

Analysis of Service Performance at Kotabumi Lampung Train Station using the Kano Method

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ABSTRACT

The Railway Station is an essential thing in the operation of the train. Passenger trains will raise and lower passengers, both the initial destination of passengers and transit. Kotabumi Railway Station is a station whose activities are to raise and lower passengers; in this case, the train station must have excellent and effective service performance for passengers. So, it is necessary to research the level of passenger satisfaction with the benchmarks for the service performance of train stations regulated in the Minister of Transportation Regulation No. 63 of 2019 concerning Minimum Service Standards. These benchmarks are then submitted as questions to the passengers, which are then processed using the kano method to determine the level of passenger needs and satisfaction. The kano method on the level of passenger satisfaction at the Kotabumi Railway Station results in that 19 attributes are one-dimensional where service performance if fulfilled, will experience the pleasure that is balanced with the existing version, and six characteristics of satisfaction levels are in the indifferent category, namely service performance must remain maintained. Furthermore, the highest CS and DS values were obtained for information on train arrivals and station operating schedules. If this service performance is fulfilled, the passenger satisfaction level is 0.77. If the service performance is not fulfilled, passenger disappointment is at -0.82, so this attribute must be a top priority.

Keywords: *Trains; Railway Stations; Service Performance; Kano Method*

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INTRODUCTION

Stations are the main requirement for trains to carry out activities. This is because trains need a station as the centre for controlling train operations. As a train control centre, the station has one function: picking up and dropping off passengers. Kotabumi Train Station is a station that picks up and drops off passengers as a transit point or destination for passengers. This station is in Cempedak Village, Kotabumi District, North Lampung Regency. In serving Kotabumi station passenger activities, they must have satisfactory service performance based on the applicable Minimum Service Standards regulated in Minister of Transportation Regulation No. 63 of 2019 concerning Minimum Service Standards. So, it is necessary to research the service performance of the Kotabumi Train Station as measured by the level of passenger satisfaction. From the results of the level of passenger satisfaction, it can be seen how well the existing service performance is. The results of passenger satisfaction levels are then used as reference material for the Kotabumi Railway Station to make improvements and improvements in satisfying passengers in terms of service performance.

1. Train

A train is a form of transportation commonly used by the general public that moves on rails and consists of a locomotive and carriages. This transportation is used en masse and has its own quality and integrated advantages compared to other transportation.

There are 5 types of trains, namely passenger trains, goods trains, mixed trains, work trains and relief trains. Passenger trains are trains specifically used to load people as rail transportation. Trains have several operational characteristics. The operational character of trains is that every train movement always starts from the point of origin or station and ends at a certain destination point, which, of course, is a station. Then the running train can be controlled or stopped, even by the engineer as the train driver, so transportation is very controlled. , has its route and is scheduled. The Train Travel Chart (GAPEKA) has prepared the train schedule to make it easier for train officers to prepare for work shifts, service or maintenance of machines and functions on the train.

2. Kotabumi Train Station

Kotabumi Train Station is a train station located in Cempedak Village, North Kotabumi District, North Lampung Regency, which was founded on January 2 1921. This station carries out passenger activities, both dropping off passengers and picking up passengers on the Kuala Stabas Train on the Bandar Lampung- Baturaja round trip and the Rajabasa Train route from Bandar Lampung Train Station to Keretapati Train Station round trip, with a total of 136,133 passengers in 2022.

3. Minimum Service Standards

Minimum service standards are used as a benchmark for questions that will be given as a level of passenger satisfaction using Minister of Transportation Regulation No. 63 Years concerning Minimum Service Standards. Benchmark questions as follows:

Table 1. SPM Question

No.	Question
Safety	
1	Fire extinguisher
2	Evacuation routes
3	Emergency telephone numbers
4	Health clinic
5	Health clinic facilities
6	Facilities intended for disabled people and the elderly
7	State of the platform
Security	
1	Security Officer
2	CCTVs
Reliability	
1	Information on train arrivals and train operating schedules
2	Information related to train tickets
Comfort	
1	Station waiting area
2	Bathrooms
3	Prayer rooms
4	Cleanliness and comfort at the station

5	Warnings against smoking
6	The coolness of the room
Convenience	
1	Station information media
2	Information regarding onward transportation
3	Service facilities for passengers
4	Food canteens
5	Parking areas
Equality	
1	Facilities for disabled users
2	Rooms for breastfeeding mothers

4. Research Sample

The required samples are obtained from representatives of the existing population so that the number of data samples can be calculated using the formula :

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

N = Total population

e = Error tolerance (10%)

n = Minimum total sample of respondents

Validity Test and Reliability Test

Validity Test

A validity test is a test of how valid or not the data obtained from a questionnaire is, how far the answers given by the respondents in a study match, and if the correlation coefficient used is used. $r_{count} \geq r_{table}$, then the data obtained is invalid. Determine the rcount by looking for the Degree of Freedom (DF) N-2 value where n is the total number of samples with a significant value of 5% so that the r_{table} , value can be seen in the attachment. (Fathimah, 2017). To use the validity test, the following formula is used :

$$r_{hitung} = \frac{n\sum x_i y_i - (\sum x_i)(\sum y_i)}{\sqrt{(n\sum x_i^2 - (\sum x_i)^2) ((n\sum y_i^2 - (\sum y_i)^2))}}$$

With :

r_{count} = Coefficient in validity test

n = Total questionnaire respondents

x = Total for the statement to be selected

y = Total for the statement to be selected

Reliability Test

Reliability testing is a questionnaire measured as an indicator of the applicable variables. The consistency of the data obtained was tested through reliability with Cronbach's Alpha provisions ($\alpha > 0,60$), and then it can be proven that the data used can be trusted correctly. The reliability test uses the following formula (Kurniawan dan Putra, 2021).

$$Cr_{Alpha} = \left[\frac{K}{(K - 1)} \right] \left[1 - \frac{\sum \sigma b^2}{\sum \sigma t^2} \right]$$

Cr_{Alpha} = Reliability

K = Total on statement items
 $\sum \sigma b^2$ = Total on-item variance
 $\sum \sigma t^2$ = Amount to the total variance

5. Kano Method

The Kano Method provides results based on how much service users can satisfy customer needs. This method categorizes the attributes of the services provided into several categories as follows:

1. Must-be, namely that service users will feel dissatisfied if the performance of the attribute is said to be low, but service user satisfaction will not increase much above neutral even though the performance of the attribute is high;
2. One-dimensional, namely that service users will feel a level of balance between performance and attributes, so high attribute performance will lead to high service user satisfaction;
3. Attractive, namely, service users will feel a very high satisfaction with increasing performance attributes. However, a decrease in the level of performance will not affect the level of satisfaction in this case, and the attractive category does not have to be applied;
4. Reverse, namely service users where the level of satisfaction will be inversely proportional to the results of attribute performance;
5. Questionable, namely, service users experience a level of satisfaction that cannot be explained; this leads to a contradiction;
6. Indifferent, namely that service users experience a level of satisfaction that does not affect attribute performance results. (Budhiana and Wahida, 2019).

		Dysfunctional Question				
		Very Satisfied	Very Satisfied	Very Satisfied	Very Satisfied	Very Satisfied
Functional Question	Very Satisfied	Q	A	A	A	O
	Satisfied	R	I	I	I	M
	Just Normal	R	I	I	I	M
	Not Satisfied	R	I	I	I	M
	Very Not Satisfied	R	R	R	R	Q

Figure 1. Kano Method

With :

- A = attractive or interesting;
- M = must-be or must exist;
- O = one-dimensional or one-dimension;
- R = reverse or opposite;
- Q = questionable or doubtful;
- I = indifferent or just ordinary.

The definition of functional and dysfunctional in the table above is that functional explains the conditions service users feel regarding facilities and services that are available or fulfilled. In contrast, dysfunction is when service users feel that facilities or services are unavailable or fulfilled. Then, based on the categories of each attribute known in the table, calculations are carried out using the CS-Coefficient formula to determine the attributes that have the greatest

impact on service user satisfaction and dissatisfaction. In the Kano method, the CS (Customer Satisfaction) formula identifies consumer satisfaction, while DS (Customer Dissatisfaction) identifies service users' dissatisfaction with services (Hermanto and Wiratmani, 2019). Determine CS (Customer Satisfaction) using the following formula:

$$CS = \frac{A + O}{A + O + M + I}$$

With :

- CS = *Customer satisfacation*
- A = attractive or interesting;
- M = must-be or must exist;
- O = one-dimensional or one-dimension;
- R = reverse or opposite;
- Q = questionable or doubtful;
- I = indifferent or just ordinary.

Determine DS (Customer Dissatisfaction) using the formula, namely :

$$DS = \frac{O + M}{(A + O + M + I) \times (-1)}$$

With :

- DS = *Customer Dissatisfacation*
- A = attractive or interesting;
- M = must-be or must exist;
- O = one-dimensional or one-dimension;
- R = reverse or opposite;
- Q = questionable or doubtful;
- I = indifferent or just ordinary.

RESEARCH METHODS

The steps for measuring service performance carried out by analyzing this data are as follows:

1. Create questions with applicable SPM benchmarks with functional and dysfunctional divisions;
2. Distributing questionnaires regarding satisfaction with Kotabumi Station services offline;
3. Carry out Slovin method calculations to obtain the required sample requirements, then continue testing the validity and reliability of the questionnaire and interview results so that they become correct and valid data so that they can be processed in the next method;
4. Process questionnaire data using the Kano method;

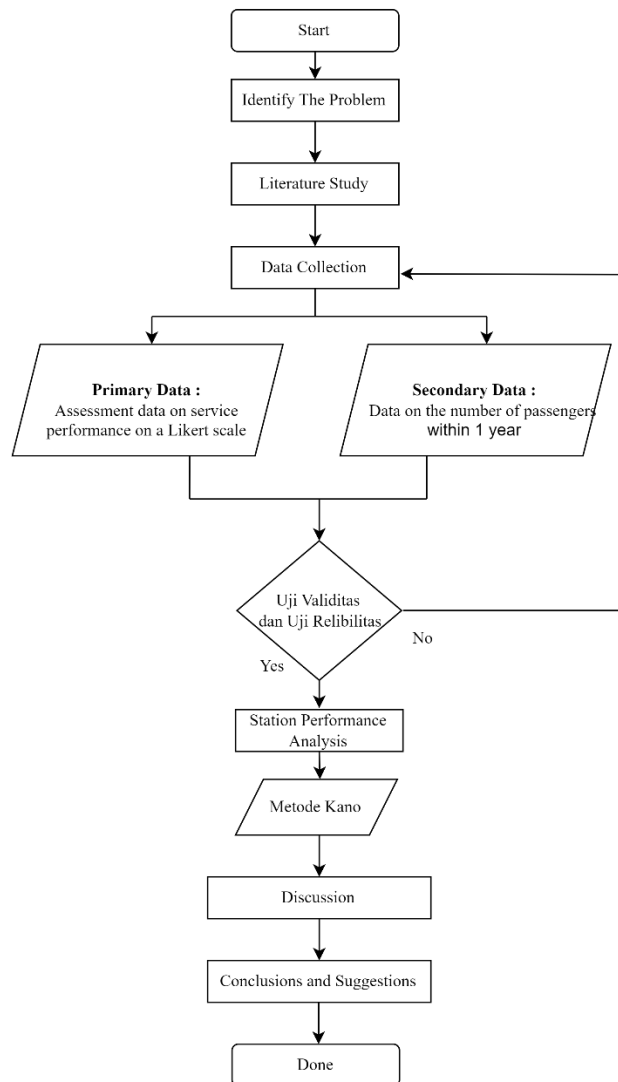


Figure 2. Flowchart

RESULTS AND DISCUSSION

Research Sample

Calculating Respondent Samples

$N = 136733$ People

$e = 0,1$

So we get the calculation :

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

$$n = \frac{136733}{1 + 136733 (0,1)^2}$$

$$n = 99,92 \text{ (rounded to 100).}$$

So, the results obtained from calculating the number of respondents using the Slovin method, which can represent the total population of passengers at the Kotabumi Train Station is 100 people.

Validity Test and Reliability Test

1. Validity Test

The validity test is used to determine whether the data used is valid or not to be used in subsequent method calculations. After the passengers have filled out the questionnaire, the data obtained is processed to find out whether the data used can be decided as valid or not. r_{count} must be greater than the existing r_{table} , which is 0.196. So that validity testing is obtained.

Find the value of r_{count}

$$\begin{aligned} n &= 100 \\ \sum x_i &= 160 \\ \sum y_i &= 4153 \\ \sum x_i y_i &= 4313 \\ \sum x_i^2 &= 328 \\ \sum y_i^2 &= 183969 \end{aligned}$$

So we get the calculation :

$$r_{count} = \frac{n \sum x_i y_i - (\sum x_i)(\sum y_i)}{\sqrt{(n \sum x_i^2 - (\sum x_i)^2)(n \sum y_i^2 - (\sum y_i)^2)}}$$

$$r_{count} = \frac{100 \times 4313 - (160)(4153)}{\sqrt{(100(328) - (160)^2)((100 \times 183969 - (4153)^2)}}$$

$$r_{count} = 0,400$$

Table 2. Validity Test (Functional)

No.	Attribute	r count	Decision
1.	Fire extinguishers	0,400	Valid
2.	Evacuation Route	0,333	Valid
3.	Emergency telephone number	0,227	Valid
4.	Health clinic	0,415	Valid
5.	Health clinic facilities	0,563	Valid
6.	Facilities for the disabled and elderly	0,487	Valid
7.	State of the platform	0,199	Valid
8.	Security officer	0,521	Valid
9.	CCTV	0,456	Valid
10.	Information on train arrivals and train operating schedules	0,589	Valid
11.	Information regarding train tickets	0,586	Valid
12.	Station waiting area	0,569	Valid
13.	Bathroom	0,522	Valid
14.	Prayer room	0,586	Valid
15.	Cleanliness and comfort of the station	0,568	Valid
16.	Warning not to smoke	0,522	Valid
17.	Coolness of the room	0,511	Valid
18.	Station information media	0,614	Valid
19.	Information regarding onward transportation	0,622	Valid
20.	Service facilities for passengers (customer service)	0,654	Valid
21.	Canteen eating	0,661	Valid
22.	Parking area	0,626	Valid
23.	Facilities for disabled users	0,640	Valid
24.	Nursing room	0,660	Valid

Table 3. Validity Test (Dysfunctional)

No.	Attribute	r count	Decision
1.	Fire extinguishers	0,600	Valid
2.	Evacuation Route	0,653	Valid
3.	Emergency telephone number	0,630	Valid
4.	Health clinic	0,670	Valid
5.	Health clinic facilities	0,617	Valid
6.	Facilities for the disabled and elderly	0,660	Valid
7.	State of the platform	0,446	Valid
8.	Security officer	0,655	Valid
9.	CCTV	0,681	Valid
10.	Information on train arrivals and train operating schedules	0,367	Valid
11.	Information regarding train tickets	0,604	Valid
12.	Station waiting area	0,642	Valid
13.	Bathroom	0,557	Valid
14.	Prayer room	0,611	Valid
15.	Cleanliness and comfort of the station	0,456	Valid
16.	Warning not to smoke	0,561	Valid
17.	Coolness of the room	0,628	Valid
18.	Station information media	0,527	Valid
19.	Information regarding onward transportation	0,662	Valid
20.	Service facilities for passengers (customer service)	0,638	Valid
21.	Canteen eating	0,612	Valid
22.	Parking area	0,611	Valid
23.	Facilities for disabled users	0,671	Valid
24.	Nursing room	0,658	Valid

Based on these results, it was found that the value of $r_{count} \geq r_{table}$ was declared valid and could be continued with the next calculation.

1. Reliability Test

Reliability testing is very important in processing the results of questionnaire answers that respondents have filled in. Reliability testing was carried out to ensure how consistent the respondents were in filling out the questionnaires that had been given. Reliability test calculations use applicable provisions Cronbach's Alpha (α) > 0,60.

Find the value of Cr_{Alpha}

$$\begin{aligned}
 K &= 24 \\
 \sum \sigma b^2 &= 18,929 \\
 \sum \sigma t^2 &= 116,110
 \end{aligned}$$

So we get the calculation :

$$\begin{aligned}
 Cr_{Alpha} &= \left[\frac{K}{(K-1)} \right] \left[1 - \frac{\sum \sigma b^2}{\sum \sigma t^2} \right] \\
 Cr_{Alpha} &= \left[\frac{24}{(24-1)} \right] \left[1 - \frac{18,929}{116,119} \right] \\
 Cr_{Alpha} &= 0,873
 \end{aligned}$$

Table 4. Reability Test

CrAlpha	Functional	Dysfunctional
	0,873	1,174
	0,6	0,6
Decision	Reliability	Reliability

So, the respondent's results on the functional question were 0.873 and dysfunctional was 0.921. This value is greater than 0.6. The results of the respondent assessors can be used because the respondents' answers are consistent and correct.

Kano Method

The level of satisfaction of passengers as service users at the Kotabumi Train Station consists of six categories. The results obtained from the answers filled in by respondents were then processed to obtain the appropriate category groups. So the following results are obtained :

Table 5. Value of Questionnaire Results

No.	R	I	Q	A	O	M
1	3	17	4	7	49	20
2	2	17	6	13	37	25
3	4	32	7	7	27	23
4	2	33	5	14	38	8
5	1	33	4	15	35	12
6	2	34	6	9	33	16
7	31	25	16	4	8	16
8	2	18	5	11	46	18
9	3	24	4	15	47	7
10	0	10	2	8	67	13
11	1	19	1	8	52	19
12	1	15	1	9	56	18
13	0	16	1	12	54	17
14	1	18	1	11	59	10
15	2	13	1	11	63	10
16	2	33	0	13	43	9
17	0	26	2	14	49	9
18	0	31	0	12	37	20
19	2	42	1	8	33	14
20	1	23	0	13	47	16
21	1	51	0	15	25	8
22	1	31	2	17	36	13
23	0	27	2	10	47	14
24	2	30	1	15	39	13

Then, from the table above, the maximum value is searched to obtain the following category decisions:

Table 5. Category Results

No.	Attribute	Category
1.	Fire extinguishers	O
2.	Evacuation Route	O
3.	Emergency telephone number	I
4.	Health clinic	O
5.	Health clinic facilities	I
6.	Facilities for the disabled and elderly	I
7.	State of the platform	I
8.	Security officer	O
9.	CCTV	O
10.	Information on train arrivals and train operating schedules	O
11.	Information regarding train tickets	O
12.	Station waiting area	O
13.	Bathroom	O
14.	Prayer room	O
15.	Cleanliness and comfort of the station	O
16.	Warning not to smoke	O
17.	Coolness of the room	O
18.	Station information media	O
19.	Information regarding onward transportation	I
20.	Service facilities for passengers (customer service)	O
21.	Canteen eating	I
22.	Parking area	O
23.	Facilities for disabled users	O
24.	Nursing room	O

Based on the table above, there are 19 categories of one-dimensional attributes. These attributes make passengers feel that performance and importance are balanced towards passenger satisfaction. Meanwhile, 6 attributes are included in the indifferent category, where in this category, passengers experience satisfaction. However, the level of satisfaction obtained is not due to the performance and importance of existing services.

Measuring the level of passenger satisfaction is done by calculating the CS value, and the level of passenger dissatisfaction is calculated by calculating the DS value. Steps in calculating CS and DS scores from the categories that get the maximum score. The results obtained if the value is close to 1, satisfaction is considered satisfactory, but conversely, if the value is close to -1, passengers as service users experience dissatisfaction. The calculation step is carried out by calculating the values per attribute A, O, M, and in Table 5.

Calculating Customer Satisfaction (CS) value

- A = 7
- O = 49
- M = 20
- I = 17

So we get the calculation :

$$CS = \frac{A + O}{A + O + M + I}$$

$$CS = \frac{7 + 4}{7 + 49 + 20 + 17}$$

$$CS = 0,60$$

Calculating the Customer Dissatisfaction (DS) value

$$A = 7$$

$$O = 49$$

$$M = 20$$

$$I = 17$$

So we get the calculation :

$$DS = \frac{O + M}{(A + O + M + I) \times (-1)}$$

$$DS = \frac{49 + 20}{(7 + 49 + 20 + 17) \times (-1)}$$

$$DS = -0,74$$

After calculating the number of each category, looking for the maximum value and then looking for the CS and DS values, a table is produced, which is described in the table below :

Table 6. CS dan DS Results

No.	Attribute	CS	DS
1.	Fire extinguishers	0,60	-0,74
2.	Evacuation Route	0,54	-0,67
3.	Emergency telephone number	0,38	-0,56
4.	Health clinic	0,56	-0,49
5.	Health clinic facilities	0,53	-0,49
6.	Facilities for the disabled and elderly	0,46	-0,53
7.	State of the platform	0,23	-0,45
8.	Security officer	0,61	-0,69
9.	CCTV	0,67	-0,58
10.	Information on train arrivals and train operating schedules	0,77	-0,82
11.	Information regarding train tickets	0,61	-0,72
12.	Station waiting area	0,66	-0,76
13.	Bathroom	0,67	-0,72
14.	Prayer room	0,71	-0,70
15.	Cleanliness and comfort of the station	0,76	-0,75
16.	Warning not to smoke	0,57	-0,53
17.	Coolness of the room	0,64	-0,59
18.	Station information media	0,49	-0,57
19.	Information regarding onward transportation	0,42	-0,48
20.	Service facilities for passengers (customer service)	0,61	-0,64
21.	Canteen eating	0,40	-0,33
22.	Parking area	0,55	-0,51
23.	Facilities for disabled users	0,58	-0,62
24.	Nursing room	0,56	-0,54

The results showed that the attributes that influenced the highest level of satisfaction were the attributes of train arrival information and train operation schedules. The level of satisfaction with this attribute is very important because if this attribute is met, passengers will experience satisfaction of up to 0.77. In contrast, if this attribute does not provide unsatisfactory service performance, passenger disappointment can reach -0.82. In the lowest attribute of the CS value, namely the condition of the platform, passengers experience a level of satisfaction of 0.23 if there is a slippery platform, commercial activities and no guiding block; conversely, if the condition of the platform is not met, the level of satisfaction is at a value of 0.45.

Furthermore, with canteen facilities, passengers only experience a significant value for high satisfaction if this attribute works well or exists because the dissatisfaction value obtained is -0.33. If it is met, the CS value for the canteen dining attribute is only 0.20. Attributes with high CS and DS values, such as information on train arrivals and operation schedules, must be carried out with the hope that train arrival services are on time and train operation schedules are appropriate, effective and efficient in order to produce a high level of satisfaction. Tall.

CONCLUSION

The Kano method resulted in 19 attributes being one-dimensional and 6 attributes of satisfaction level being in the indifferent category. Furthermore, the highest CS and DS values are obtained for information related to train arrivals and station operation schedules. If this service performance is met, then the level of passenger satisfaction is 0.77. If service performance is not met, then passenger disappointment is -0.82, so this attribute must be the main priority that must be considered.

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