

Analysis of the Relationship Between Service Quality and Customer Satisfaction in the Stevedoring Process at Hatta Makassar (TPM) and Bitung (TPB) Container Terminal

Syanne Pangemanan¹, Sumarni H. Aly¹ and Muralia Hustim²

¹Doctoral Program Student, Department of Civil Engineering, Hasanuddin University, Indonesia

²Department of Civil/Environmental Engineering, Hasanuddin University, Indonesia

Keywords: Stevedoring, Container Terminal, Customer Satisfaction, Service Quality.

Abstract: This research is based on the phenomenon of several indicator of service quality and level of customer satisfaction in the stevedoring process at the Hatta Makassar (TPM) and Bitung (TPB) Container Terminal which is still below the standard of port operational service performance. This research aims to determine (1) the level of customer satisfaction with service quality in the stevedoring process at the Hatta Makassar (TPM) and Bitung (TPB) Container Terminal, and (2) service quality indicators that are a priority to be improved in the stevedoring process at the Hatta Makassar (TPM) and Bitung (TPB) Container Terminal. The research was carried out at the Hatta Makassar Container Terminal and Bitung Container Terminal. The methodology used in this research was descriptive research methods. The results showed (1) customer satisfaction in the stevedoring process at the Hatta Makassar (TPM) and Bitung (TPB) Container Terminal as a whole has been fulfilled with the quality of this service with a percentage of customer satisfaction level of 73.74%, and (2) Service indicators which according to service users are a priority for Hatta Makassar (TPM) and Bitung (TPB) Container Terminal to be improved, namely: container loading and unloading operator services, availability of loading and unloading facilities, dwelling time, transparent and compliant service fees, certainty of service hours, and illegal levies.

1 INTRODUCTION

Sea transportation is the backbone of world trade and encourages globalization, in line with the rapid development of the world economy which has brought the use of containers. The port is a node in the transportation network, as a gateway for economic activity, a place for transportation mode switching activities, supporting industrial trading activities, and a place for distribution, production and consolidation of cargo or goods. To serve various types of ships and all activities related to shipping and receiving goods through containers, a container terminal is needed. Construction and development of container terminals in the context of container services is a necessity and a demand for various ports in the world (Simbolon and Achmadi, 2012).

PT. Pelabuhan Indonesia IV is a State-Owned Enterprise engaged in port services that provides port facilities and infrastructure in order to support the smooth flow of ships, passenger transportation,

delivery of goods, and become one of the port centers in Eastern Indonesia which oversees several port branches and based in Makassar. Mission of PT. Pelabuhan Indonesia IV is to implement government program policies in the field of economy and development through port services, as well as to gain profits for companies by conducting port service businesses and other businesses that support the quality of port services, for example docks and other facilities for mooring, loading and unloading of goods, passenger transportation, loading and unloading equipment, as well as other services related to ship piloting and ship delaying. Hatta Makassar Container Terminal and Bitung Container Terminal are services in the port sector under PT. Indonesian Port IV, which functions to serve container loading and unloading activities, container stacking, container receiving or delivery, and other supporting activities.

Hatta Makassar Container Terminal and Bitung Container Terminal are one of the business segments of PT. Pelabuhan Indonesia IV (Persero) which is

engaged in loading and unloading containers from and to ships. The services provided are oriented to cost efficiency and time effectiveness as well as customer satisfaction, the improvement efforts are supported by the availability of modern facilities and equipment as well as implementing an international standard service system (ISO 9002: 1994 Certificate). In this research what is meant by stevedoring is an activity to unload goods from the ship to the dock, or vice versa loading from the dock to the ship. Freight port and the factors that influence the level of satisfaction of the freight port service, including waiting time and loading and unloading costs. Satisfaction targeted in this study relates to satisfaction with the service of imports and exports of goods. This research purpose is to analyze the relationship between service quality and the level of customer satisfaction in the stevedoring process at the container terminal, namely when unloading goods from ship to dock, and loading goods from dock to ship.

2 LITERATURE REVIEW

2.1 Container Terminal

According to Government Regulation No. 69 Tahun 2001 Pasal 1 ayat 1, concerning Ports, a port is a place consisting of land and surrounding waters with certain boundaries as a place for government activities and economic activities that are used as a place for ships to dock, dock, up and down. passengers and/or loading and unloading of goods equipped with shipping safety facilities and port support activities as well as a place for intra and intermodal transportation. According to Triatmodjo (1996), ports can be divided into several aspects of review, namely in terms of their operation, in terms of their operation, functions in national and international trade, in terms of their use and geographical location. Where the port of goods must have a dock equipped with facilities for loading and unloading of goods.

The container terminal is a port supporting facility that is engaged in loading and unloading of goods. Transport using containers allows goods to be combined into one in a container so that loading and unloading activities can be mechanized. This can increase the amount of cargo that can be handled so that loading and unloading times are faster. The container terminal is one of the transportation infrastructure that serves the loading and unloading of goods using ship transportation. Inside the container

terminal is supported by several facilities that are prepared to serve its customers. The components which are also the facilities of a container terminal in supporting the smooth handling of containers including loading and unloading in a container terminal are facilities and infrastructure. The facilities consist of the Port Pier, Container Stacking Field, Container Freight Service (CFS), Maintenance and Repair Shop, Control Tower, Ship Planning Center, and Weighting Bridge. Infrastructure consists of Gantry Crane, Saddle Carrier, Forklift, Sidelift, Roll Trailer, and Head Truck or Chassis.

2.2 Loading and Unloading Containers

According to the Decree of the Minister of Transportation of the Republic of Indonesia No. 33 of 2001 concerning the Organization and Operation of Sea Transportation, loading and unloading activities are activities of moving goods from sea transportation to land transportation modes and vice versa, which includes the following activities: (1) Stevedoring, which is an activity of moving goods from the ship's hold until the goods are released from the ship. slings on the pier or vice versa, and (2) Receiving and delivery; receiving is the activity of receiving goods from service users to the temporary storage area (CY), and delivery is the activity of withdrawing goods or sending goods from the temporary storage area (CY) to the service user's warehouse. Meanwhile, the activities of unloading and loading goods that do not go through the stacking place (warehouse or stacking yard) are: Truck Losing and Kade Losing.

2.3 The Concept of Customer Satisfaction on Service Quality

Creating customer satisfaction can bring a number of benefits, including seamless business-to-customer relationships, creating a sound basis for repeat purchases and customer loyalty, and forming word of mouth recommendations that benefit the company's business. Basically, the concept of customer satisfaction includes the difference between expectations and perceived performance or results.

2.4 Loading and Unloading Containers

Based on the Decree of the Minister of Administrative Reform No. KEP/25/M.PAN/2/2004 concerning General Guidelines for Compiling the Community Satisfaction Index, the service principle is developed into 14 (fourteen) relevant, valid, and

reliable dimensions, as the basic elements that must be fulfilled in measuring the satisfaction index are:

1. **Service procedures**, especially the ease of service steps, provide convenience and clarity of service flow to container port service users.
2. **Service requirements**, namely in particular the technical and administrative requirements needed to obtain container terminal services.
3. **Clarity of Service Officers**, namely the existence and certainty of service providers.
4. **Discipline of Service Officers**, namely the seriousness of officers when providing services, especially to the consistency of working time.
5. **Responsibilities of Service Officers**, namely clarity of authority and responsibility of officers in managing service performance.
6. **Ability of Service Officers**, namely the qualifications and skills of agents to provide or complete services to container port service users.
7. **Speed of Service**, namely the target service time can be completed within the time specified by the container terminal.
8. **Fairness in Service Reception**, namely the implementation of services without distinguishing the class or status of service users served at the container terminal.
9. **Politeness and Friendliness of Officers**, in particular the attitudes and behavior of officers in providing services to users in a polite and friendly manner as well as mutual respect and appreciation.
10. **Fairness of Service Charges**, in particular the accessibility of service users to the rates determined by the container terminal.
11. **Cost Certainty**, which has determined the adequacy between the fees paid by the service user and the fees charged.
12. **Service Guarantee**, especially the implementation of service time, in accordance with the requirements set by the container terminal.
13. **Environmental Comfort**, namely the condition of clean, orderly and orderly service facilities and infrastructure so as to provide a sense of comfort to service recipients.
14. **Service Security**, namely ensuring the level of environmental security of the facilities used, so that service users feel comfortable in receiving services against the risks posed by service performance.

3 RESEARCH METHODS

3.1 Research Methods

This research is a quantitative and qualitative type with surveys and direct field observations because it has the final result, namely knowing how big the level of customer satisfaction is with service performance. The survey was carried out using a questionnaire as the data collection instrument. The aim is to obtain information about a number of respondents who are considered representative of a particular population. While the observation is that the researcher goes directly to the field to record systematically, and can control its reliability (reliability) and validity (validity), with the support of secondary data. The data is then analyzed to get a conclusion.

3.2 Location and Time Research

The research location which is the object of research is the Port of Indonesia (PT. Pelindo) Region IV, namely at the Hatta-Makassar Container Terminal in South Sulawesi, and the Bitung Container Terminal in North Sulawesi. The time of the study was carried out for 4 months. Implementation of a preliminary survey through interviews and observations. The reason for choosing the location of Hatta Makassar Container Terminal and Bitung Container Terminal is because the two Container Terminals are the largest in PT. Pelindo IV. Another reason is that the number of service users and the flow of goods at the two container terminals continues to increase.

3.3 Data Collection Techniques

Each paper must have an abstract. The abstract should appear justified, with a linespace exactly of 11-point, a hanging indent of 2-centimeters, spacing before of 12-point and after of 30-point, and font size of 9-point. The sentence must end with a period.

3.4 Data Collection Techniques

The population in this study were all customers of the Hatta Makassar Container Terminal and the active Bitung Container Terminal, which totaled 54 companies/person. The sample is part of the number and characteristics possessed by the population. The sample which is part of the population in this study from the results of calculations using the slovin formula amounted to 35 used as respondents. The sampling method used in this study is non-probability sampling using accidental sampling technique. The

reason researchers use this method is because it is faster and because of the limited time of the study. The research population that is being targeted in this research is the users and management of the container terminal authority.

3.5 Data Collection Stages

The data collection method used in this research is the survey method. The survey method used is Interview, Questionnaire and Literature Study. To collect research data, a research instrument is used in the form of a questionnaire consisting of questions about service quality, customer satisfaction and the correlation between service quality and customer satisfaction which is composed of 14 dimensions and 36 indicators. Data was obtained by distributing questionnaires to customers who use the services of the Hatta Makassar Container Terminal and Bitung Container Terminal.

3.6 Data Collection Stages

The initial research conducted was by literature study. The method in this research is planned to use qualitative and quantitative methods at the research site. Qualitative methods are data that only classify, for example the classification of container port service levels based on service quality and customer satisfaction, namely physical appearance - tangible, reliability, responsiveness, assurance, and empathy. So that the output can be presented in the form of a percentage of each element. Quantitative method is an objective description based on research results or data in the form of numbers. In this case, the importance of service and the quality of service performance is ranked using 5 (five) points, namely:

Table 1: Rating and performance service quality.

No.	Answer	Weight
1	Very Important	5
2	Important	4
3	Quite Important	3
4	Less Important	2
5	Not Important	1

Meanwhile, the level of performance/customer satisfaction aspect of container terminals is ranked using a 5 (five) point scale, namely:

Table 2: Rating aspects of performance/customer satisfaction.

No.	Answer	Weight
1	Very Good / Very Satisfied	5
2	Good / Satisfied	4
3	Fairly Good / Fairly Satisfied	3
4	Less Good / Less Satisfied	2
5	Not Good / Not Satisfied	1

In this research there are 2 (two) variables represented by the letters X and Y, where X is the level of performance of the container terminal (quality of service) that provides customer satisfaction and Y is the level of customer interest (customer satisfaction).

3.7 Data Analysis Technique

3.7.1 Validity Test

Validity test is a test step that is carried out on the contents of an instrument (questionnaire) to measure the accuracy of the instrument used in research. So that, the validity of an instrument is related to the level of accuracy of the measuring instrument in research. To find the value of validity, that is by correlating the score of the instrument items with the *Pearson Product Moment* formula as follows:

$$r_{xy} = \frac{n \sum_{i=1}^n x_i y_i - \sum_{i=1}^n x_i \sum_{i=1}^n y_i}{\sqrt{\left(n \sum_{i=1}^n x_i^2 - \left(\sum_{i=1}^n x_i \right)^2 \right) \left(n \sum_{i=1}^n y_i^2 - \left(\sum_{i=1}^n y_i \right)^2 \right)}}$$

Figure 1: Formula to find the value of validity.

Where,

- rx_y = Correlation Coefficient / rcount
- ∑x = Total score of each item
- ∑y = Total score (all items)
- N = Number of Respondents

In this research, the instrument validity was calculated using Microsoft Excel with a significance level of 0.05 (*Pearson Product Moment Correlation*). The criteria for testing the validity of this research are as follows:

1. If $r_{count} \geq r_{table}$, then the instrument or item in the question has a significant correlation with the total score, meaning that the question is declared valid.
2. If $r_{count} \leq r_{table}$, then the instrument or item in the question is not significantly correlated with the total score, meaning that the question is declared invalid.

3.7.2 Importance Performance Analysis (IPA)

The analysis carried out is the level of suitability of importance and performance, different tests and priority mapping is carried out with IPA. The data that has been obtained from the questionnaire is analyzed with Importance Performance Analysis (IPA) to obtain the level of conformity between the performance of container services and respondents' expectations of container services. Provided that the service satisfaction of Makassar and Bitung Container Terminals was the level of compatibility between the performance of the Hatta Makassar Container Terminal and Bitung Container Terminal on the level of interest/expectations of service users or consumers. To get the level of conformity use the following formula:

$$\bar{X} = \frac{\sum_{i=1}^N X_i}{K} \text{ dan } \bar{Y} = \frac{\sum_{i=1}^N Y_i}{K}$$

Figure 2: Formula to get the level of conformity.

Where:

- Tki= Respondent Suitability Level
- Xi = Performance Assessment Score
- Yi = Interest rating score

After getting the level of conformity, then calculate the average of all variables of importance and performance which are the limits in the Cartesian diagram. Where the elaboration of each variable is carried out using the following formula:

$$T_{ki} = \frac{X_i}{Y_i} \times 100 \%$$

Figure 3: Formula for elaboration of each variable.

Where,

- \bar{X} = Average score of performance level
- \bar{Y} = Average score of importance level
- N = Number of respondents
- K = Number of variables that can affect service user satisfaction

3.7.3 Customer Satisfaction Index (CSI) Analysis

In the analysis of the Customer Satisfaction Index, the average score for the level of performance and the average score for the level of importance was used to determine the level of overall service user satisfaction

with the services of Makassar Container Terminal and Bitung Container Terminal. In this analysis, the average score of the level of performance and importance is multiplied to get the product value, then all the products of the average score of the level of performance and level of importance are added up and then divided by the total score of the average level of importance and yields the percentage level of satisfaction overall for Makassar Container Terminal and Bitung Container Terminal services.

4 RESULTS AND DISCUSSION

4.1 Validity Test

After getting the rcount value, then comparing the rcount obtained with the rtable with a significance level of 5%. If rcount > rtable it means valid, otherwise if rcount < rtable it means invalid. Where the rtable used in this study for 35 respondents is 0,404. In processing this validity data, using the validity test calculation formula, namely:

$$r_{hitung} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}} \quad (1)$$

- X = Score obtained by the subject of all items
- Y = Total score obtained from all items
- N = 35
- $\sum X$ = Total item score
- $\sum Y$ = Total score of items

Then the validity test for all questions based on the results of the validity test above with all the statements in the research questionnaire declared **valid**.

4.2 Performance Level and Interest Level Analysis

Based on the data obtained from the results of a survey of 35 respondents using Makassar Container Terminal and Bitung Container Terminal, it is possible to analyze the Level of Conformity between Performance Levels and Interest Levels for each service dimension at Makassar Container Terminal and Bitung Container Terminal. Based on the survey results, from the overall service indicators, an average level of conformity was obtained with a percentage of 82.3% from 36 service indicators at Makassar Container Terminal and Bitung Container Terminal. Where the level of conformity obtained is still in very good criteria.

4.3 Performance Level and Interest Level Analysis

In the Cartesian diagram, the average Performance Level \bar{X} becomes the ordinate in the Cartesian diagram and the average Importance Level \bar{Y} becomes the ordinate in the Cartesian diagram. And the total average of all attributes for each Performance Level \bar{X} and Importance Level \bar{Y} will be the limit that describes the quadrant position in the Cartesian diagram.

The performance level score and the importance level score of each indicator as well as the average value of each indicator can be calculated by the formula below, to get the \bar{X} and \bar{Y} values, namely:

$$\bar{X} = \frac{\sum Xi}{N} \text{ dan } \bar{Y} = \frac{\sum Yi}{N} \quad (2)$$

Where,

\bar{X} = Average Performance Level Score

\bar{Y} = Average Interest Level Score

Xi = Performance Level Score

Yi = Importance Score

N = Number of Respondents = 35 Respondents

The following is the calculation of the values of \bar{X} and \bar{Y} :

$$\bar{X} = \frac{\sum \bar{X}}{K} \text{ and } \bar{Y} = \frac{\sum \bar{Y}}{K} \quad (3)$$

Where,

$\sum \bar{X}$ = 131,08 (Total sum of \bar{X})

$\sum \bar{Y}$ = 159,91 (Total sum of \bar{Y})

K = 36 (Number of Service Indicators)

So the value of $\bar{X} = 3,63$ and $\bar{Y} = 4,42$.

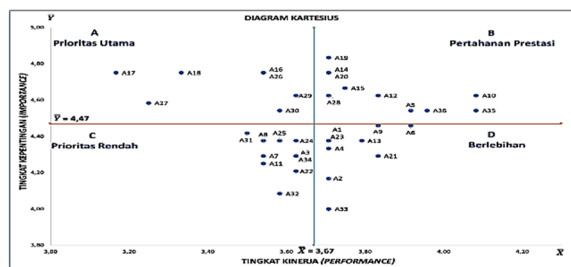


Figure 4: Cartesian diagram of Makassar and Bitung container terminal services.

4.4 Service User Satisfaction Level

To determine the overall level of satisfaction at Makassar Container Terminal and Bitung Container Terminal, the Customer Satisfaction Index (CSI)

method was used. The calculation of the Customer Satisfaction Index uses the formula:

$$CSI = \frac{T}{5 \times Y} \times 100\% \quad (4)$$

Where,

T = Total Score from Multiplication of Interest Level Score x Performance Level = 589,62

Y = Total Interest Level Score = 159,91

CSI = Percentage of Satisfaction Level

$$CSI = \frac{589,62}{5 \times 159,91} \times 100\% = 73,74\% \quad (5)$$

From the results of the above calculations, it is known that the results of the calculation of the level of customer satisfaction obtained from all service indicators at the Makassar and Bitung Container Terminals are 73.74%. These results are included in the **satisfied** CSI criteria.

5 CONCLUSIONS

1. Makassar Container Terminal service users as a whole are satisfied with the current service performance at Makassar and Bitung Container Terminals with a satisfaction level of 73.74%.
2. Service indicators that according to service users are a priority for Makassar and Bitung Container Terminals to be improved are: container loading and unloading operator services, availability of loading and unloading facilities, dwelling time, transparent and compliant service fees, certainty of service hours, and extortion.

ACKNOWLEDGEMENTS

In this study, the authors would like to express their deepest gratitude to the Directorate General of Higher Education, Research and Technology at The Ministry of Education, Culture, Research and Technology.

REFERENCES

Adisasmita, R 2010, *Dasar-dasar Ekonomi Transportasi*, Edisi Pertama, Graha Ilmu, Yogyakarta.

Due Nha Le, Hong Thi Nguyen, Phuc Hoang Truong, 2019. *Port Logistics Service Quality and Customer Satisfaction Empirical Evidence from Vietnam*, The Asian Journal of shipping and logistics, Volume 36, Issue 2, June 2020, **89-103**.

- Dafazal Saffan, Bambang Syairudin, Fuad Achmadi, 2018. *Analisis Kepuasan Pelayanan Dan Loyalitas Pelanggan Dengan Menggunakan Metode Servqual, IPA, dan QFD*, Business and Finance Journal, Volume 3, No. 1, March 2018.
- Engel, J.F., et al. 1990. *“Consumer Behaviour”*, 6th ed, Chicago, The Dryden Press.
- Kotler, Philip. 2000. *Marketing Management*, Prentice Hall Inc.
- Munawar Ahmad, 2005. *Dasar-dasar Teknik Transportasi*, Yogyakarta.
- Padang Farid. 2018. *“Model Angkutan Peti kemas Hub Dan Feeder Port Dalam Menunjang Implementasi Tol Laut Di Indonesia Timur”*, Disertasi, Universitas Hasanuddin Makassar.
- Salim, A. A. 1994. *Manajemen Pelabuhan*. Jakarta: Raja Grafindo Perkasa.
- Tamin, Ofyar Z. 2008. *Perencanaan, Pemodelan, dan Rekayasa Transportasi: Teori, Contoh Soal, dan Aplikasi*, Bandung: Penerbit ITB.
- Tjiptono, 1996, *Manajemen Jasa*, Penerbit Andi, Yogyakarta.
- Triatmodjo, 1996, *Pelabuhan*, Beta Offset, Yogyakarta.
- Tse, D.K. and P. C. Wilton. 1998. *Model of Customer Satisfaction Formation: An Extention*, Journal Marketing Research.

