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The Analysis of Service Quality Level of Customer Satisfaction and Loyalty at Terminal Teluk Lamong

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Abstract—The port has an important role as the gateway of regional economy, which becomes the determinant of effective and efficient trading activities between islands and between countries. Port is a company engaged in services, in which customers or port users get stevedoring, cargo-dooring, receiving and delivering services. Thus, to gain customer satisfaction and loyalty,port operators need to improve and maintain their quality of services. One of them in East Java Indonesia is Terminal Teluk Lamong (TTL).In undertaking its business, TTL as multipurpose terminal operator has a major function to flow the density and accelerate the process of distributing goods in Eastern Indonesia. Data collection process in this study is completed byface-to-face interviews using structured and systematic questionnaires and focus discussion group to potential port users particularly on containerrelated customers such as ship crews, shipping agents, forwarders both for domestic and international trades. Further, this studyapplies the method of Importance Performance Analysis (IPA) to determine the level of satisfaction, loyalty includingservice attributes of customer perceptions that need to be improved in order to improve the quality of service at TTL.

Keywords—Service Performance, Customer Satisfaction, Customer Loyalty, Importance Performance Analysis (IPA).

I. INTRODUCTION

In the port industry, TTL,as a subsidiary of Indonesia Port Corporation (PELINDO) III,has beenoffering loading and unloading services both for container as well as dry bulk cargoes not only in its hinterland in East and Central Java but also surround its foreland in Eastern Indonesia. In particular, TTLis considered as the onlynational green semi-automatic terminal in Indonesia. Further, TTL alsorelatively is a new port, but has been equipped with advanced and automated tools providingfasterrate of handling and accuracy of services particular in containerized traffic. If containerized service is concerned, TTL may be defined as one leading container terminal delivering online order and digitalized services in Indonesia. Due to its automation and digitalization strategy, therefore TTL needs to identify the quality of service performance particularly on containerized related services.

The level quality of service may be identified by measuringtheexpectations of customersrelating to services they get at TTL. If the services providedare stated more than the expectation, then the services satisfactionmay be categorizedis very good,or if it is less than the satisfaction level isnot good. In this study, the quality of service is assumedin three dimensions[7], namely:

- Physical quality, constituting goods such as building condition and safety equipment;
- The quality of the company, referring to the company's image and profile;
- Interactive quality, coming from the interaction between the person includingbetween the terminal operator and the customer.

Furthermore, qualityof service may also be measured by comparing the perceptions of customers for any services they have received with the level of services they expect[10].This may be achieved by constructing some determinants of qualityfactors into five dimensions as listed in Figure 1, in which each dimension reflects factorthe port users need to be considered in understanding the quality of service, as follows:

a. Tangibles
   The ability of a terminal operatorin relation to the physical facilities, equipment and employee performance.
b. Reliability
   The ability of the terminal operator to pursue the promised service accurately and consistently.
c. Responsiveness
   The ability of staff to assist port users and provide responsive services.
d. Assurance
   Ability and attitudes of port staff possess in obtaining customer trust from the dangers or risks of doubts.

e. Emphaty
The ability of terminal operators in providing convenience to communicate and make connections and the ability to understand the needs of customers.

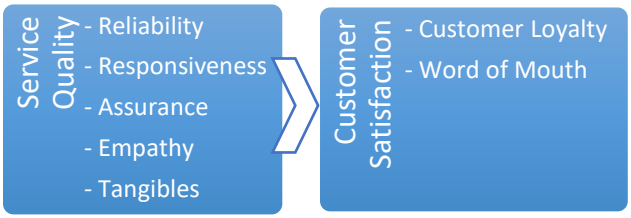

Figure 1. Scheme The Relation between Quality of Service with Customer Satisfaction [4]

In the literature, customer satisfaction maybe defined as perceived service performance including profitability, brand image and customer expectations with service quality level [3]. In addition, perception is also considered as an opinion of what customers see and judge to the product or service they buy, because each customer has a different view. Further, the terminology of satisfaction basically can mean anything related to users of a product or service, taking into account price, time, execution, convenience, responsiveness, reliability and benefits[2]. Thus, various attributes of customer satisfaction as recommended by literature may be listed in Table 1 below.

Service	• International anddomesticshipservice • Truckdriverservice • Forwardingservice • International anddomesticshippingagent • Cargoowner
Delivery	• Deliveryontime • Speedorrateofdelivery
Staff	• Goodservice • Availability • Knowledge • Reliability • Friendliness • Receivecriticismandsuggestions • Responsivetoquestions • Warrantyservice • Technicalservices
Company	• Corporatereputation • Easeofdoingbusiness • Invoiceclarity • Invoices are ontime
Price	• Serviceorhandlingtariff • Total usagefeeandaddedvalue

Table 1. Customer Satisfaction Attributes

Loyalty may be defined as a very strong commitment to frequently order or replace a preferred product or service in the future despite situational influences and marketing efforts that could potentially lead to switching behavior[9]. Therefore, loyalty means the behavior of customers to continue to make purchases regularly. One form of customer loyalty,which will havea major effect on the company, is the support of customers in relationto product or services embodied in theirpositive communication sharing of customersto others due to their worthy experiences or called word of mouth.

The recommendation of a product or service from the customer to others is a reflection of the high level of customer loyalty [1]. A customer is indicated to be loyal or loyal when making regular or frequent purchases or conditions in which the customer made a purchase at least twice in a certain time[6].Further, due to literature above, customer loyalty may beconstructed by three factors:

1. Emotional driving
Whereby customers may be affected by a service brand that has its own attractiveness so that customers can flow to a terminal operator due to its brand.This reflects the characteristics of customers to the bonds of a terminal operator that arise from a brand. Thus, customers appear to take pride in using the brand service.
2. Switching barrier
Barriers creating difficulties for customers to switch to other terminal operators because customers are dissatisfied with the current services related to flexibility they wanted, based on financial, social and psychological considerations that customers feel when switching to other terminal operators [5].
3. Customer focused attitude
Consumer attitudes that have a relationship of customer confidence in the services used. Consumer confidence comes from customer knowledge of the attributes and benefits of the services they use. Attributes to these factors are characteristic in the service quality.

The method of Importance Performance Analysis (IPA) was first introduced by Martilla and James in 1977. with the aim of measuring customer satisfaction with the product or service. The IPA method applies two-dimensional graphics in which the vertical axis as an expectation attribute (importance) and horizontal axis as performance attributes (performance). The two-dimensional graph is divided into four quadrants which are often called the IPA Cartesian diagram as illustrated in Figure 2 below, shows each attribute according to the average value of the customer's total.

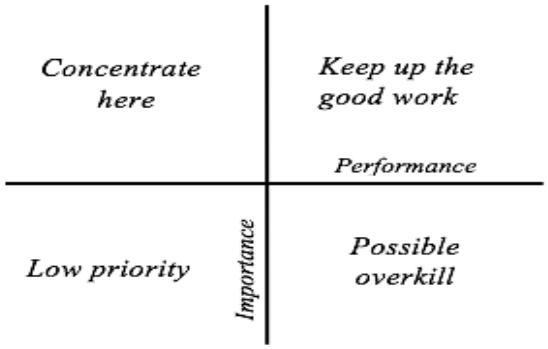

Figure 2. Cartesian Diagram Importance Performance Analysis (IPA)[8]

Attribute positions in all four quadrants have different strategies:

- Quadrant 1 is keep up the good work, that is has high levels of expectation and performance attributes because customers are very satisfied with the company's performance.
- Quadrant 2 is posible overkill that has attributes to low customer expectations, but the company's performance is very good, therefore it is considered excessive by the customer.
- Quadrant 3 is low priority that is a low priority, where there are low customer expectation attributes and poorly rated company performance.
- Quadrant 4 is concentrate here that is the top of priority improvement because there are the important attributes that consider by the customer, but in fact it is not according with the level of customer expectations.

II. METHODOLOGY

Qualitative approach is dominantly applied in this research particularly on data collection process combined with some descriptive statistics in analyzing process using Index Performance Analyses (IPA) method. For the data collection process, face to face interviewing was performed withsystematic and structured questionnaires to the existing container-related customers at TTL. The questionnaires contain the TTL service attributes as listed in the Table 2.To achieve the purpose of this study, no question deviates from the intent of the study, and the language of questionnaire is easy to understand. The interview process with respondents are described as follows:

(a) Researchers come to the location where the respondent activities are located, such as:
- Port for ship crew customers;
- Focus Group Discussion (FGD) for shipping agent customers;
- Service and office counters for forwarders/EMKLare cargo ship expeditions.

(b) Explaining the purpose and objective of the survey to the respondents regarding the mechanism of filling the questionnaire includingrequest to the respondent shall complete the questionnaire alone or with the assist of researcher in their consent.

(c) Assisting written elaboration from respondents'responses according to questionnaire sheet according to the respondent's answer. It must not change or add the previous verbal answer of respondents.

(d) After all questions in the questionnaire have been answered, the researcher did re-study the completeness of the answers that have been filled by the respondents.

Type of Customer	Attribute
Forwarders/EMKL	Order Online, Proforma & EIR Take care of the Cargo in the Terminal General Services
Ship Crew International and Domestic	Ship on the dock Ship when loading/unloading General Service
Shipping Agent International and Domestic	Web Access & Data Berthing Plan Licensing Process Shipbuilding Process Loading and Unloading Process Terminal Departure Report (TDR) and payment process Order Online, Proforma & EIR Take care of the Cargo In Terminal General Services

Tabel 2. Attributes in the Questionnaire

Respondents of this study are customers of TTL who has been conducting transactions in the last one year at TTL with the number of population is 130 companies. In determining the number of samples of this study, the Slovin Formula is applied[11], as follows:

$$n = \frac{N}{1+N\,e^2} \quad (1)$$

Equation (1) isthe number of samples (n); population (N);limit of tolerance (e) in percent.

This study establishes a limit of toleranceof 10% includingthe number of samplesof 57 as obtained by the formula with the distribution of respondents is explained in Table 3 below.

Type of respondents		∑
EMKL		27
Ship Crew	Domestic	14
	Interntional	7
Shipping Agent	Domestic	3
	International	6
	Total	57

Table 3. Distribution of Container Respondents

The responses of respondents are further considered as data assembled from the questionnaire sheet that has been filled by the respondent. Then these results validated viaone session of focus group discussion (FGD) of customers mainly consisting of ship agents and freight forwarding. If the survey results match the conditions of service operation, then the survey results are considered valid. Then researchers can proceed to the data analysis stage consisting of several stages, as follows:

A. Creating likert scores from five levels of answering preferences of various questions in the questionnaires to make easier for respondents to answer questions as listed in Table 4.

Points	Satisfaction Category	Loyalty Category	Information
1	Strongly Dissatisfied (VD)	Strongly Disloyal (SD)	The statement is very inappropriate with the respondent's perceived situation
2	Dissatisfied (D)	Disloyal (D)	The statement does not match the respondent's perceived situation
3	Neutral (N)	Neutral (N)	Respondents is unable to determine exactly what is perceived or neutral
4	Satisfied (S)	Loyal (L)	Statement according to respondent's condition
5	Very Satisfied (VS)	Very Loyal (VL)	The statement is very appropriate to the situation felt by respondents

Table 4. Likert Scale

Next is to determine the index value in Table 5 to describe the value of customer satisfaction and loyalty level with satisfaction index criteria and loyalty.

Index	Satisfaction Category	Loyalty Category
0.00 – 1.00	Strongly Dissatisfied	Strongly Disloyal
1.01 – 2.00	Dissatisfied	Disloyal
2.01 – 3.00	Neutral	Neutral
3.01 – 4.00	Satisfied	Loyal
4.01 – 5.00	Very satisfied	Very Loyal

Table 5. Index of Customer Satisfaction and Loyalty Level

B. Calculate the respondents level of relevance (TKi) between performance levels and customer expectations,

$$TKi = \frac{Xi}{Yi} \cdot 100\% \quad (2)$$

Equation (2) is conformity level of respondent (TKi); rating of company performance (Xi); assessment of customer expectations (Yi).The diagram consists of the horizontal axis (X) as the performance level and erect axis (Y) scores of customer expectations for each attribute by the formula:

$$X' = \frac{\Sigma Xi}{n} ; Y' = \frac{\Sigma Yi}{n} \quad (3)$$

Equation (3) isaverage performance level (X'); average customer expectation level (Y'); number of performance levels (ΣXi); total level of customer expectations (ΣYi); number of respondents (n).After obtaining X'and Y' values on each attribute / question, then create a performance-importance position map that is divided into four quadrants bounded by two perpendicular lines intersecting by using one formula below:

$$X'' = \frac{\sum_{i=1}^{N} Xi}{k}; Y'' = \frac{\sum_{i=1}^{N} Yi}{k} \quad (4)$$

Equation (4) is average of average performance levels across all attributes which X" isaverage of the average customer expectation rate across all attributes; Y" is number of attributes that can affect customer satisfaction (k).

Further, the method of Importance Performance Analysis (IPA) consists of four quadrants for all variables affecting service quality as illustrated in Figure 2 below.

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III. RESULTS

A. *Customer Satisfaction Level of Customer*

a). *Level of Customer Satisfaction based on Customer Type*

Level of customer satisfaction TTL 2017 for container loading and unloading is divided into five types of customerssuch as shipping agent international, shipping agent domestic, forwarding, ship crew for international domestic routes.

Figure 3. Customer Satisfaction Rate of TTL 2017

Figure 3above shows the level of customer satisfaction which according to entities of customers in the following order:

1. Domestic customers: 4.11 (very satisfied category)
2. International master's customers: 4.10 (very satisfied category)
3. Customer forwarders/EMKL: 3.82 (satisfied category)
4. Domestic shipping agent customers: 4.32 (very satisfied category)
5. International shipping agent customers: 3.53 (satisfied category)

Level of customer satisfaction of TTL 2017 based on customer entitiesas listed in Figure 3 is 3.98 (satisfied category)

b). *Level of Customer Satisfaction per Factor*

Level of customer satisfaction TTL 2017 for container customers is formed by fivedetermining factors namely reliability, assurance, tangible, empathy, responsiveness. These five factors reflect the driving factors considered asdeterminants ofsatisfaction level of service.

Factor	Shipping Agent Domestic	Shipping Agent International	Ship Crew Domestic	Ship Crew International	*EMKL*	$\bar{\Sigma}$
Reliability	4.13	3.57	4.10	4.17	4.11	4.02
Responsiveness	4.33	3.55	4.06	3.93	3.63	3.90
Assurance	4.67	3.17	4.21	4.13	3.81	4.00
Emphaty	4.22	3.65	4.05	4.05	3.82	3.96
Tangible	4.26	3.72	4.14	4.22	3.72	4.01

Table 6. Determinant Factors of Customer Satisfaction of TTL

Table 6above shows five factors with the highest rate is the reliability factor of 4.02 (very satisfied category). High reliability factor values reflect that the ability of terminal operators in performing service quality reliably, accurately and consistently.While having the lowest average satisfaction rate is a responsiveness factor of 3.90 (category satisfied). The value of the low responsiveness factor reflects the willingness of the employee to assist the customer and take follow-up service is felt less when compared to other satisfaction factors. Then TTL needs to improve the ability of employees in responding to customer problems to the service.

B. *Customer Container Loyalty Rate*

a). *Customer Loyalty Level based on Customer Type*

Figure 4 below shows the customer loyalty rate of TTL based on entities of customers in the following order:

- Shipping agent international: 3.19 (loyal category)
- Shipping agent domestic: 3.65 (loyal category)
- Forwarder/EMKL: 3.57 (loyal category)
- Ship crew international: 3.72 (loyal category)
- Ship crew domestic: 3.64 (loyal category)

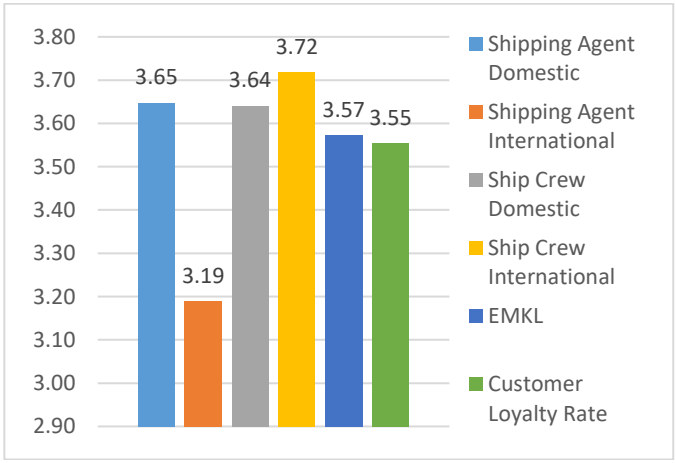


Figure 4. Customer Loyalty Rate of TTL 2017

Customer loyalty level TTL 2017 based on customer type in Figure 4 shows that the average loyalty rate of TTL 2017 is 3.55 (loyal category), which reflects the quality of service with customer expectation is good.

b). Customer Loyalty Level Per Factor

Customer loyalty level TTL 2017 for container customers is formed by three factors: switching barrier, customer attitude, and emotional. These three factors reflect the attitude of customers who have a relationship between the quality of service obtained by customers with customer expectations to recommend to others.

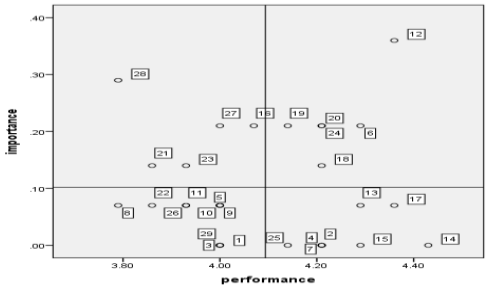
Factor	Shipping Agent Domestic	Shipping Agent International	Ship Crew Domestic	Ship Crew International	EMKL	$\bar{\Sigma}$
Emotional	3.83	3.38	4.09	4.04	3.38	3.82
Switching Barrier	3.44	2.94	3.26	3.57	2.94	3.32
Customer Attitude	3.67	3.25	3.57	3.86	3.25	3.59

Table 7. Level of Customer Loyalty Per Factor

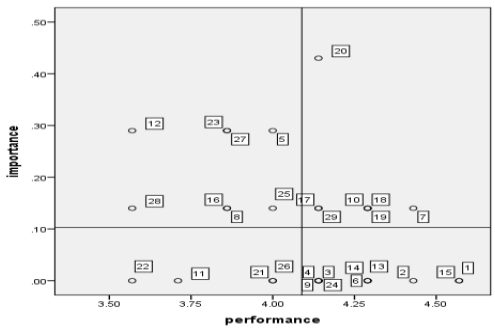
Table 7 shows three factors with the highest average loyalty rate is emotional factor that is 3.82 (loyal category). Emotional factors its the high loyalty level that reflects the amount of customer confidence in the quality of terminal operator by the company. While the lowest level of loyalty is a switching barrier factor of 3.32 (loyal category).

C. Result of Importance Performance Analysis (IPA)

Other instrument to measure combined the customer satisfaction, loyalty and expectationmaybe determined by the overall performance index that is given by the company. While customer loyalty is determined by the importance of customer importance. This research uses IPA method using two-dimensional graphic that is vertical axis (x) as attribute importance and horizontal axis (y) as performance attribute as listed in Figure 5 to measure the combined parameters.



(a)



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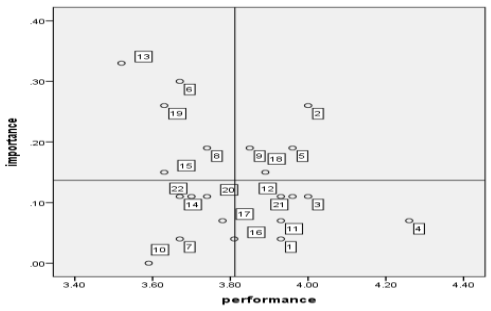

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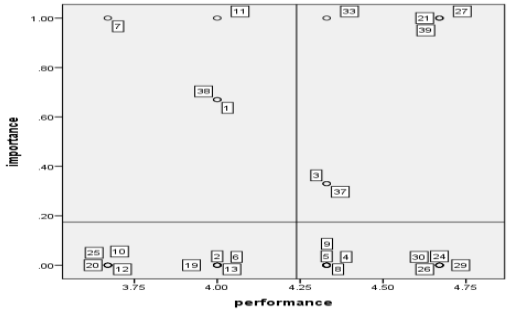
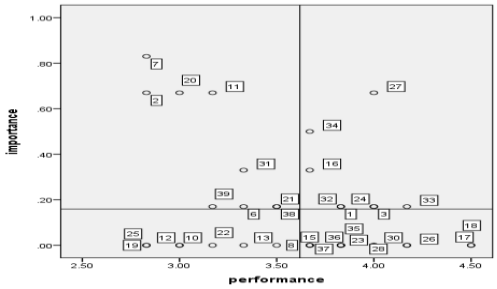


(d)



(e)

Figure 5. Cartesian IPA Diagram : (a) Domestic Container Ship Crew Customers; (b) International Container Ship Crew Customers; (c) EMKL Container Customers; (d) Shipping Agent Domestic Customers; (e) Shipping Agent International Customers

From Cartesian diagrams of a-e above, it may be presumed that the port users or customers of TTL as defined in their attributes, expectbetter service quality in some factors. The attributes as expected by customers for quality improvement in the future service operations of TTL are:

1. Attributes as the top of priority for domestic container ship crew respondents:
   - Improvementof real information on scales data
   - More clarified communication system
   - Better rules apply to anchor distances around the port
   - Improvement of gangway facilities
   - Better facilities of mess-room, garbage cars and wifi connection for the ship's crew

- The removing of shipwreck and need immediate pinched and marked and not interfering ship's berthingprocess
- Extendthe shuttle bus routes

2. Attributes asthe top of priority for international container ship crew respondents:
   - Extended shuttle bus routes
   - Better facilities of garbage facilities, traffic marine and wifi connection for ship crew
   - Better tug-boats serviceincludingits controlled schedule
3. Attributes as the top of priority for freight-forwarders of container respondents:
   - Facilitate online facilities with relevant agencies to make the process out ofgoods can be faster and quarantine systems can be integrated
   - Apply e-care system for faster email response
   - Treat SIM access of B1 and B commonly equated
   - Evaluatethe payment system against price per-container
   - Better EIR coupled print counter
   - Clarify rules of chargesinto a detail description
   - Simplify services without diversification
4. Attributes as the toppriority for domestic container shipping agent respondents:
   - Improved management and good communication for tug-boats
   - Additional payment facilities for other banks
5. Attributes as the topprioityfor international container shipping service are:
   - Extendthe length of the existing jetty
   - Improvethe stabilization and consistency of shiploads
   - Provide better service of fumigation and trucking services
   - Improve TTL coordination with customs and quarantine
   - Evaluate the response of container shifting when required
   - The tug-boats service needs tobe controlled on the schedule
   - The new arrangement of are for anchoring area of boats and cruise line next to TTL water-area.

IV. CONCLUSIONS

The results of surveys conducted for container related port users obtainthe value of customer satisfaction of TTL 2017 is 3.98 (satisfied category). While the value of customer loyalty is 3.55 (loyalty category).

Analysis with IPA methods in combining expectation factors of 57 respondents has a perspective on TTL services in Quadrant 2, where the value of customer satisfaction is higher than the value of customer loyalty. Lower TTL customer loyalty is due tohigher switching barrier factor, where customers are not satisfied with the current services in particularly on flexibility of services they require.

In the future, therefore strategies of TTL to increase switching barrier so that customer will bevery loyal to TTL is required.More attention based on customer enquiries and flexibility responses not only from higher level but also on operational level need to be importantly considered. This also includes the education effort to customers in understanding and upgrading their business process following the development of automation and digitalization process.

In detail, the TTL needs to pay more attention in eradicating of causesof future low loyalty level on the switching barrier factor in order tofulfillboth expectationof customers such as comfortability and easiness in using TTL services, also customers need to be educated in adapting various online orders and services in their business process internally. Table 8 below listed attributes that need to be considered in the future.

Customer entities	Attribute
Shipping agent domestic	• Loading loading and unloading activities in CY (Container Yard) are still slow to 2 days for capacity 1500 TEUs, normal condition 26-28 hours is completed • Registration of a set of chassis and its head to be weighing, is more flexible provided and applied
Shipping agent international	Insufficient berthlength (± 500meters), expect to providelonger jetty up to 1000meters
Forwarders	New arrangement of SIM driver access B1 and B as this time is distinguished
Ship crew domestic	The berthing line is interrupted by shipwreck and anchoring area of other boats and vessels
Ship crew international	The pilot service is often late arriving

Table 8. Attributes contribute of Loyalty Level based on Switching Barrier Factor

V. ACKNOWLEDGMENT

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