Analysis of Rail Passenger Satisfaction Level of Services At Pasar Turi Surabaya Station

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Abstract: Success in the country's economic development process must be accompanied by an improvement in the transportation system that is good according to needs and keeps up with the times that are happening. One form of transportation that continues to improve service quality is rail transportation. Train transportation during the current post-Covid-19 pandemic provides a service policy for passengers. The policy given by PT KAI (Persero) during the post-Covid-19 pandemic is that long-distance train passengers who have taken the third vaccine (booster) are not required to show negative results for the Rapid Antigen Test during boarding. In addition to post-pandemic policies, the service system and facilities at stations often have problems. As one of the largest stations in the city of Surabaya, Surabaya Pasar Turi station is required to provide excellent service. Therefore, this research was conducted to analyze the level of satisfaction of railroad passengers with services at Surabaya Pasar Turi Station. The method used in this research is the Customer Satisfaction Index (CSI) and Importance Performance Analysis (IPA). The sample size used for this study was 105 respondents. The results of this study obtained a CSI value of 84.507%, which means that train passengers are very satisfied with the service at Surabaya Pasar Turi Station. In the IPA analysis, the results show that the reliability attribute in overcoming boarding pass printing problems must be improved.

Keywords—Service Quality, Customer Satisfaction, Surabaya Pasar Turi Station, Customer Satisfaction Index, Importance Performance Analysis

1. Introduction

The transportation sector is a field that has a very vital function, especially in supporting the increase in the economic value of the community, and is the foundation for the country's economic development. Success in the country's economic development process must be accompanied by an improvement in the transportation system that is good according to needs and keeps up with the times [4]. Improving the quality of the transportation system continues to be carried out from year to year to maintain passenger satisfaction with rail transport services. Passenger satisfaction needs to be maintained because it is a parameter that determines service quality [16]. The form of improving the quality of service can be in the form of improving existing facilities at stations or in the form of policies. One form of transportation that continues to improve service quality is rail transportation. Train transportation during the current post-Covid-19 pandemic provides a service policy for passengers. This is done at all places providing rail transportation services at all stations in Indonesia.

According to Law Number 23 of 2007, a train station is a place for departures and stops for trains. One of the train stations that has implemented post-Covid-19 pandemic policy services is the Surabaya Pasar Turi station. Surabaya Pasar Turi Station is one of the largest stations in Surabaya and is included in the auspices of PT Kereta Api Indonesia (Persero) Operational Area 8. As one of the largest stations in the city of Surabaya, Surabaya Pasar Turi station is required to provide excellent service. Excellent service is the best service according to quality standards that meet customer expectations and satisfaction [13]. The excellent form of service provided by PT KAI (Persero) during the post-Covid-19 pandemic is the policy of long-distance train passengers who have had the third vaccine (booster) not required to show negative results for the Rapid Antigen Test during boarding. In addition, PT KAI also provides free vaccinations for the public and long-distance train customers at PT KAI's various health clinics [10]. In addition to post-pandemic policies, the train, as the transportation that is most in demand by the public, must also pay attention to the service system and facilities at the station. At the Surabaya Pasar Turi station, boarding pass printing services often experience printing problems due to the absence of officers accompanying passengers when printing boarding passes.

The purpose of this study was to analyze the level of satisfaction of railroad passengers with services at Surabaya Pasar Turi Station. This research has benefits for PT KAI, especially DAOP 8 Surabaya as a provider of rail transportation services in Indonesia, to evaluate passenger services at Surabaya Pasar Turi Station so that service quality can be improved and maintain passenger satisfaction.

2. Literature Review

2.1 Pasar Turi Surabaya Station

Surabaya Pasar Turi Station, with code SBI, is a train station in the city of Surabaya, which has an altitude of +1 M above sea level [9]. This station is located at Jalan Semarang No. 1, Gundih, Bubutan, Surabaya, East Java, and is the main departure point for all trains from the city of Surabaya that pass through the Pantura route (Surabaya-Bojonegoro-Cepu-Semarang-Cirebon-Jakarta). The types of trains departing from Surabaya Pasar Turi station are long-distance trains,

local or commuter trains, and freight trains. Long-distance trains that depart from Surabaya Pasar Turi Station are Argo Bromo Anggrek, Sembrani, Jayabaya, and others. Meanwhile, for local routes, there are the Sulam Commuter and Bojonegoro Local Economy trains.

2.2 Service quality

Service quality is a measure of how well the level of service provided meets customer expectations [21]. Service quality is an important part that must be considered in providing excellent service [13]. In providing excellent service, customers demand that the service be carried out optimally. If customers fail to get maximum quality service, customer expectations will not be met. Failure to meet customer expectations occurs because service quality is a form of comparison between the service perceived by the customer and the quality of service expected by the customer [17].

2.3 Customer satisfaction

Customer satisfaction is a measurement or indicator of the extent to which users of a company's products or services are very happy with the products or services received [6]. Customer satisfaction is very important to maintain customer loyalty to buy a product or use a service. Customer satisfaction is an important element in improving marketing performance in a company. The satisfaction felt by customers will increase the intensity of buying from these customers [14].

2.4 Validity test

Validity is defined as how accurately a test (measuring instrument) performs its measurement function [18]. A questionnaire can be said to be valid if the questions on the questionnaire are able to reveal something that will be measured by the questionnaire [6].

Testing the validity of this study using the corrected item-total correlation, by correlating the score of each item with the total score. The statistical technique used to calculate the correlation coefficient is the product moment technique from Pearson, using computer aids with the SPSS 26 program. With the following formula [20]:

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

With:

r_{xy} : Correlation coefficient for each variable
x : Score the question items
y : Total score of questions
$\sum x$: Total score of the question items
$\sum y$: The total score of the questions
$\sum x^2$: The sum of the squared scores of the questions
$\sum y^2$: The sum of the total squared scores of questions
n : Sample size

2.5 Reliability Test

Reliability test is a test to measure the extent to which measurement results using the same object will produce the same data [20]. A questionnaire is said to be reliable if one's answers to the statement are consistent or stable over time.

Reliability test can be done using Cronbach's alpha. Cronbach's alpha is a measure of reliability that has a range of values from zero to one [8]. Here is Cronbach's alpha formula:

$$r_{\propto} = \frac{k}{(k-1)}\left[1 - \frac{\sum_{b=1}^{k}\sigma_b^2}{\sigma_t^2}\right] \quad (2)$$

With:

$r_{\propto}$: Score *Cronbach's alpha*
k : Number of question items
σ_b^2 : Variance of the question item
σ_t^2 : Variance of the total score of all questions

2.6 Customer Satisfaction Index

Customer Satisfaction Index (CSI) is a quantitative analysis in terms of the percentage of satisfied customers in a customer satisfaction survey. CSI is needed to determine the overall level of customer satisfaction by considering the level of importance of product or service attributes [3]. Small or large CSI Customer Satisfaction Index values can be found in the following steps [2]:

1. Determining the Mean Importance Score (MIS)

$$MIS_j = \frac{\sum_{i=1}^{n}Y_{ij}}{n}; \text{j=1,2,…,p} \quad (3)$$

With
n is the number of respondents
Y_{ij} is the expected value of the ith respondent at the jth attribute

2. Calculating Weighted Factors (WF)

$$WF_j = \frac{MIS_j}{\sum_{r=1}^{p}MIS_r} x\ 100\% \quad (4)$$

With
p is the attribute of p-th importance

3. Calculating the Mean Satisfaction Score (MSS)

$$MSS_j = \frac{\sum_{i=1}^{n}X_{ij}}{n}; \text{j=1,2,…,p} \quad (5)$$

With
X_{ij} is the value of the perception or reality of the ith respondent at the jth attribute

4. Calculating Weight Score (WS)

$$WS_j = WF_j\ x\ MSS_j \quad (6)$$

5. Calculating the Satisfaction Index
The CSI value is obtained by the formula:

$$CSI = \frac{\sum_{j=1}^{p}WS_j}{HS} x\ 100\% \quad (7)$$

With
HS (Highest Scale) is the maximum scale used (scale 5).

2.7 Importance Performance Analysis

The main purpose of IPA is as a diagnostic tool in facilitating the identification of attributes based on their respective interests, whether the product or service is underperforming or overperforming [1].

To carry out an IPA analysis, the following steps are carried out:

1. Calculating Conformity Prices (with IPA analysis)
    The X axis will be filled with performance level scores, and the Y axis will be filled with importance level scores. To simplify the formula, each attribute that affects customer satisfaction can be identified by the formula:

$$\bar{X}_j = \frac{\sum_{j=1}^{n} X_{ij}}{n}; \ i = 1,2,\ldots,p \qquad (8)$$

$$\bar{Y}_j = \frac{\sum_{j=1}^{n} Y_{ij}}{n}; \ i = 1,2,\ldots,p \qquad (9)$$

With
$\bar{X}_j$: the average score of the implementation/reality level to -j.
$\bar{Y}_j$: the average score of the jth level of importance/expectation.
n: the number of respondents.
p is the number of attributes/questions.

2. Interpret the results of IPA calculations in a Cartesian diagram
   The Cartesian diagram is a building of four parts bounded by two lines that intersect perpendicularly at the points . is the average of the average score of the level of implementation or customer satisfaction of an attribute factor and is the average of the average score of the importance of all factors or attributes that affect customer satisfaction. Formula used:$(\bar{\bar{X}}, \bar{\bar{Y}})\bar{\bar{X}}\bar{\bar{Y}}$

$$\bar{\bar{X}} = \frac{\sum_{i=1}^{k} \bar{X}_I}{k}; \ i = 1,2,\ldots,k \qquad (10)$$

$$\bar{\bar{Y}} = \frac{\sum_{i=1}^{k} \bar{Y}_I}{k}; \ i = 1,2,\ldots,k \qquad (11)$$

With
k is the number of factors or attributes that influence consumer satisfaction.
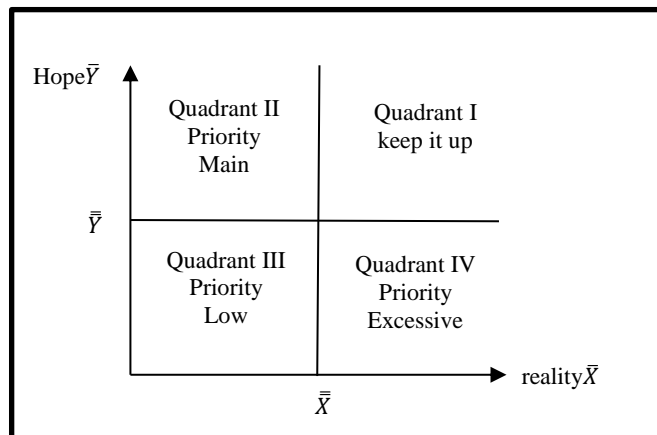
Picture1. Cartesian diagram

Indicating the main service elements that have been successfully implemented for which it must be maintained is considered very important and very satisfying.
b. Quadrant II
Shows the factors or attributes that are believed to affect customer satisfaction, including service elements that are considered very important, but management does not implement them according to the wishes of customers so that it disappoints or dissatisfies them.

c. Quadrant III
Indicates some factors that are less important to the customer. General company performance. Considered less important and unsatisfactory.
d. Quadrant IV
Shows that the factors that affect customers are less important but overly applied. Considered less important but very satisfying.

3. Methodology

3.1 Data and Data Sources

The source of data used in this study is primary data obtained by conducting a survey of train passengers at Surabaya Pasar Turi Station. The survey was conducted by distributing questionnaires and face-to-face interviews with train passengers at Surabaya Pasar Turi Station from November to December 2022.

3.2 Data collection technique

In this study, the target population to be selected was train passengers at Surabaya Pasar Turi Station. The data collection technique in this study used purposive sampling by selecting respondents based on certain objectives and considerations. Because the population is unknown, the sample calculation uses the formula (Lemeshow, 1997) [11] as follows.

$$n = \frac{z^2_{1-\frac{\alpha}{2}}P(1-P)}{d^2} \qquad (11)$$

Is known:
n: Minimum number of samples.
Z: Normal distribution quartile value with significant level α=5%.
P: Optimal estimation (P=0.5%).
d:Sampling precision/error rate.

So that:

$$n = \frac{(1,96)^2 0,5(0,5)}{0,1^2} = 96,04$$

From the results of the calculation above, it is obtained that the minimum number of samples to be taken is 96 respondents.

4. Results

4.1 Validity test

A questionnaire can be said to be valid if the questions on the questionnaire are able to reveal something that will be measured by the questionnaire [6]. Zi,j is the attribute of satisfaction from the ith dimension to the jth question. The validity test shows the following results.

table1. Test the Validity Dimension of Reliability

Variable	Information	p-values	decision	Conclusion
Z1.1	The reliability of officers in	0.000	Reject H0	Valid

Variable	Information	p-values	decision	Conclusion
	handling the problem of printing train passenger boarding passes.			
Z1.2	The speed of the refund process for canceling train tickets.	0.000	Reject H0	Valid
Z1.3	Application of train ticket fares.	0.000	Reject H0	Valid
Z1.4	Knowledge of customer service officers regarding all forms of requirements for train travel during the post-pandemic period.	0.000	Reject H0	Valid

Based on Table 1 the results of the validity test for the reliability dimension using software, it was found that all question variables had a p-value smaller than α = 0.05, which means rejecting H0 so that it can be concluded that all question items in the questionnaire are valid.

table2. Test the Validity Dimension of Reliability

Variable	Information	p-values	decision	Conclusion
Z2.1	Responsiveness of officers in helping passengers print boarding passes.	0.000	Reject H0	Valid
Z2.2	Responsiveness of customer service officers in providing answers to passenger questions.	0.000	Reject H0	Valid
Z2.3	The alertness of officers in serving	0.000	Reject H0	Valid
	check-in or boarding passengers.			
Z2.4	Responsiveness of officers in providing information on the location of the railroad tracks and passenger cars.	0.000	Reject H0	Valid
Z2.5	The alertness of officers in directing the flow of passenger departures.	0.000	Reject H0	Valid

Based on Table 2 the results of the validity test for the responsiveness dimension using software, it was found that all question variables had a p-value smaller than α = 0.05, which means rejecting H0 so that it can be concluded that all question items in the questionnaire are valid.

table3. Guarantee Dimensional Validity Test

Variable	Information	p-values	decision	Conclusion
Z3.1	Readiness of security officers in ensuring the safety of passengers.	0.000	Reject H0	Valid
Z3.2	Friendliness and courtesy of officers in serving train passengers.	0.000	Reject H0	Valid
Z3.3	Implementation of health protocols in the post-pandemic period.	0.000	Reject H0	Valid

Based on Table 3 the results of the validity test for the dimension of guarantee using software, it was found that all question variables had a p-value smaller than α = 0.05, which means rejecting H0 so that it can be concluded that all question items in the questionnaire are valid.

table4. Empathy Dimension Validity Test

Variable	Information	p-values	decision	Conclusion
Z4.1	The responsiveness	0.000	Reject H0	Valid

	of the officers gave directions to passengers regarding new post-pandemic policies.			
Z4.2	Call center service that functions 24 hours.	0.000	Reject H0	Valid
Z4.3	The use of language that is easy to understand when providing information by officers.	0.000	Reject H0	Valid
Z4.4	Solutions given by officers to passenger problems regarding the use of rail transportation services.	0.000	Reject H0	Valid

Based on Table 4 the results of the validity test for the empathy dimension using software, it was found that all question variables had a p-value smaller than α = 0.05, which means rejecting H0 so that it can be concluded that all question items in the questionnaire are valid.

table5. Test the Validity of the Direct Evidence Dimension

Variable	Information	*p-values*	decision	Conclusion
Z5.1	Cleanliness of the Surabaya Pasar Turi station area.	0.000	Reject H0	Valid
Z5.2	The comfort of the passenger waiting room.	0.000	Reject H0	Valid
Z5.3	Cleanliness and comfort of the toilet.	0.000	Reject H0	Valid
Z5.4	Availability of vehicle parking area.	0.000	Reject H0	Valid
Z5.5	Availability of places of worship.	0.000	Reject H0	Valid
Z5.6	Cleanliness and tidiness of officers in appearance.	0.000	Reject H0	Valid
Z5.7	Availability of ATM machines that are complete, modern, and always operational 24 hours.	0.000	Reject H0	Valid

Based on Table 5 the results of the validity test for the dimension of direct evidence using software, it was found that all question variables had a p-value smaller than α = 0.05, which means rejecting H0 so that it can be concluded that all question items in the questionnaire are valid.

4.2 Reliability Test

The instrument has a very high level of reliability if the Cronbach's Alpha coefficient value is greater than 0.8, then it can be said to be highly reliable if the Cronbach's Alpha coefficient value is between 0.6 to 0.8, then it can be said to be moderately reliable if the Cronbach's Alpha coefficient value is between 0 .4 to 0.6, then it can be said that reliability is low if the value of the Cronbach's Alpha coefficient is between 0.2 to 0.4.

table6. Reliability Test Results 5 Dimensions of Service Quality

Variable	*Cronbach's Alpha*	Conclusion
Reliability Dimension (Z1)	0.648	High Reliability
Responsiveness Dimension (Z2)	0.698	High Reliability
Warranty Dimensions (Z3)	0.637	High Reliability
Empathy Dimension (Z4)	0.637	High Reliability
Direct Proof Dimension (Z5)	0.799	High Reliability

Based on Table 6 it can be seen that the results of the analysis with Cronbach's Alpha values for the five dimensions (Reliability, Responsiveness, Assurance, Empathy, and Direct Evidence) have high reliability with Cronbach's Alpha values between 0.60 to 0.80.

4.3 General Characteristics of Respondents

Based on the survey results, the characteristics of the respondents were obtained as follows.

table7. Characteristics of Respondents

Characteristics	Information	Presentation
domicile	Surabaya	49.52%
	Outside Surabaya	50.48%

Z5.6	4.665714	4.486764	4.470476	20.05797
Z5.7	4.457143	4.286192	4.247619	18.20611
Total				422,537
CSI value				422,5337
				5
				= 84.507

4.5 Importance Performance Analysis (IPA) analysis

The importance Performance Analysis method (level of importance and performance) is used to determine the level of customer satisfaction, as well as what attributes need to be repaired and maintained for the services that have been provided so that it can be the basis for increasing customer satisfaction [15]. Following are the results of the IPA analysis on the five dimensions of service quality.
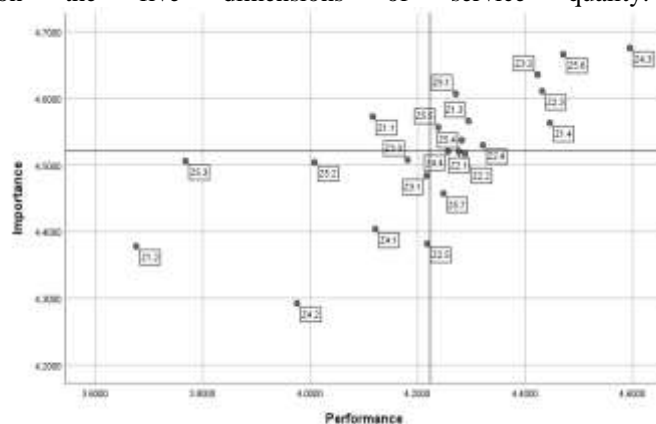
Picture2. IPA analysis

Based on Figure 2, the attributes included in quadrant I as superior service so that it needs to be maintained are:

Application of train ticket rates (Z1.3), knowledge of customer service officers regarding all forms of requirements for traveling on trains during a post-pandemic period (Z1.4), alertness of officers in serving check-in or boarding passengers (Z2.3), the responsiveness of officers in providing information on the location of the railroad tracks and passenger cars (Z2.4), the friendliness and courtesy of the staff in serving train passengers (Z3.2), the use of language that is easy to understand when providing information by officers (Z4.3), the cleanliness and tidiness of the officers in appearance (Z5.6), cleanliness of the Surabaya Pasar Turi station area (Z5.1), availability of places of worship (Z5.5), and availability of vehicle parking areas (Z5.4). Then,

Attributes that are included in quadrant III as low-priority services and service elements are not considered by passengers, namely:

The speed of the refund process for canceling train tickets (Z1.2), the alertness of officers in directing the flow of passenger departures (Z2.5), the readiness of security officers in ensuring passenger safety (Z3.1), the application of health protocols in the post-pandemic period (Z3. 3), the responsiveness of officers in providing directions to passengers regarding new post-pandemic policies (Z4.1), call

### 4.4 Analysis of Customer Satisfaction Index (CSI)

The results of the calculation of the CSI value are 84.507%. This value is in the value interval of 81% -100%, which means that passengers are very satisfied with the services of Surabaya Pasar Turi Station. Even though it has received a very good CSI score, Surabaya Pasar Turi Station needs to improve and maintain the quality of services provided to train passengers.

table8. CSI calculations

Varia ble	Average Expecta ncy Score (MISj)	*Weight Factor*(W Fj)	Average Satisfacti on Score (MSSj)	*Weight Score*(W Sj)
Z1.1	4.572381	4.397011	4.11619	18.09893
Z1.2	4.378095	4.210177	3.67619	15.47741
Z1.3	4.565714	4.3906	4.294286	18.85449
Z1.4	4.562857	4.387852	4.445714	19.50714
Z2.1	4.52	4.346639	4.27619	18.58706
Z2.2	4.517143	4.343891	4.287619	18.62495
Z2.3	4.610476	4.433645	4.431429	19.64738
Z2.4	4.529524	4.355797	4.320952	18.82119
Z2.5	4.381731	4.213673	4.217143	17.76966
Z3.1	4.48381	4.311836	4.21619	18.17952
Z3.2	4.635238	4.457457	4.422857	19.7147
Z3.3	4.507619	4.334733	4.180952	18.12331
Z4.1	4.40381	4.234905	4.120952	17.45184
Z4.2	4.292381	4.12775	3.975238	16.40879
Z4.3	4.675238	4.495923	4.594286	20.65555
Z4.4	4.52	4.346639	4.25619	18.50012
Z5.1	4.606667	4.429981	4.270476	18.91813
Z5.2	4.50381	4.331069	4.007619	17.35728
Z5.3	4.505714	4.332901	3.767619	16.32472
Z5.4	4.537143	4.363124	4.281905	18.68248
Z5.5	4.55619	4.381441	4.238095	18.56897

center services that function 24 hours (Z4.2), the comfort of passenger waiting rooms (Z5.2), and the cleanliness and comfort of toilets (Z5 .3).

In quadrant IV, the attributes included as low priority services and service elements that are less important, but the service is satisfactory, namely the responsiveness of customer service officers in answering passenger questions (Z2.2), the responsiveness of officers in helping passengers print boarding passes (Z2.1), solutions provided by officers regarding passenger problems regarding the use of rail transportation services (Z4.4), and the availability of ATM machines that are complete, modern, and always in a 24-hour operating condition (Z5.7).

5. Conclusion

The results of the analysis of the level of satisfaction of railroad passengers at Surabaya Pasar Turi Station based on the CSI calculation results were 84.507, which means that train passengers were very satisfied with the service at Surabaya Pasar Turi Station. Then, based on the results of the IPA analysis, the priority service and the need to improve performance to maintain service quality is the reliability of officers in handling the problem of printing train passenger boarding passes.

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