PAPER • OPEN ACCESS

Analyze of Tanjung Api-Api Ferry Port Service Performance South Sumatera, Indonesia

To cite this article: Yossy Marissa *et al* 2019 *J. Phys.: Conf. Ser.* **1198** 082002

View the article online for updates and enhancements.

Analyze of Tanjung Api-Api Ferry Port Service Performance South Sumatera, Indonesia

Yossy Marissa*, Maulid Muhammad Iqbal, Ika Juliantina

Civil Engineering Department, Sriwijaya University, Indonesia

*E-mail: marissayossy@gmail.com

Abstract. The Government of Indonesia has established a marine infrastructure development program which is the concept of maritime logistics to connect the major ports of the archipelago. This study aims to determine the level of satisfaction of Tanjung Api-Api crossing port, as this can be a reference for improving the quality of services to passengers. During this quality of service has been pretty good, but at certain moments felt less, especially during the holiday season, where there will be accumulation of passengers. The method used in this research is the method of analysis of Importance and Performance Analysis (IPA). From the calculation results, it can be seen that the passenger satisfaction level and the eight factors become the main priority for port management for service enhancement, namely the condition of road access to the port, night lights, street access lighting to night ports, public / mikrolet from port and Conformity of Transportation Tariff , distance and availability of taxi from port and Conformity of Transportation Tariff, Security of crime, Cleanliness of waiting room, air circulation waiting room, and Toilet Hygiene on board, Ship Cleanliness, Availability of worship places on boat, Availability of Wald (Clinic) for sick passenger, Officers quick actions when there is a problem.

Keywords: Service Performance, Importance and Performance Analysis (IPA)

1. Introduction

In the province of South Sumatra in particular, one of the intensely discussed infrastructure development plans for maritime area is Tanjung Carat Sea Port. It will later be integrated with Tanjung Api-Api Ferry Terminal, Tanjung Api-Api Container Port and Tanjung Api-Api Special Economic Zone. The ferry terminal is located in Banyuasin Regency, approximately 80 km from Palembang. It serves crossing from Tanjung Kelian (Bangka Belitung) to Tanjung Api-Api (South Sumatera). Its development was based on the proposal of South Sumatra Government for a substitution of 35 Ilir Port in 2002. It is a part of the plan of the government to develop Tanjung Api-Api area as an integrated and multi-modal area for the development of road and rail transport.

With several problems faced by the port of Tanjung Api-Api Crossing starting from the level of accessibility that is the distance and port facilities and infrastructure. Therefore, it is necessary to study the Analysis of Customer Satisfaction Level Against Port of Tanjung Api-Api Service this is necessary for evaluation of existing service and to determine strategy in improving service at Tanjung Api-Api Port so that this Port of Tanjung Api-Api can be expected to be better.

1.1. Function of Passenger ship
Functions of passenger ship services are such as:
  a) Provision of infrastructure and facilities for passengers while waiting for ships and doing preparatory activities.
  b) Provision of facilities accommodating comfort, food supply and other needs.

1.2. Service Quality

   Kotler (2003: 464) defines service as an action or performance from someone to others. Factors that may affect service quality are as follows (Kotler, 1997: 24) [1]:
   a) Reliability, the ability of employees in providing immediate and satisfactory services as promised;
   b) Assurance, the decency and credibility of staff;
   c) Tangible, the ability of a company in displaying its existence to others;
   d) Empathy, including convenience in relationships, good communication, and sincere attention to customers' needs;
   e) Responsiveness, the eagerness of staff to help the customers and provide services responsively.

1.3. Previous Studies

   a) Andi Wahyu Hermanto (2008) in his research entitled Analysis of Consumer Satisfaction Level toward Container Terminal Services in Semarang discusses five service qualities with IPA analysis method [2].
   b) Beny Agus. S (2010) in his study of the Analysis of Factors Affecting Port Performance examines the port performance indicators based on the Shipping Regulation of 2008 with a qualitative descriptive analysis method [3].
   c) Budiman Soamole (2012) in his research entitled Passenger Perception Analysis on Quality of Sea Transport Service at Sanana Regional Port of Sula Islands of North Maluku Province discusses five dimensions of service quality with IPA and CSI analysis methods [4].
   d) Alfian Zaki Ghufroni (2012) in his research with the title of Analysis of Service Performance and Passenger Response toward Jangkar ferry terminal in Situbondo Regency reviews based on departure schedule, tariff, security, convenience, availability of facilities with IPA analysis method [5].
   e) Cherryl. C. R, T.K. Sendouw, and Mecky.R.E. Manoppo (2016) in their research under the title of Operational Performance Evaluation of Bitung Port, discussing Ship Flow Performance, Flow of Load and Facilities' use and Port Supporting Suggestion on Port Support. The review uses Quantitative Method with port service performance indicators such as ouput, service and utility using Likert Scale [6].
   f) Darmadi, Muhammad Zainul Arifin (2016) in their research entitled Review of Satisfaction Level of Service Users toward Service Performance at Ferry Service of Kariangau-Penajam, Balikpapan. They review the perception of the service users using IPA and CSI analysis [7].

2. Methods of Research

This is a survey study in which quantitative descriptive method was used and it was conducted by collecting information through questionnaires and interviews from respondents in one population. In general, the unit of analysis in survey research is individual [8].

2.1. Source of Data

Primary data and Secondary data were needed in this study in which the Primary data is derived from questionnaires and interviews the respondents of which were constituted of ship passengers and operators, and port managers. They were based on service quality. Furthermore, Secondary data were the suitable information with research objectives and were related to the activities of Tanjung Api-Api Ferry Terminal, namely, number of passenger flows and vessels, and conditions of Tanjung Api-Api ferry port, Banyuasin Regency, South Sumatera Province.

2.2. Data Collection

The primary data were collected by distributing questionnaires with closed type questions to respondents in order to measure the level of passenger satisfaction. Aspects of passengers and employees of the port satisfaction include vessel operational schedule, tariff, safety, convenience,

vessel condition and facility availability in terms of quality of service of physical appearance (Tangible), Reliability, Responsiveness, Assurance and Empathy.

Secondary data were obtained from related agencies in the form of development policy of Tanjung Api-Api ferry terminal, condition of port facilities and infrastructure, and others. The related agencies are:

• Technical Service Unit of Sea Port and River Transportation Management (UPTD PPLASDP) Department of Transportation, Communication and Information of South Sumatera Province;
• Statistic Central Agency (BPS) of South Sumatera Province
• Other related agencies.

2.3. Number of Samples Determination
Based on the location of the study, the populations were all passengers and operators at Tanjung Api-Api Ferry Terminal. Due to the population unidentified number, the determination of sample number was by using the Bernoulli approach formula [9].

$$n = \frac{Z^2 \, P \times q}{e^2} \tag{1}$$

where:
Z = Value obtained from standard normal table with $\alpha / 2$ chance
p = probability of population not taken as sample
α = level of accuracy
q = probability of population taken as sample (1-p)
e = error rate

The level of accuracy (α) used was 5% and a confidence level used was 95% that the obtained value Z was 1.96. E value (error rate) has been determined by 10%. The probability of population not being taken as a sample or as a sample was 0.5 repectively. If counted as in the formula, minimum sample number will be as follows:

$$n = \frac{Z^2 \, P \times q}{e^2}$$

$$n = \frac{(1{,}96)^2 \times 0{,}5 \times 0{,}5}{0{,}1^2}$$

$$n = 96{,}04$$

Based on Bermoulli approach the number of respondents was 101 (One hundred and one) that is 101 passengers of the ship: 51 passengers heading to Tanjung Kalian, and 50 passengers from Tanjung Kalian.

2.4. Research Variables
Kurnia (2009) explains that variable is an object determined by researchers aiming to obtain information to conclude on something [10]. The variables in this study are of independent, intervening, and dependent variable. The variables are described as follows:

2.4.1. Dependent Variable
Dependent variable is variable that influenced or as a result of independent variable, so it is influenced by independent variable. Kurnia (2009) reveals that every time a number of units of independent variables changes, it is expected to cause the dependent variable to change as well, otherwise if there is a decrease in the number of times the unit of independent variables it is expected to change the decrease in dependent variable so many times the units as well [10]. Dependent variable is often denoted as Y. In this study the dependent variable (Y) was consumer satisfaction.

2.4.2. Independent Variable

The independent variable is the variable that affects or variables that cause change or the emergence of the dependent variable. Ferdinand (2006) states that the independent variable is the variable that affects the dependent variable, either positive or negative [11]. The independent variable is denoted as X. In this study the independent variables were:

a) tangibles
b) Reliability
c) Responsiveness
d) assurance
e) Empathy

2.5. Data Analysis

2.5.1. Profile of Respondents

In this study, respondents were grouped among others based on gender differences. To know the difference of satisfaction and expectation between man and woman use test analysis. And these respondents are divided based on the level of satisfaction and the level of importance of each taken number of respondents as many as 101 people.

Table 1. Distribution of Respondents by Gender

Num.	Gender	Frequency	Percentage
1.	Pria	57	56,44
2.	Wanita	44	43,56
	Jumlah	101	100

Source: Results of Questionnaire, 2017

Table 2. Distribution of Respondents by Age

Num.	Ages	Amount	Percentage
1.	< 20THN	4	3,96%
2.	20-30 THN	42	41,58%
3.	31-40 THN	38	37,62%
4.	41 - 50 THN	15	14,85%
5.	> 50 THN	2	1,98%
	Total	101	100,00%

Source: Results of Questionnaire, 2017

Table 3. Distribution of Respondents by Type of Work

Num.	Work	Amount	Persentage
1.	entrepreneur	22	21,78%
2.	businessman	5	4,95%
3.	Gov. employees / army / police	5	4,95%
4.	driver	28	27,72%
5.	college student	25	24,75%
6.	employees	7	6,93%
7.	housewife	9	8,91%
	Total	101	100,00%

Source: Results of Questionnaire, 2017

Table 4. Distribution of Respondents Based on Education Background

Num.	Education	Amount	Persentage
1.	Bachelor/Master	18	17,82%
2.	D1/D2/D3	27	26,73%
3.	Senior High School	48	47,52%
4.	Junior High School	8	7,92%
	Total	101	100,00%

Source: Results of Questionnaire, 2017

Table 5. Distribution of Respondents by Total Income

Num.	Income	Amount	Persentage
1.	> 5.000.000	27	26,73%
2.	Rp. 2.206.000 s.d Rp. 5.000.000	40	39,60%
3.	≤ Rp. 2.206.000	34	33,66%
	Total	101	100,00%

Source: Results of Questionnaire, 2017

Table 6. Distribution of Respondents by Reason of Trip

Num	Reason of Trip	Amount	Persentage
1.	Task / Office	27	26,73%
2.	Business	5	4,95%
3.	Vacation / Tour	10	9,90%
4.	School / College	25	24,75%
5.	Family Affairs	9	8,91%
6.	Others, specify	25	24,75%
	Total	101	100,00%

Source: Results of Questionnaire, 2017

2.5.2. Data Validity and Reliability
Wardono M. (2012) elaborates that validity of an instrument relates to the ability of the instrument to measure or reveal the characteristics of the variable intended to measure [12]. An instrument to measure consumer attitudes toward an advertisement, for example, is required to produce an attitude score that does show consumer attitudes toward the advertisement, not the interest or others.

The Validity was done using pearson product moment method, that is by correlating the score of items on the questionnaire with the total score. This validity test uses SPSS for windows program. The formula is:

$$r_{xy} = \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[(\sum x^2 - (\sum x)^2)(N \sum y^2 - (\sum y)^2)]}} \tag{2}$$

where:
r_{xy}= Product Moment Correlation
N = Number of test objects
$\sum x$= Total score of items
$\sum y$= Total score of variables
$\sum x^2$= number of squares score
$\sum y^2$= sum of squared variable scores
$\sum x\, y$ = total multiplication of score and variable score

Criteria validity of a data is if:

r_{xy}count $> r_{xy}$table, valid

r_{xy}count $< r_{xy}$table, invalid

The reliability index was tested using cronbach alpha coefficient with significance level at 5%. If the correlation coefficient is higher that the critical value or if cronbach alpha coefficient is higher than 0.6 then the item is reliable. Coefficient lower than 0.6 shows a poor reliability. A figure at about 0.7 indicates an acceptable reliability and above 0.8 displays a good reliability [13]. The formula used is:

$$r_{11} = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum \sigma_b^2}{\sigma_t^2}\right) \tag{3}$$

where:

r_{11}= Reliability of the questionnaire

k = Number of questions

$\sum \sigma_b^2$= The number of variance items

σ_t^2= Total Variance

2.5.3. IPA and Analysis Method

Analysis of sea port service satisfaction level was done using IPA (Importance and Performance Analysis) technique in which it was used to find out the service attributes in which according to users give significant influence to satisfaction level and loyalty of service user and the attributes that service users need think need to improve. It was done on the basis of the differences in the perception between what was perceived and what was expected

Based on respondents' responses, satisfaction and expectations score will be discovered and be calculated to reveal the level of satisfaction and expectations. The level of conformity is the result of the comparison between satisfaction and expectations of passenger. The formula used (John Martila and John C. James in Supranto, 2006) is as follows [14]:

$$Tki = \frac{Xi}{Yi} \times 100\% \tag{4}$$

where:

Tki = Degree of respondent's conformity

Xi = Score of passenger satisfaction

Yi = Score of passenger expectation

Quadrant analysis served to map customer satisfaction and expectations for the service they experience. The variable used was the level of customer satisfaction on service performance experienced and it was expressed as X, and the level of customer expectations expressed as Y.

Then the horizontal axis (X) was filled with implementation level score, while the upright axis (Y) was filled by the score of expectation level. For each factor affecting customer satisfaction, the formulas were simplified as follows:

$$\overline{X} = \frac{(\sum X_i)}{n} \tag{5}$$

$$\overline{Y} = \frac{(\sum Y_i)}{n} \tag{6}$$

In which:

$\overline{X}$ = average score of level of satisfaction

$\overline{Y}$ = average score of importance level

n = number of respondents

Cartesian diagram is a plane that is divided into four parts bounded by two lines intersecting perpendicularly at points (,), in which   is the average score of passenger satisfaction of all factors or attributes and   is the average score of importance of all factors affecting customer satisfaction.

$$\overline{X} = \frac{\sum_{i=1}^{n} \overline{X_i}}{K} \tag{7}$$

$$\overline{Y} = \frac{\sum_{i=1}^{n} \overline{Y_i}}{K} \tag{8}$$

In which:

K = number of attributes / facts that can affect customer satisfaction.

Furthermore, the level of these elements is split into four parts into the Cartesian Diagram.

$\overline{Y}$ = EXPECTATION

$\overline{Y}$	MAIN PRIORITY A	MAINTAIN ACHIEVEMENT B
	C LOW PRIORITY	D EXCESSIVE
	$\overline{X}$	SATISFACTION $\overline{X}$

Figure 1. Quadrant Importance and Performance Grid

3. Results and Discussion

The results of this study indicate that the condition of port performance through port service user perception where analysis is used IPA method. Where this method compares between the performance level and the importance of the service users of the port, where the dimensions of the variable use the principle of service quality level of service that is physical appearance (tangible), reliability, responsiveness, assurance and empathy, which expanded again into several indicators. The result of analysis by IPA method obtained by factor of performance level factor that influence service delivery satisfaction which then gets priority of performance improvement from Tanjung Api-Api Port either from port aspect or ship aspect that is:

Based on an assessment of the level of importance or expectation and performance or satisfaction, will result in a calculation of the suitability between the level of importance and level of performance. The value of conformance is the result of the comparison of performance values with importance values.

The order of priority increase of each attribute item will be determined by this value of conformity, which affects the satisfaction of the port service user. This means that there are 2 variables that can be represented by X and Y, where X is the degree of port performance that gives satisfaction for service users, whereas Y is the degree of interest of service users by using tables 7 and 8, and the Cartesius Diagrams are show below:

Table 7. Level of Performance and Interest from port aspect

Num	Levels of Satisfaction & Interest Indicators	Xi	Yi	Comfort Level	$\overline{X}$	$\overline{Y}$	Qua-drant
A1	Information Board for schedule/route of the ship	314	321	98,798	3,109	3,178	3
A2	Car parking capacity	351	324	109,417	3,475	3,208	3
A3	Condition of asphalt / floor of parking area	317	345	92,803	3,139	3,416	1
A4	Condition of access road to the port	211	450	47,358	2,089	4,455	2
A5	Night lighting	220	441	50,385	2,178	4,366	2
A6	Night lighting for road access to port	227	431	53,195	2,248	4,267	2
A7	Waiting room's cleanliness	176	349	50,934	1,743	3,455	2
A8	Amount of waiting room chairs	351	333	106,459	3,475	3,297	3

| Num	Levels of Satisfaction & Interest Indicators	X_i	Y_i	Comfort Level	$\bar{X}$	$\bar{Y}$	Qua-drant
A9	Physical condition of waiting room chairs	316	338	94,426	3,129	3,347	3
A10	Waiting room air circulation	204	334	61,689	2,020	3,307	4
A11	Waiting room capacity	352	326	109,055	3,485	3,228	3
A12	Toilet Cleanliness	350	353	100,142	3,465	3,495	1
A13	The distance from the waiting room to the ship	369	251	148,482	3,653	2,485	3
A14	Jetty Cleanliness	373	373	101,000	3,693	3,693	1
A15	Condition and Cleanliness of Canteen at Port	373	343	109,834	3,693	3,396	3
B1	Schedule accuracy of Ship Departure	324	367	89,166	3,208	3,634	1
B2	Schedule accuracy of Ship Arrival	322	384	84,693	3,188	3,802	1
B3	Shipping Fare Suitability	355	334	107,350	3,515	3,307	3
B4	Parking Fare Suitability	339	304	112,628	3,356	3,010	3
B5	Fare Suitability of Freight Cost to Ship	336	301	112,744	3,327	2,980	3
B6	Queue Control for buying tickets	336	335	101,301	3,327	3,317	3
B7	Incoming Queue Control by officers / barrier device	364	335	109,743	3,604	3,317	3
B8	Up and Down Queue Control by officers / barrier device	362	326	112,153	3,584	3,228	3
B9	Ship departure announcement via loudspeakers / whistles	372	252	149,095	3,683	2,495	3
C1	Passenger waiting time on departure or arrival	327	310	106,539	3,238	3,069	3
C2	Officers quick actions when there is a problem	341	318	108,305	3,376	3,149	3
D1	Distance and Availability of public transport from the port and the suitability of transportation fare	220	381	58,320	2,178	3,772	2
D2	Distance and Availability of taxi from the port and the suitability of transportation fare	212	370	57,870	2,099	3,663	2
D3	Security from crime acts	178	311	57,807	1,762	3,079	4
D4	Parking security at the port	342	330	104,673	3,386	3,267	3
E1	Officer readability to passenger	385	357	108,922	3,812	3,535	3
E2	Hospitality of counter ticket officer	376	381	99,675	3,723	3,772	1
				94,218			

Source: Results of Questionnaire, 2017

Table 8. Level of Performance and Interest from ship aspect

| Num	Levels of Satisfaction & Interest Indicators	X_i	Y_i	Comfort Level	$\bar{X}$	$\bar{Y}$	Quadrant
A1	Physical Condition of the ship	406	206	199,058	4,020	2,040	3
A2	Ship Toilets Cleanliness	339	455	75,251	3,356	4,505	2
A3	Ship Cleanliness	353	434	82,150	3,495	4,297	2
A4	Waiting room's condition	307	330	93,961	3,040	3,267	4
A5	Completeness of safety equipment on boat	364	429	85,697	3,604	4,248	1
B1	Availability of worship places on boat	354	404	88,500	3,505	4,000	2
B2	Availability of Wald (Clinic) for sick passenger	348	408	86,147	3,446	4,040	2

Num	Levels of Satisfaction & Interest Indicators	X_i	Y_i	Comfort Level	$\overline{X}$	$\overline{Y}$	Quadrant
B3	Availability of CCTV (Monitoring Camera)	332	375	89,419	3,287	3,713	4
B4	Comfortness on boat	379	443	86,409	3,752	4,386	1
C1	Officers quick actions when there is a problem	343	402	86,177	3,396	3,980	2
D1	Security on boat	372	454	82,758	3,683	4,495	1
E1	Officers Hospitality on boat	377	416	91,531	3,733	4,119	1
				95,588			

Source: Results of Questionnaire, 2017

And from Table 7 and Table 8, we can transforme into the Cartesius's diagram, so we can see each indicators in every quadrant, where quadrant 1 means that we need to maintain performance, quadrant 2 means that we need to improve the performance, quadrant 3 means overbearing, and quadrant 4 means low priority, and we can see them from Fig. 2 for port's aspect and Fig. 3 for ship's aspect.
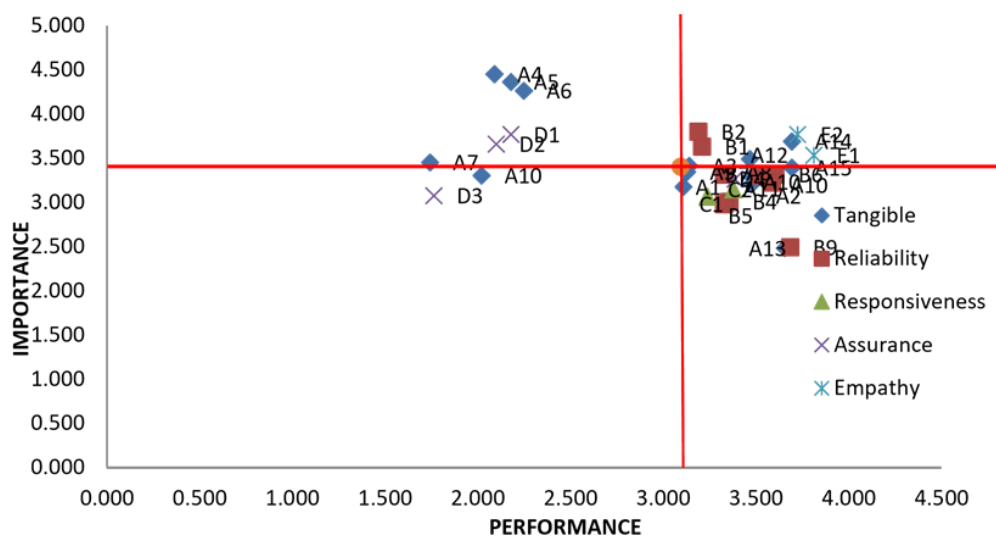
Figure 2. Analysis of IPA aspects of the Port
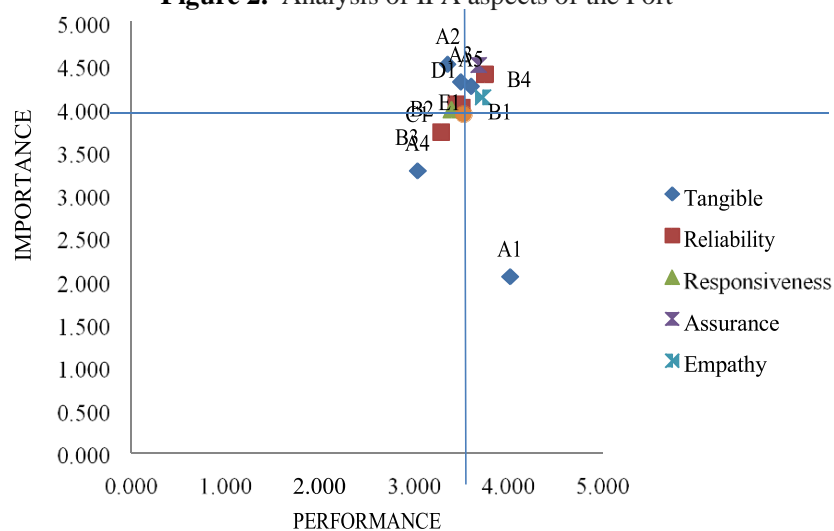
Figure 3. Analysis of IPA aspects of Ship

4. Conclusion

From this research can be drawn some conclusions as follows:

There are 32 indicators of satisfaction assessment for the port aspect and 12 indicators for the aspect of the vessel, which satisfy 5 satisfaction variables namely tangible, reliability, responsiveness, assurance and empathy. In the analysis of customer satisfaction by using quadrant in Cartesian diagram of IPA method based on level of performance and interest of service user, resulted some indicator from service quality level variable which need priority improvement of its performance by port manager either from port aspect or ship that indicator that exist in Quadrant II which become priority scale, that is for aspect of Port of Access Road Access to Port 47,358%, Night Light at 50,385%, Light of access road access to harbor at night 53,195%, Room cleanliness 50,934%, Distance and Availability of public transport from harbor and the Conformity of Transportation Tariff 58,320%, and the distance and availability of taxi from the port and the Conformity of Transportation Tariff 57,870%. While the aspects of ship Hygiene Toilet in the ship 75.251%, Hygiene Ship 82,150%, Availability of places of worship in the ship 88,500%, availability of treatment room (clinic) for the sick 86.147%, officer quick action if there is a problem 86.177%.

References

[1]   Kotler, P. 1995, "Marketing Management Analysis and Implementation", Salemba Empat, Jakarta. (in Indonesian)

[2]   Hermanto, Andi Wahyu, 2008, "Analysis of Consumer Satisfaction Level Toward Container Terminal Services in Semarang". (in Indonesian)

[3]   Agus, Beni S, 2010, "Analysis of Factors Affecting Port Performance Examines the Port Performance Indicators Based on the Shipping Regulation". (in Indonesian)

[4]   Soamole Budiman, 2012, "Passenger Perception Analysis on Quality of Sea Transport Service at Sanana Regional Port of Sula Islands of North Maluku Province". (in Indonesian)

[5]   Ghufroni Alfian Zaki, 2012," Analysis of Service Performance and Passenger Response Toward Jangkar Ferry Terminal in Situbondo Regency". (in Indonesian)

[6]   Cherryl. C. R, T.K. Sendouw, and Mecky.R.E. Manoppo , 2016, "Operational Performance Evaluation of Bitung Port". (in Indonesian)

[7]   Darmadi, Muhammad Zainul Arifin, 2016, 'Review of Satisfaction Level of Service Users toward Service Performance at Ferry Service of Kariangau-Penajam, Balikpapan". (in Indonesian)

[8]   Singarimbun, Masri and Sofian Effendi, 1989, "Survey Methodes", LP3ES, Jakarta.

[9]   Sedarmayanti, Hj, 2002, "Research Methodology", Mandar Maju. (in Indonesian)

[10] Kurnia, Ratnawati.2009. "Actions Control, Results, Personnel, and Cultures and Their Influence on Organizational Satisfaction and Commitment", Accountant Journal Vol. 1. (in Indonesian)

[11] Augusty, Ferdinand. 2006. "Management Research Methode : Research Methode for Skripsi, Tesis and Disertasi on Management". Universitas Diponegoro. Semarang. (in Indonesian)

[12] Wardono, Moch. Noor Setyo. 2012. Pengaruh Pendidikan Pelatihan dan Motivasi Terhadap Kinerja Pegawai di Kantor Kecamatan Semen Kabupaten Kediri. Jurnal Ilmu Manajemen, REVITALISASI, Vol. 1, Nomor 2, September 2012.

[13] Riduan, dkk. 2006. Rumus Dan Data Dalam Aplikasi Statistika. Bandung: Alfabeta.

[14] Supranto, J. 2006. "A Customer Satisfaction Level Measurement to Raise a Market Share". PT. Rineka Cipta. Jakarta. (in Indonesian)