ) generally refer to the SERVQUAL or SERVPERF methods. Several researchers have further developed these approaches by not only measuring service quality dimensions but also developing models aimed at achieving customer satisfaction (Gulc, 2017).

The SERVQUAL method has been widely applied in various service quality studies. In the logistics transportation service industry, several studies have been conducted by Khabir and Faisal (2016), Yeo, Thai, and Roh (2015), Bobak, Pivodova, and Polakova (2013), Limbourg et al. (2016), and Li et al.

(2015). The development and design of questionnaires based on SERVQUAL attributes for Logistics Service Quality (LSQ) enable the mapping of service quality attributes according to customer perceptions.

Data processing and analysis in this study were conducted using the Zone of Tolerance (ZOT) approach. The Zone of Tolerance method measures three aspects of service quality: the current level of service quality perceived by customers (perceived service), the level of service quality expected by customers (desired service), and the minimum acceptable level of service quality tolerated by customers (adequate service) (Rukmi et al., 2009). This method is widely used in service quality studies because it effectively maps acceptable quality ranges, thereby assisting industries in prioritizing service attributes that require improvement while enhancing operational efficiency.

Recent studies applying this approach have expanded into various sectors such as information systems (Gorla, 2012), healthcare services (Shen et al., 2020), service recovery (Hogreve et al., 2017), and B2B service quality (Ho et al., 2015).

RESEARCH METHOD

This study was conducted at a logistics transportation service company in Makassar. Data collection was carried out by identifying service attributes through literature reviews and field observations based on SERVQUAL dimensions. The SERVQUAL model was developed into a questionnaire as the research instrument for data processing and analysis.

The questionnaires were distributed to respondents who met the criteria of having previously used the logistics services being analyzed. The questionnaire consisted of closed-ended questions, meaning respondents selected answers from predefined options for each statement or question. The number of respondents was determined using sampling techniques and referred to the Central Limit Theorem based on a population of 320 service users.

The questionnaire design was intended to measure the current service quality perceived by customers (perceived service), the service quality desired by customers (desired service), the minimum acceptable service quality (adequate service), and the importance level of each service quality attribute (<https://www.leveons.id/insight/data-driven-decision-making>).

The collected questionnaire data were processed and analyzed using the Zone of Tolerance (ZOT) method. Zone of Tolerance refers to the area between desired service as the upper limit and adequate service as the lower limit. If perceived service falls above the ZOT area, it indicates that the service quality meets customer expectations. Conversely, if perceived service falls below the ZOT area, the service quality fails to meet customer expectations, implying customer dissatisfaction (Kettinger & Lee, 2005).

The Zone of Tolerance values were calculated using the following formulations:

1. Measure of Service Adequacy (MSA) = Perceived Service – Adequate Service

2. Measure of Service Superiority (MSS) = Perceived Service – Desired Service

3. Zone of Tolerance (ZOT) = Desired Service – Adequate Service

The resulting MSS, MSA, and ZOT values were subsequently used to determine the current service position through the following calculations:

1. Current Service Position = Perceived Service – Adequate Service

2. MSS Position = ZOT – MSS

3. MSA Position = ZOT – MSA

Based on these calculations, service quality conditions were categorized into three major conditions:

1. Current logistics service quality meets customer expectations when service quality values are above MSS values.

2. Current logistics service quality is unsatisfactory when service quality values are below MSA values.

3. Current logistics service quality falls between MSS and MSA values, indicating that customers are relatively satisfied although their expectations have not been fully achieved.

Following data analysis, the researchers mapped service quality levels, identified service attributes that failed to meet customer expectations, and formulated recommendations for responsive service quality improvements.

Research Attributes

Research attributes were developed from literature reviews and field studies based on the five SERVQUAL dimensions.

Research Instrument

Before distributing the questionnaire to respondents, validity and reliability tests were conducted using 30 respondents as pilot samples.

Validity Test

The validity test aimed to determine the extent to which the measuring instrument accurately measures what it is intended to measure. A valid questionnaire indicates that it effectively functions as a data collection instrument capable of exploring the research problems. The effectiveness was based on the assumption that the questionnaire was easy to understand and answer by respondents.

Validity testing was conducted on Adequate (A), Perceived (P), and Desired (D) statements. The calculated correlation values (r -count) for all attributes were compared with the r -table value (0.361). Service quality attributes were considered valid if r -count exceeded r -table. The test was performed by correlating each statement item with the total score from 30 pilot respondents at a significance level of 5% or a confidence level of 95% (<https://www.leveons.id/insight/data-driven-decision-making>).

The validity test results indicated that the measurement indicators were appropriate for use as research instruments, enabling further data processing based on SERVQUAL dimensions.

Reliability Test

Reliability refers to the consistency and trustworthiness of the instrument in collecting reliable data. A research instrument is considered

reliable if it has a Cronbach's Alpha value greater than 0.60.

The reliability test results for the 20 statement attributes demonstrated that all Cronbach's Alpha values exceeded 0.60. These findings indicate that the research indicators used in the questionnaire are reliable and capable of consistently measuring each operationalized dimension to reveal the research problems. Reliability is important because respondents possess diverse characteristics and perceptions.

RESULTS AND DISCUSSION

After the research instrument met validity and reliability requirements, questionnaires were distributed to service users to measure respondent perceptions regarding three indicators: minimum service performance, current perceived service performance, and expected service improvement.

Calculation of Adequate, Perceived, and Desired Values

The initial findings present the average recapitulation results of the questionnaires for the three indicators used in the Zone of Tolerance analysis.

Based on the analysis, the tangibles dimension showed an average desired value of 3.54, which was higher than the perceived value of 2.60. The adequate service value was 2.10. This indicates that the current service performance has not yet met customer expectations, although it remains above the minimum acceptable level.

A similar condition occurred in the reliability dimension, where the perceived value (2.51) was lower than the desired value (3.60), although still above the adequate level (2.07).

In contrast, the responsiveness dimension demonstrated a perceived value (3.37) higher than the desired value (3.33), indicating customer satisfaction because the service performance exceeded expectations.

The assurance and empathy dimensions showed patterns similar to tangibles and reliability. In the assurance dimension, the desired value was 3.86 while the perceived value was 3.55, indicating that customer expectations had not yet been fully achieved despite service performance remaining above the adequate level (2.41). Similarly, the empathy dimension showed a desired value of 3.34, exceeding the perceived value of 3.13.

Calculation of MSA, MSS, and ZOT

Values

The analysis revealed varying ZOT values across SERVQUAL dimensions.

In the tangibles dimension, the highest ZOT value was found in attribute A3 regarding complete and adequate office equipment to support services, while the lowest ZOT value was found in attribute A4 concerning the availability of packaging in various sizes.

Within the reliability dimension, the highest ZOT value was observed in the accessibility of company communication channels, while the lowest was associated with delivery punctuality.

In the responsiveness dimension, the highest ZOT value related to employees' willingness to contact customers when problems occurred, whereas the lowest related to prompt complaint handling.

The assurance dimension showed the highest ZOT value for compensation or Money Back Guarantee (MBG) policies, while the lowest related to delivering goods in the same condition as initially received.

Finally, within the empathy dimension, the highest ZOT value was associated with polite responses to complaints, while the lowest related to friendliness in answering customer questions.

Mapping of Service Positions

The mapping results of MSA positions, MSS positions, and current service positions in the Zone of Tolerance revealed three categories:

1. Customers were satisfied when current service positions exceeded MSS positions. This condition occurred in attributes related to employees' ability to provide information, willingness to contact customers regarding problems, and polite responses to customer complaints. These service efforts should be maintained.
2. Several attributes fell within the tolerance zone, meaning customers were relatively satisfied but not maximally satisfied. These attributes included transportation variations, strategic location, delivery punctuality, billing accuracy, complaint responsiveness, compensation guarantees, office and warehouse security, delivery accuracy, patience in listening to complaints, and friendliness in answering customer questions. Although improvement is

necessary, these attributes were not considered top priorities.

3. Customers were dissatisfied when current service positions fell below MSA positions. Seven attributes requiring immediate improvement were identified: clean and comfortable facilities, employee appearance, adequate office equipment, packaging availability, shipment coverage area, tracing services, and accessible communication channels.

Priority Service Attributes for Improvement

The service quality mapping identified seven priority attributes requiring immediate improvement. Four attributes originated from the tangibles dimension and three from the reliability dimension. Priority scales were determined by calculating the gap between desired service and perceived service values. Attributes with the largest negative gaps were prioritized for improvement.

Recommendations for Service Quality Improvement

The analysis results indicate that seven service quality attributes should become priorities for improvement. This situation presents both opportunities and challenges in the modern era, where customers are increasingly critical and capable of accessing open information regarding alternative logistics service providers.

Improving these attributes is essential considering recent findings indicating that customer service quality and satisfaction significantly influence customer loyalty (Wardhani et al.,

2020). Furthermore, other studies suggest that honesty, trustworthiness, friendliness, and politeness are important attributes that should be adopted in improving logistics service quality (Hermanto & Wiratmani, 2019).

CONCLUSION

The study findings demonstrate that overall service quality has generally met customer expectations, with thirteen attributes categorized as meeting customer expectations. Among these, three attributes exceeded customer expectations, while ten attributes remained within the tolerance zone, indicating relative customer satisfaction despite not fully meeting expectations.

However, seven service attributes require immediate attention and improvement by logistics transportation service providers. These attributes were perceived by customers as unsatisfactory and even below the minimum acceptable service level. Based on these findings, several recommendations can be proposed to improve future service quality, including expanding shipment coverage areas, providing packaging facilities in various sizes, implementing real-time tracing systems, improving communication accessibility and responsiveness, and enhancing employee appearance and professionalism.

This study remains limited to a single logistics service company. Therefore, future research opportunities remain open for broader investigations involving multiple logistics service industries within similar sectors.

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