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### **Study Of Quality Of Service Operations Train Commuter Surabaya-Lamongan**

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#### **Abstract**

Operation KA Kommuter Daop VIII in Surabaya Surabaya route-Lamongan is an effort to reduce congestion Lamongan is one of the smaller cities around Surabaya who donated immigrants is quite a lot to the city of Surabaya. This is because the mileage Lamongan - Surabaya is not too far and not too difficult to be reached by different types of vehicles. A considerable number of immigrants will increase congestion on road sections in Surabaya. Not to mention if it is added to the user's path from Surabaya itself. Mass transit is the quality of service with a range of local mass transportation is available for those who pay for specified and designed it to move some passengers bear the same time, one of the forms of transportation services is the mass rapid transit train commuting. Commuter Train Launch Surabaya-Lamongan Department in February 2006, giving out a lot of choices to passengers in the selection of mode of transport to be used. In addition to the above understanding memepinyai mass rapid transit services quality understanding angkutanyang have a fixed route and schedule examples are bus and train. This mode of transportation is not serving permintaan but menyediakan fixed service, good schedules, rates and trajectories. To know the services provided to users of the commuter rail / commuter rail passengers, a study conducted by distributing questionnaires distributed to passengers with questions to determine the number of passengers, gender, age, education, occupation and reason for choosing last mass transit Commuter Train . This study using analysis descriptive

and quantitative. Technique data collection is done through literature study, questionnaires, and interviews. Method of sampling used is a non probability sampling with sampling using accidental sampling. Technique data analysis done by using method Importance Performance Analysis (IPA). The result is known that public transport non stretch Surabaya-Lamongan, operates every day with a frequency of 1 (one) commuting 3 (three) cars with a 2 (two) times the round trip is when the morning at 04:15-05: 06 and on a afternoon the day 3:58 p.m. to 16:59, headway keberangkatan Komuter Surabaya-Lamongan which is an average 4.85  $\approx$  5 minutes headway of arrival of an average of 6 menin, travel time Api Komuter Surabaya Lamongan <2 hours and factor unloading (load factor) 95% From the results of all indicators were operational could disimpulkan average quality operational service CART Api Komuter Surabaya-Lamongan pretty good nice.

### **Key words**

Quality Service Train Api commuting, Services the operational

### **Preliminary**

Indonesia Train Operation Region VIII (Surabaya) since February 2006 and remains beroperasi today. For now just 1 Railway commuter routes serving Surabaya - Lamongan (SULAM). 1 train set consists of three carriages, with a capacity of one carriage to accommodate about 168 passengers (interviews of PT KAI DAOP VIII). Type Railway operated as Railway Commuter rail is the type Diesel Electric (KRD - E). In fact that is happening on the ground, commuter trains Surabaya - Lamongan when performing activities often encountered the problem that their delays are detrimental to society commuter rail facility users.

With a high enough density, local governments and Lamongan Surabaya provide one alternative to reduce the level of congestion that exists is to provide mass transportation which in this case is the Railway commuting. Besides expected to reduce congestion on the streets, Train commuting is also expected to increase productivity and save time so that people avoid stress when to and from work.

But some day yesterday Railway commuter majors Surabaya - Lamongan not operate approximately two days, because there is damage to one of the tools that made air-operations Train commuters and also no damage to the carriage, because the workshop in Surabaya can not handle it finally carriages and his surgical sent abroad. Therefore it will be more users, or people who use services Railway commuters will switch modes and use of private vehicles. In this case people will spend more, and therefore people expect the Central Office DAOP VIII Surabaya can overcome these problems and facilitate the workshop Train commuters, so not far to send equipment Railways were broken so not long to wait and to be able to operate regularly. Train Commuters constraints encountered by passengers juga that damage to the seat, the handle stands, jenddela and fans.

In a study of the quality of operational services Railway Commuter

Surabaya-Lamongan, will focus on the characteristics of rail operations and the quality of their train services using Importance Performance Analysis (IPA) as a measure of the suitability of the service on Railway Commuter Sulam (Surabaya-Lamongan).

## **Literature Review**

### **Commuter Train**

Train commuters are passenger trains that carry passengers in urban areas or on the outskirts of town to town. The commuter train usually serves at peak hours (peak hours). (Lloyd Wrigh and Karl Fjellstrom 2003) Railway means of transport such as vehicles powered by motion, either walking alone or coupled with other vehicles, which will move on rails. (Naylil, 2011)

- a. Commuter Train excellence.
  - 1) Has a greater carrying capacity compared to other public transportation, such as buses, so it can mamindahkan large number of passengers from one place to another.
  - 2) Have a special line, so it does not interfere with other road users.
  - 3) The travel time is relatively faster than the other freight for the same purpose.
- b. Commuter Train weakness.
  - 1) Area less extensive coverage, it can not reach remote areas because the train is only intended to reach certain areas daerah
  - 4) Train schedules, passengers must be willing to adapt to the existing schedule and had to wait patiently if the train is delayed.

### **Importance Performance Analysis (IPA)**

Importance Performance Analysis (IPA) was introduced by Martilla and James in 1977 to measure the relationship between the priority of improving the quality of products / services also known as the quadrant analysis and consumer perception IPA has been generally accepted and used in various fields of study because of the ease to apply and display analysis results which facilitate performance improvement proposal.

IPA aims to display information relating to the factors which, according to customer service greatly affects their loyalty and satisfaction, and the factors which according to the customer service needs to be improved because the condition is not currently satisfy the customer. IPA brings together the performance level factor measurements (performance) and the level of importance (importance) are then illustrated in the diagram is a two-dimensional diagram of importance-performance to gain practical proposals and facilitate explanation of the data.

### **Assessment Method**

### **Primary data**

Primary data is data or obtain the source reference that comes from direct observation in the location mentioned in the problem, these data are:

- a. Characteristics of the commuter train users Surabaya - Lamongan.
- b. The type of service provided by commuter Surabaya - Lamongan or DAOP VIII to users (user) obtained by distributing questionnaires / questionnaire.
- c. Perception users or commuter rail passenger Surabaya - Lamongan obtained by distributing questionnaires / questionnaire.
- d. User expectations or commuter rail passenger Surabaya - Lamongan obtained by distributing questionnaires / questionnaire.
- e. Facility services that the company provides commuter rail Surabaya - Lamongan obtained by interviews with a number of employees including the driver.

Calculation of number of wagons drawn by the circulation time, frequency, headway, travel time, and load factor.

### **Secondary Data**

Secondary data is data collected indirectly from the source. Secondary data can be obtained through journals - journals, magazines, newspapers and other literature. Secondary data were collected as follows:

- a. Data on the number of passengers
- b. Data amount Commuter Train Surabaya - Lamongan

### **Location and Time**

Location studies carried out in several places, namely:

- a. In the Commuter Train  
Distributing questionnaires on railway passengers commuting and observe the number of users and the condition of the train.
- b. Station and Shelter

Studies conducted on the corridor Surabaya - Lamongan consisting of seven stations starting from Pasar Turi station - Station Lamongan. The study was conducted by observing the pattern up and down passengers along and condition of the station or shelter.

Implementation of the survey conducted during the four (4) days and consists of two business days (Tuesday and Wednesday) and two days during the holidays (Coir and Sunday). Before previously conducted pilot survey (preliminary survey of some of the respondents), namely on Monday and Tuesday. Time observations were made in accordance with the train operating times are:

- a. Morning rush hour from Pasar Turi Station - Station Lamongan.
- b. Namely the afternoon rush hour commute direction of Turi- Market Station Lamongan Station.
- c. Time is not busy breakfast or lunch is station Lamongan - Pasar Turi station.

This is done to obtain data representing all the time, so that can know the number of movements made by the user.

### Data Analysis Methods

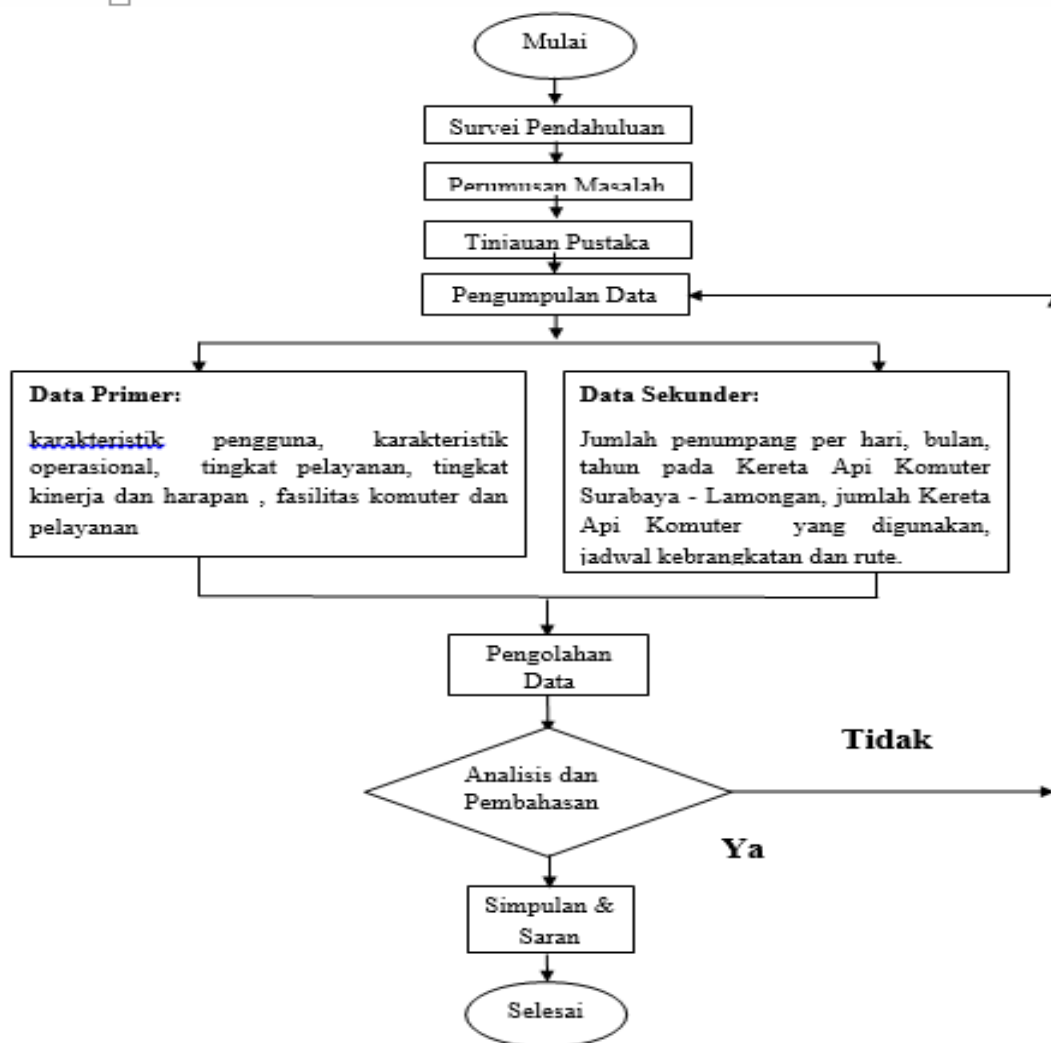
#### The data analysis method comprising

##### 1. Descriptive analysis

Descriptive analysis is a technique for making a systematic description, factual, and accurate information about the object of study. This analysis is done by interpreting the data on the identity of the respondents were obtained from the questionnaire as well as an overview of the products offered.

##### 2. Quantitative analysis

Quantitative analysis aims to add a data and generally use some form and statistical data.



Flow Chart

**Results And Discussion**

**Karakteristik Operational Commuter Train**

**Frequency**

Frequency the number of trains departing at a time unit, unit of time used is buggy minute, this frequency also determines the length of waiting time.

Frequency an inverse ratio with the headway, so the higher the headway of the lower frequency and vice versa. But in the mass transit commuter train to calculate the frequency of required time per day because there are definite schedule to keep. From the data collected then the frequency data obtained as follows:

Table 1 Frequency Commuter Train Surabaya - Lamongan

<b>Time (days)</b>	<b>total Train</b>	<b>origin Destination</b>	<b>Departure time</b>	<b>Information</b>	<b>Frequency</b>
1 day	1 KA Commuter	Surabaya Pasar Turi Station	a. 4:15 to 05:06 16:00 to 16:59	Morning Schedule Afternoon Schedule	2 Times / Day
1 day	1 KA Commuter	station Lamongan	b. 5:25 to 06:15 17:17 to 18:20	Morning Schedule Afternoon Schedule	2 Times / Day

Source: data processing, 2013

**Headway**

Headway is the distance between commuting time on a rail track of the same. The smaller the value headway the higher the frequency shows commuters that would cause waiting times low, this is a favorable condition for the passengers, but for operators if the high headway dimbangi not a high demand for it will result in a loss. To know headway majors Commuter Train Surabaya - Lamongan This can be done by looking Commuter Train departures and arrivals at Surabaya Pasar Turi station or the Lamongan station without doing a survey.

- a. Headway departures KA Komuter Surabaya - Lamongan, with an average headway of 5 minutes.
- b. Headway Arrival KA Komuter Surabaya - Lamongan, with an average headway of 6 minutes.

**Traveling time**

From data collection activities undertaken by direct observation of the transit travel time Commuter Train Surabaya - Lamongan, obtained the results as follows:

- a. The survey was conducted on 1 Commuter Train with 3 wagons from Surabaya turi market station to station along the journey Executed Lamongan Surabaya - Lamongan, Railway Surabaya - Lamongan through the route starting from Turi- Market Station Tandes Station - Station Kandangan - Benowo stations - Station Cerme - Sit stations - station Lamongan.

- b. From direct observation and data processing by averaging, it can be concluded the travel time from Surabaya turi market station to station Lamongan <2 hours.

### load Factor

The analysis is intended to measure the load factor passenger capacity each trip, so the load factor of the data, will be known whether each car of each station capable of carrying passengers in every carriage of the maximum capacity, When viewed from the interests of public service users, a low load factor would be fun for public service users more flexibility and loose his seat harness. But for companies Train commuting orPT. KAI (Persero) DAOP VIIIILoad factor is low will harm them. To mengetahui Load Factor on Commuter Train Surabaya - Lamongan can be described by the table 4.9 as follows:

$$\text{load factor} = \mathbf{X100\%} \frac{\text{jumlah penumpang}}{\text{kapasitas}}$$

carriages I

At the first hoppers are 62 seating (m).

Use the seating comfort of 0.167 to 0.25 m<sup>2</sup> / space. In this analysis the convenience stand (used was 0.25 m<sup>2</sup> / space.σ)

$$m' = \frac{Ab}{\sigma}$$
$$m' = m' = 72.68 \frac{(0,9 \times 2,6) + (1,3 \times 2,8) + (0,9 \times 9,5) + (1,3 \times 2,8)}{0,25}$$
$$m' = 73 \text{ passengers}$$

I train carriage capacity Sulam = m + m' = 62 + 73 = 135 passengers

Carriage II and III

m (seating capacity) = 68 passengers in comfort standing (0.25 m<sup>2</sup> / space.σ)

$$m' = \frac{Ab}{\sigma}$$
$$m' = \frac{(0,9 \times 2,6) + (1,3 \times 2,8) + (11,65 \times 0,9) + (2,05 \times 2,8)}{0,25}$$

m' = 89

m' = 89 passengers

II and III capacity carriage train embroidered =

m + m' = 68 + 89 = 157 passengers

carriages IV

with the convenience of standing (0.25 m<sup>2</sup> / spaceσ)

$$m' = \frac{Ab}{\sigma}$$
$$m' = \frac{(0,9 \times 2,6) + (1,3 \times 2,8) + (11,65 \times 0,9) + (2,05 \times 2,8)}{0,25}$$

m' = 89 passengers

II and III capacity carriage train embroidered = m + m' = 68 + 89 = 157 passengers

Total seating capacity is 258 passengers, with a maximum capacity of 595 passengers number

Data on the load factor in the can with table 4.9 of the dynamic survey results are as follows:

Table 2 Load Factor KereFire ta commuting Surabaya - Lamongan

No.	KA. commuting	total Passenger	Capacity	load Factor
1	The carriages 1	114	144	79%
2	The carriages 2	139	144	97%
3	The carriages 3	158	144	110%
Average - Average Load Factor				95%

Source: data processing, 2013

**Analysis Method of Importance Performance Analysis (IPA)**

Analysis Importance Performance Analysis (IPA) aims to determine the perception of the level of interest and gratification of passengers Railway Surabaya - Lamongan. Analysis of the level of importance and satisfaction is done to measure the respondents' opinions about the facilities located on the train with a passenger who answered some pertanyaan with variables containing existing services. The results of this analysis can be seen how much the level of passenger satisfaction with their expectations. The satisfaction level of care can be assessed by comparing the average total performance (x) and interest (y).

Attributes in the questionnaire assessment Importance Performance Analysis (IPA), which will be assessed the level of interest and the level of satisfaction by the passenger train. After making all the data from the questionnaire method IPA will then test the validity and reliability of the questionnaire data. Thereafter, if the data valud meal will do an analysis to see the level of interest and suitability of performance on each attribute questionnaire.

**Cartesian diagram**

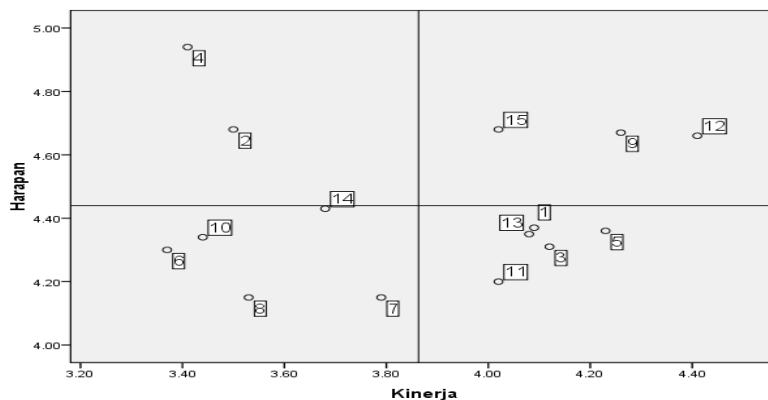


Figure 1 Diagram Cartesian

The results of measurement of the elements of these services based on the level kinerja and hopes that enables the service provider to be able to focus improvement efforts on the attributes that really are important to the passengers. In Figure 4.10 shows that the layout of the attributes that affect service quality Commuter Train Surabaya-Lamongan is divided into four sections.



**Existing problems**

The study results obtained various problems in the Railways commuting during the trip from the station to the station Surabaya Pasar Turi Lamongan. Therefore, it is necessary to repair the commuter train service quality Surabaya-Lamongan. Here are the entries that can be given to companies in order to provide penteleasaian to the problems that occur in the field:

Table 3 Issues Available In Field

<b>NO.</b>	<b>Problem</b>	<b>completion</b>
<b>1.</b>	The number of passengers exceeds the capacity of the trains, especially at rush hour	Need the addition of a railway carriage so that it can make passengers feel safe and nyamanan.Do not sell tickets train exceeds the capacity that has been determined the PT. KAI (Persero) DAOP VIII Surabaya.
<b>2.</b>	Facilities such as the passenger's seat and the train window inadequate	It needs a repair and maintenance facility on a regular basis.Giving sanctions against passengers who vandalized the facilities in the train
<b>3.</b>	Poor hygiene	Provision of trash on every carriage.Janitor cleaning their trains before and after the operation.Captioning for a ban on throwing garbage everywhere.
<b>4.</b>	The absence of toilet facilities inside the train	Need the addition of toilet facilities on each railroad car.
<b>5.</b>	The lack of space for storing passenger luggage.	Need additional passenger luggage storage area so that more secure passenger luggage.

**Efforts Repair and Improvement Railway Facility In Surabaya - Lamongan**

From the results of the study are encouraged to provide repair, feedback and suggestions on the factors that are still lacking support for the benefit of the customer. Multiple input / advice that can be given to the improvement of service quality Commuter Train Surabaya - Lamongan can see in the table below:

Table 4 Feedback / Suggestions for Improvement of Service Quality Operational Commuter Train

No.	Indicator	Existing condition	level of Compliance	Quadrant	Suggestions/Feedback	Information
<b>A. Physical Appearance (Tangible)</b>						
1	Completeness of train facilities are fulfilled	Inadequate facilities	93.54%	D	Rejuvenation and improvement of the commuter train that his condition was not roadworthy (maximum 5 years of use). The need for additional and improved facilities in the commuter train.	
2	Cleanliness and comfort in the train	The floor was dirty commuter Garbage not disposed disembarking place. Security is less than optimal	85.20%	A	Hiring a janitor to clean the bus before and after the bus operation Provide a trash can carriage. Make writings containban on littering.	Immediately make repairs
3	Conditions look good rail	The condition of the windows and doors commuter poor.	95.50%	D	Rechecking the condition of the windows and doors to avoid damage in transit before the train departed. Periodic servicing.	
<b>B. Reliability (Reliability)</b>						
4	Timeliness and berangkat arrive on schedule	Departure time and arrival time is not appropriate on schedule	83.05%	A	Setting the train arrival and departure order on time or according to the schedule on the ticket.	Immediately make repairs
5	Can soothe the customer if there is a problem	Masinis. kondektur able to handle problems that arise with the good.	97.11%	D	Provide training on how traffic is good and right. Establish standartertentu in hiring driver or conductor.	
<b>C. Responsiveness (Responsiveness)</b>						
6	Immediately followed up the complaint process	Lack of personnel in trains	78.37%	C	Extra security officers and conductor. Showing the empty seats to passengers	
7	Security on the train	Lack of security in trains.	92.98%	C	Officers keeping their stuff during the trip and remind passengers what if there are passengers who missed the goods	
8	The speed and responsiveness kondektur	The conductor is less rapid and responsive in dealing with problems.	74.89%	C	Stay calm when dealing with problems that arise. Coordinate or contact the company when the problem occurred	
9	The conductor always be polite to the passengers	The conductor is less friendly to passengers.	91.29%	B	Instill all employees respect and courtesy to all passengers. Employees must always give a smile to passengers.	
<b>D. Assurance (Assurance)</b>						
10	Comprehensive knowledge of the conductor or driver to be able to answer the question of passenger	The lack of attention or knowledge on the train.	79.21%	C	Employees should be more communicative to passengers	
11	Security luggage in commuter train	Security is quite optimal.	95.98%	D	Prioritize the safety of passengers. Separating passenger luggage with each other.	
12	Ticket reservations / ticket purchases easy.	Booking is quite difficult and queued.	94.54%	B	Two doors should be opened for the purchase of tickets for commuter trains and also officers to avoid scalpers	
<b>E. Empathy (Empathy)</b>						
13	Give positive feedback, if passengers make mistakes	Lack of communication between the crew of a commuter train with passengers.	93.76%	D	It shall train officers maintain good communication with passengers.	
14	Respect and value the opinions of passengers	Lack of communication between the crew of the commuter train with passengers	77.69%	C	Sanctions to those with less rama to passengers.	
15	Companies earnest attention to the interests of customers	Commuter trains deliver passengers to their destination safely.	85.88%	B	Prefer the safety of passengers to their destination and provide a guarantee	

## **Conclusion**

Conclusions from the study of the operational service quality commuter train Surabaya - Lamongan which can be obtained from the writing is as follows:

1. Basically PT. KAI (Persero) DAOP VIII perusahaan mass transit Commuter Train Surabaya - Lamongan in the activities of the operational characteristics have a pretty good operating system, it can be shown by:
  - a. Schedule operates two (2) times a day ie morning, from Surabaya turi market station - Lamongan berangkat at 4:15, arrived at the station Lamongan at 05:06 and in the afternoon berangkat of turi market station to station Lamongan at 16 : 00 to 16:59 o'clock stasiun Lamongan, has a number of mass transit as much as 1 (one) unit consists of three carriages.
  - b. Headway on operational Commuter Train Surabaya - Lamongan, leaving the average headway  $4.85 \approx 5$  minutes and headway come an average of 6 minutes, from the average headway berangkat and came to conclude that these Commuter Train headway Surabaya - Lamongan is normal.
  - c. Frequency Commuter Train operations can be:  
Fresuensi accordance with the table above.
  - d. load factor on operational Commuter Train Surabaya - Lamongan that is equal to 95%. of the minimum standard of 70% load factor.
  - e. Train travel time commuting Surabaya - Lamongan can diketahui is <2 hours drive.
2. Quality of services provided by the mass transit company PT. KAI (Persero) DAOP VIII classified as less good. It can be seen from the calculation of the average score of performance and expectations on every indicator / service attributes. The calculations show the overall score of the average level of performance (X) is smaller than the average score of the level of expectation (Y) and for the total average performance scores also showed a smaller value than the average total score of expectations (  $X < Y$ ) that is equal to  $(X) = 3.86$  and  $(Y) = 4.44$ .

## **Suggestion**

The advice can be given of this final project to be used as inputs for the PT. KAI (Persero) DAOP VIII, namely:

1. Need for Extra carriages to the Railway commuter route Surabaya - Lamongan so that passengers do not jostle and can meet the needs of passengers.
2. There should have additional facilities, and the number of seats. Other facilities that need to be addressed is the air circulation, door, and window this can be overcome by improvements fan repair automatic doors and windows, it may be necessary also the addition of the toilet because there was no toilet in the train, and safety is the main priority that need attention ,

3. It needs a conductor in each carriage for meminimalisis their passengers who do not have a ticket.
4. Build a double track to minimize delays in the arrival / departure of trains due to the crossing.

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