

# Analysis of Customer Satisfaction on Service Quality of KRL Bogor-Jakarta

**Muhammad Isradi, Lensi Oktavia Stini, Widodo Budi Dermawan, dan Amar Mufhidin**  
Faculty of Engineering, Univeristy Mercu Buana Jakarta, Indonesia  
[isradi@mercubuana.ac.id](mailto:isradi@mercubuana.ac.id), [lensioktaviastini@gmail.com](mailto:lensioktaviastini@gmail.com), [wbdermawan@gmail.com](mailto:wbdermawan@gmail.com),  
[amarmufhidin@gmail.com](mailto:amarmufhidin@gmail.com)

**Joewono Prasertijo**  
Faculty of Engineering, Universiti Tun Hussein Onn Malaysia, Malaysia  
[joewono@uthm.edu.my](mailto:joewono@uthm.edu.my)

## Abstract

Bogor is an area that has the potential for economic growth and development, services and transportation. Bogor is a buffer area for the city of Jakarta, this has an impact on the growing need for transportation service providers to be used as a means of mobilization. Train is one type of mass transportation that is efficient and effective. The advantages of rail transportation are large capacity, relatively low cost, and fast time. The method used is to use a questionnaire that is distributed to passengers of the electric railroad transportation of the Bogor-Jakarta route. The data obtained were then processed using Ms. Excel and SPSS software for statistical testing. The results of the study show that the service quality attributes that are considered the most important by consumers of the Bogor-Jakarta KRL transportation are information, insurance, affordable ticket prices, and cleanliness of toilets at stations. The results of IPA are attributes that are considered important but their low performance is the accuracy of travel schedules, information, assistance in using tickets, speed and accuracy of responding to consumer problems, safety and comfort, insurance, toilet cleanliness. Meanwhile, the attributes that are declared important and good performance are the availability of information related to KRL schedules, friendliness and courtesy of officers, honesty and patience of officers, and ticket prices. The CSI result is known to be 71,241%, which means that consumers are "satisfied" with the Bogor - Jakarta KRL transportation service. The results of the Chi Square KRL Bogor-Jakarta test are gender, age, occupation, income, destination education, transportation to the station, frequency and days of use.

## Keywords:

Customer Satisfaction Index, Importance Performance Analysis, KRL Bogor-Jakarta, Satisfaction Level, SPSS.

## 1. Introduction

Bogor is a city located in the province of West Java, which is very close to the capital city of Jakarta, Bogor is an area that has the potential for economic growth and development, services and transportation. Bogor is a buffer area for the city of Jakarta, this has an impact on the growing need for transportation service providers to be used as a means of mobilization. Trains are one type of mass transportation that is quite efficient and effective as a strategy to change road conditions that are increasingly congested by motorized vehicles. The advantages of the rail transportation mode are that it can carry large numbers of passengers, the costs required are relatively cheap, and the accuracy and speed of travel times make this transportation a solution to the density problem that occurs due to an increase in the number of motorized vehicles.

The objectives of this research are:

1. To find out the quality of service that is considered important for consumers
2. To find out how the performance of KRL against service quality attributes that determine KRL customer satisfaction.
3. To determine the relationship between customer satisfaction and service quality at KRL.
4. To determine the relationship between consumer characteristics and customer satisfaction levels

## 2. Research Methodology

In this research, the required data sources are primary data and secondary data. The variables used in this study are based on the Bogor-Jakarta KRL service in 2020. and field observations by seeing and feeling directly as users. The survey technique in this study was to distribute questionnaires to 100 sample respondents. The sample is a representative part of the population studied (Suharsimi Arikunto, 2002). The questionnaire in this

study uses an interval measurement scale, namely the Likert scale. This questionnaire is distributed using google form to consumers of KRL Bogor-Jakarta.

## 2.1 .Data Processing

Data analysis is a process for examining, cleaning, modifying, and modeling data in order to find useful information so that it can provide guidance for researchers to make decisions on research questions. In this study, data analysis used the method of validity test, reliability test, normality test, Chi Square test, and Importance and Performance Analysis (IPA).

### 2.1.1 Validity Test

Validity comes from the word validity, which means the accuracy and accuracy of a measuring instrument in performing its measuring function (Azwar, 2008). A test that is intended to measure variable A but produces data about variable A 'or even B, is said to be a measuring tool that has low validity for measuring variable A and high validity for measuring variable A or B. Validity testing is intended to determine the extent of the measuring instrument. (instrument) measures what it wants to measure. The validity test was used to calculate the correlation value (r) between the data on each question and the total score. In the validity test, data can be said to be valid if the calculated r value or  $r_{xy}$  is greater than the r table value. Validity can be calculated using the formula:

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

Explanation :

$r_{xy}$  = Correlation between x and y

$x_i$  = X value

$y_i$  = Y value

N = Number of values

### 2.1.2 Reliability Test

Reliability (Reliability) is the consistency of measurement. According to Masri Singarimbun, reliability is an index that shows the extent to which a measuring instrument is reliable or reliable. If a measuring device is used twice - to measure the same symptoms and the measurement results obtained are relatively consistent, then the measuring device is reliable. In other words, reality shows the consistency of a measuring device in the same symptom gauge (Hidayatullah, 2020) . Reliability is a value that shows the consistency of a measuring instrument in measuring the same symptoms. A data is said to be reliable if the conbarch alpha value is > 0.6. Reliability test can be calculated using the formula:

$$\alpha = \left[ \frac{k}{k-1} \right] \left[ 1 - \frac{\sum \sigma_b^2}{\sigma_t^2} \right]$$

Explanation :

$\alpha$  = Reliability instrument coefficient (cronbach alpha)

k = Number of items for question or statement.

$\sum \sigma_b^2$  = Total number of variants

### 2.1.3 Normality Test

According to V Waratna Sujarweni, (2016) in Hidayatullah, (2020). Normality test aims to determine the distribution of data in the variables to be used in the study, data that are good and suitable for use in research are data that have a normal distribution. In approaching data normality using an approach by looking at the results of the Kolmogorov-Smirnov data with the assumption that the distribution variable data is declared normal using the significance level or  $\alpha = 5\%$  (0.05). The provision is that it will be said to be normal if the probability value is > 0.05. The normality test can be calculated using the formula:

$$KD = 1.36 \sqrt{\frac{n_1 + n_2}{n_1 \cdot n_2}}$$

Explanation :

KD = Total Kolmogorov Smirnov

$n_1$  = The number of samples obtained

$n_2$  = Number of samples expected

### 2.1.4 Chi Square Test

Chi Square test is a non-parametric statistical test. The chi square test is included in the non-parametric test category, so the Chi Square test can be applied for testing nominal and nominal categorical data. Chi Square test is used to see the relationship between customer satisfaction level variables as endogenous variables to the respondent's characteristic variables as exogenous variables. Types of data that represent customer characteristics are simple-scale data where the numbers assigned to a category do not reflect the position of the category. Chi-Square test procedure ( $\chi^2$ ) (Nazir, 1988). The basis for decision making is if the calculated Chi Square value is greater than the Chi Square table or the Chi Square probability value is smaller than  $\alpha$  (10%), then  $H_0$  is rejected. Conversely, acceptance of  $H_0$  occurs if the calculated Chi Square value is smaller than the Chi Square table or the Chi Square probability value is greater than  $\alpha$  (10%). The chi square test can be calculated using the formula:

$$\chi^2 = \sum_i \sum_j \frac{(C_{ij} - e_{ij})^2}{e_{ij}}$$

Explanation :

$\chi^2$  : Chi Square

$C_j$  : The frequency of observation results

$e_j$  : The expected frequency

### 2.1.5 Importance Performance Analysis (IPA)

Importance and Performance Analysis method is used to obtain information about the level of customer satisfaction with a service by measuring the level of importance and level of implementation. The level of importance of service quality is how important a service variable is for customers to service performance (Saputra, 2020). In this data analysis, there are two variables represented by the letters X and Y, where X is the level of performance of a consumer while Y is the level of consumer interest. The respondent's suitability formula can be seen in the formula:

$$TKi = \frac{X_i}{Y_i} \times 100\%$$

Keterangan :

TKi : The level of conformity of the respondents

$X_i$  : The weight of the customer assessment of the performance of PT KAI Commuter Jabodetabek.

$Y_i$  : The weight of the customer assessment of the importance level of the attributes of PT. KAI Commuter

## 3. Results and Analysis

### 3.1. Total passenger

The number of electric train passengers from Bogor station to Jakarta station is 336,162,186 passengers . The number of electric train passengers per month can be seen in table 1.

Table 1. Number of KRL Passengers in 2019

Month	Number of passengers in 2019
January	28,015,404
February	28,052,358
March	27,965,580
April	27,956,652
May	28,014,828
June	27,988,620
July	28,002,156
August	28,015,692
September	28,029,228
October	28,042,764
November	28,056,300
December	28,022,604
Number of passengers in 2019	336,162,186

### 3.2. Respondent Characteristics

From the data characteristics of the respondents can be seen how the structural characteristics of KRL passengers Bogor - Jakarta, so that this information will be used as input in the improvement according to the conditions and needs of respondents. This information can also be used as input in the segmentation policy strategy based on the characteristics of the respondent, the characteristics of the respondent in this study can be seen in table 2 , table 3, table 4 and table 5.

Table 2 Gender of Respondents

No.	Gender	Quantity	Percentage
1	Men	57	57%
2	Woman	43	43%
	Amount	100	100%

Table 3 Age of Respondents

No.	Age (Years)	Quantity	Percentage
1	18-25 years	66	66%
2	26 - 35 Years	25	25%
3	36 - 45 Years	7	7%
4	46 - 55 Years	2	2%
5	5 Over 55 Years	0	0%
	amount	100	100%

Table 4 Types of Respondents' Occupation

No.	Type of work	Quantity	Percentage
1	Student / Student	19	19%
2	PNS / BUMN	3	3%
3	Entrepreneur	25	25%
4	Private Employees	48	48%
5	Mother Home Appliances / Other	5	5%
	amount	100	100%

Table 5 Respondents' Income Level

No.	Income Level	Quantity	Percentage
1	Less than Rp. 500,000 / month	15	15%
2	Rp . 500,001 - Rp . 1,500,000 / month	10	10%
3	Rp. 1,500,001 - Rp. 2,500,000 / month	19	19%
4	Rp. 2,500,001 - Rp. 5,000,000 / month	51	51%

5	More than Rp. 5,000,000 / month amount	5 100	5% 100%
---	--	----------	------------

### 3.3. Validity Test

The data entered for validity testing is the value of the performance factor or variable X and the satisfaction factor or variable Y, with the concept of comparing the calculated R value and the R table value obtained. In this case it can be calculated the amount of alpha obtained by R table 0, 195 . The summary of the validity test results is in table 6 and table 7.

Table 6 Performance Validity Test Results

Variable	R Value Count	R table value	Significance	Decision
X1	0.887	0.195	0	valid
X2	0.871	0.195	0	valid
X3	0.927	0.195	0	valid
X4	0.918	0.195	0	valid
X5	0.943	0.195	0	valid
X6	0.949	0.195	0	valid
X7	0.942	0.195	0	valid
X8	0.954	0.195	0	valid
X9	0.950	0.195	0	valid
X10	0.958	0.195	0	valid
X11	0.950	0.195	0	valid
X12	0.951	0.195	0	valid
X13	0.941	0.195	0	valid
X14	0.951	0.195	0	valid
X15	0.958	0.195	0	valid
X16	0.955	0.195	0	valid
X17	0.952	0.195	0	valid
X18	0.954	0.195	0	valid
X19	0.954	0.195	0	valid
X20	0.900	0.195	0	valid
X21	0.949	0.195	0	valid
X22	0.921	0.195	0	valid
X23	0.934	0.195	0	valid
X24	0.943	0.195	0	valid
X25	0.937	0.195	0	valid

Table 7 Results of the Validity of Interest Test

Variable	R Value Count	R table value	Significance	Decision
Y1	0897	0.195	0	valid
Y2	0851	0.195	0	valid
Y3	0.857	0.195	0	valid
Y4	0.904	0.195	0	valid
Y5	0894	0.195	0	valid
Y6	0.936	0.195	0	valid
Y7	0.935	0.195	0	valid
Y8	0.94	0.195	0	valid
Y9	0.91	0.195	0	valid
Y10	0.921	0.195	0	valid
Y11	0.898	0.195	0	valid
Y12	0.907	0.195	0	valid
Y13	0.923	0.195	0	valid
Y14	0.945	0.195	0	valid
Y15	0.895	0.195	0	valid
Y16	0.905	0.195	0	valid
Y17	0.915	0.195	0	valid
Y18	0.904	0.195	0	valid
Y19	0.945	0.195	0	valid
Y20	0.946	0.195	0	valid
Y21	0.929	0.195	0	valid
Y22	0.925	0.195	0	valid
Y23	0.877	0.195	0	valid
Y24	0.908	0.195	0	valid
Y25	0.939	0.195	0	valid

From the results of the validity test for 25 variables of importance level in table 6 and table; 7 all variables are declared valid because  $r \text{ count} > r \text{ table}$ .

### 3.4. Reliability Test

Reliability testing is intended to measure the level of consistency of a questionnaire. In this study, reliability testing was carried out using SPSS software. To test the reliability of a questionnaire there is a basis for decision making in advance, according to V Waratna Sujarweni, (2016):.

- a) If the Cronbach Alpha value is  $> 0.60$ , then it is reliable or consistent.
- b) If the Cronbach Alpha value  $< 0.60$ , then it is not reliable or inconsistent.

The results of reliability testing in this study can be seen in table 8 and table. 9.

Table 8 Performance Reliability Test Results

Reliability Statistics		
Cronbach's Alpha Based on		
Cronbach's Alpha	Standardized Items	N of Items
.994	.994	25

Table 9 Importance Reliability Test Results

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.991	.992	25

From the results of the reliability test in Table 8 and Table 9, it can be concluded that each variable has a Cronbach's Alpha value of 0.994 > from 0.60 and 0.991 > from 0.60, so it can be concluded that each of these variables is declared reliable.

### 3.5. Normality Test

In this study, normality testing was carried out using SPSS software, namely the Kolmogorov-Smirnov method with the assumption that the distribution variable data was declared normal using the significance level or  $\alpha = 5\%$  (0,05). The provision is that it will be said to be normal if the probability value is > 0.05. The results of data testing using the Kolmogorov-Smirnov method can be seen in table 10

Table 10 Normality Test Results  
 One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
	N	99
Normal Parameters <sup>a,b</sup>	Mean	.0000000
	Std. Deviation	14.06810235
Most Extreme Differences	Absolute	.096
	Positive	.043
	Negative	-.096
Statistical Test		.096
Asymp. Sig. (2-tailed)		.024 <sup>c</sup>
Monte Carlo Sig. (2-tailed)		.294 <sup>d</sup>
		Sig.
99% Confidence Interval		Lower Bound .283
		Upper Bound .306

- Test distribution is Normal.
- Calculated from data.
- Lilliefors Significance Correction.
- Based on 10000 sampled tables with starting seeds 112562564.

From the results of the normality test in table 4:33, it can be concluded that the distribution variable data with a probability value of 0.294 > 0.05, which means the variables are normally distributed.

### 3.6. Interest and Satisfaction Level Assessment

The assessment of the importance and satisfaction of the 25 service attributes of the Bogor-Jakarta KRL transportation can be seen in table 11 and table 12.

Table 11 Results of the level of importance assessment of the service quality attributes of the Bogor-Jakarta KRL

No.	STATEMENT	AVERAGE VALUE
<i>RELIABILITY / RELIABILITY</i>		
1	Ease of reaching the station location	3.73
2	Availability of information relating to the KRL schedule	3.84
3	The accuracy of the KRL trip schedule	3.87
4	Ability to provide the best service to consumers	3.79
5	Ease of obtaining clear information	3.82
<i>RESPONSIVENESS / RESPONSE</i>		
6	Officers provide assistance related to problems using tickets	3.80
7	Speed and accuracy in providing information needed by consumers	3.80
8	Information on train arrival and departure required by consumers	3.74
9	Speed in responding to consumer problems	3.80
10	Officers always show confidence and attitude ready to serve / help consumers	3.76
<i>ASSURANCE / GUARANTEE</i>		
11	Friendliness and courtesy of officers in serving consumers	3.82
12	The ability of officers in carrying out their work	3.79
13	Safety and comfort while at the station / on the train	3.81
14	Convenience when getting on and off the train	3.80
15	Availability of insurance or safety guarantees	3.86
<i>EMPHATY / EMPATHY</i>		
16	The ability of officers to provide information to consumers	3.87
17	Willingness of employees to appreciate and serve and prioritize consumer needs	3.83
18	Honesty and patience of employees / officers in providing services	3.82
19	Ticket prices offered are affordable	3.86
20	24 hour customer service availability	3.56
<i>TANGIBLE / PHYSICAL EVIDENCE</i>		
21	Cleanliness at the station	3.81
22	Cleanliness in the train	3.77
23	Clean toilet at the station	3.84
24	Air circulation in the train	3.76
25	Availability of tools to inform travel routes	3.78



Table 12 The results of the satisfaction level assessment of the service quality attributes of the Bogor-Jakarta KRL

No	STATEMENT	AVERAGE VALUE
<i>RELIABILITY / RELIABILITY</i>		
1	Ease of reaching the station location	3.55
2	Availability of information relating to the KRL schedule	3.58
3	The accuracy of the KRL trip schedule	3.48
4	Ability to provide the best service to consumers	3.52
5	Ease of obtaining clear information	3.51
<i>RESPONSIVENESS / RESPONSE</i>		
6	Officers provide assistance related to problems using tickets	3.54
7	Speed and accuracy in providing information needed by consumers	3.45
8	Information on train arrival and departure required by consumers	3.51
9	Speed in responding to consumer problems	3.42
10	Officers always show confidence and attitude ready to serve / help consumers	3.76
<i>ASSURANCE / GUARANTEE</i>		
11	Friendliness and courtesy of officers in serving consumers	3.82
12	The ability of officers in carrying out their work	3.79
13	Safety and comfort while at the station / on the train	3.56
14	Convenience when getting on and off the train	3.54
15	Availability of insurance or safety guarantees	3.50
<i>EMPHATY / EMPATHY</i>		
16	The ability of officers to provide information to consumers	3.61
17	Willingness of employees to appreciate and serve and prioritize consumer needs	3.55
18	Honesty and patience of employees / officers in providing services	3.82
19	Ticket prices offered are affordable	3.64
20	24 hour customer service availability	3.56
<i>TANGIBLE / PHYSICAL EVIDENCE</i>		
21	Cleanliness at the station	3.53
22	Cleanliness in the train	3.51
23	Clean toilet at the station	3.39
24	Air circulation in the train	3.41
25	Availability of tools to inform travel routes	3.50

### 3.7. Chi Square Test

Chi Square test is used to determine the frequency of two observation data on the expected frequency of observation data. Based on the distribution of these data, it can be seen the magnitude of the influence of one observation on other observations. Respondent characteristic variables that have a relationship with the level of satisfaction are:

- a. Gender
- b. Age
- c. Profession
- d. Income
- e. Education
- f. The purpose of using KRL
- e. Transportation to get to Bogor station
- f. Transportation to get to Jakarta station
- g. KRL usage frequency
- h. Hari uses KRL

### 3.8 Importance Performance Analysis (IPA)

It can be seen in Figure 1 that the service attributes spread across all quadrants, quadrant one is a quadrant which shows that service attributes are important but performance is still lacking, so this quadrant is called the main priority quadrant.

- a. Service attributes that fall into quadrant one (top priority) are:
  1. The accuracy of the KRL trip schedule (3),
  2. Ease of obtaining clear information (5),
  3. The clerk provides assistance regarding the constraints of using tickets (6),
  4. Speed and accuracy in providing information needed by consumers (7).
  5. Speed in responding to consumer problems (9).
  6. Safety and comfort while at the station / on the train (13).
  7. Convenience when getting on and off the train (14).
  8. Availability of insurance or safety guarantees (15).
  9. The ability of officers to provide information to consumers (16) ..
  10. Cleanliness at the station (21).
  11. Keb ersihan toilet in the station (23).
- b. Kuadran is commonly referred to sustain achievement quadrant according to the strategy that must be adopted. The following are the attributes in quadrant two, namely:
  1. Availability of information related to KRL schedules (2)
  2. Friendliness and courtesy of officers in serving consumers (11)
  3. Honesty and patience of employees / officers in providing services (18)
  4. Ticket prices offered are affordable (19)
- c. Service attributes that are in the third quadrant are:
  1. Ability to provide the best service to consumers (4)
  2. Information on train arrival and departure needed by consumers (8)
  3. Cleanliness in the Train (22)
  4. Air circulation in the train (24)
  5. Availability of tools to inform travel routes (25)
- d. The fourth quadrant is an area that contains attributes that are considered less important by consumers but whose performance is good so that they are considered too excessive. The attributes that are in the fourth quadrant include:
  1. Ease of reaching the station location (1)
  2. Officers always show confidence and attitude ready to serve / help consumers (10)
  3. The ability of officers in carrying out their work (12)

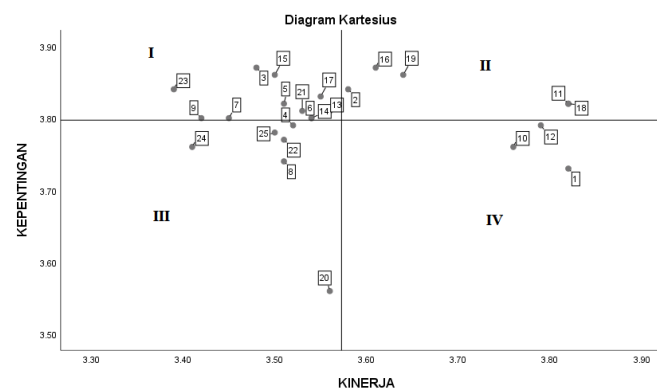


Figure 1 Diagram Kartesius

### 1.8 Customer Satisfaction Index (CSI)

The results of the calculation of the customer satisfaction index (CSI) can be seen in table 4:38.

Table 13 CSI Test Results

Attribute	Score of Interest	Performance Score	Weight Factor	Weight Score
1	3.73	3.55	3,929	13,949
2	3.84	3.58	4,045	14,481
3	3.87	3.48	4,077	14,187
4	3.79	3.52	3,992	14,053
5	3.82	3.51	4,024	14,124
6	3.80	3.54	4,003	14,170
7	3.80	3.45	4,003	13,810
8	3.74	3.51	3,940	13,829
9	3.80	3.42	4,003	13,690
10	3.76	3.76	3,961	14,893
11	3.82	3.82	4,024	15,372
12	3.79	3.79	3,992	15,131
13	3.81	3.56	4,013	14,288
14	3.80	3.54	4,003	14,170
15	3.86	3.50	4,066	14,232
16	3.87	3.61	4,077	14,717
17	3.83	3.55	4,035	14,323
18	3.82	3.82	4,024	15,372
19	3.86	3.64	4,066	14,801
20	3.56	3.56	3,750	13,350
21	3.81	3.53	4,013	14,168
22	3.77	3.51	3,971	13,939
23	3.84	3.39	4,045	13,713
24	3.76	3.41	3,961	13,506
25	3.78	3.50	3,982	13,937
Average	3.80	3.56	amount	356,205
		CSI		71,241%
				SATISFIED

#### 4. Conclusion

Based on the results of data analysis that has been carried out on the Bogor-Jakarta KRL services and facilities, the following conclusions can be drawn :

1. The attributes of service quality that are considered the most important by consumers of Bogor-Jakarta KRL transportation are: the ability of officers to provide information to consumers, the availability of insurance or safety guarantees and affordable ticket prices, the availability of information related to KRL schedules and the cleanliness of toilets at stations.
2. The results of the Importance Performance Analysis (IPA) show that the attributes that are declared important but whose performance are low are the accuracy of KRL travel schedules, the ease of obtaining clear information, the officers provide assistance regarding the constraints of using tickets, the speed and accuracy in providing information needed by consumers , speed in responding to consumer problems, safety and comfort while at the station / on the train, comfort when getting on and off the train, the availability of insurance or safety guarantees, the ability of officers to provide information to consumers, the cleanliness of toilets and stations. While the attributes that are declared important and good performance are the availability of information related to KRL schedules, friendliness and courtesy of officers in serving consumers, honesty and patience of employees / officers in providing services, and affordable ticket prices.
3. The results of the CSI (Customer Satisfaction Index) show that the CSI value is 0.71241 or 71.241%, which means that the customer is "satisfied" with the performance of services and facilities provided by KRL Bogor - Jakarta transportation.

- The results of the Chi Square test for consumer characteristic variables that have a relationship with KRL consumer satisfaction levels are gender, age, occupation, income, destination education, transportation to the station, frequency and days of use.

## References

- Azwar, S. (2008). *Reliabilitas dan Validitas*. Pustaka Pelajar.
- Hidayatullah, R. (2020). Analisis Efektivitas Layanan Angkutan Umum Mass Rapid Transit atau MRT Studi Kasus Lebak Bulus-Bunderan HI. In *Universitas Mercu Buana*. Universitas Mercu Buana.
- Nazir, M. (1988). *Metode Penelitian*. Ghalia Indonesia.
- Saputra, R. M. (2020). Evaluasi Kinerja Operasional Kereta Rel Listrik Dengan Metode Importance Performance Analysis (Studi Kasus Rute Cikarang – Jakarta). In *Universitas Mercu Buana*.
- Suharsimi Arikunto. (2002). *Prosedur Penelitian Suatu Pendekatan Praktek* (Edisi Revi). Rineka Cipta.
- V Waratna Sujarweni. (2016). *Kupas tuntas penelitian akuntansi dengan SPSS*. Pustaka Baru Press.

## Biography

**Ir. Muhammad Isradi, ST, MT, IPM**, born in Kandangan on 18 August 1972. He is secretary of study program of Civil Engineering of Mercu Buana University. He earned his Bachelor Degree in Civil Engineer from Muhammadiyah Malang University in 1998 with the title of his thesis is One Way Flat Plate Planning at Ratu Plaza Madiun. Then he earned his master degree in Civil Engineer with concentration in Transportation from Brawijaya University in 2001 with the title of thesis is Model Analysis of Family Movement Awakening in Resident Area Sawojajar Malang. He also teaches several courses such as Pavement Planning, Road Geometric Planning, Transportation Planning and Environmental Engineering.

**Lensi Oktavia Stini** Born in Kediri on October 5, 1997. Obtained a Diploma in Engineering from the Jakarta State Polytechnic in 2019. He took his Undergraduate Education in Civil Engineering Study Program at Mercu Buana University and graduated in 2021.

**Widodo Budi Hermawan ST, M.Sc** He was born on July 2, 1970. Parahyangan Catholic University 1994, Refueling System in Soekarno Hatta Airport, MSCE, 1996 University of Wisconsin at Madison. A path-based multi-class dynamic traffic assignment model, research interest road safety, accident prediction model, intelligent transportation system, teaching at UMB; Transportation Engineering, Geometric Design.

**Amar Muhfidin S.T., M.T** He was born in Majalengka on 16 June 1991. He is lecturer of some program study: pavement planning, road geometric planning, and transportation planning. He earned his Bachelor Degree in civil engineer from Indonesian University of Education, and he earned his Master Degree in Civil Engineering with concentration in transportation from Bandung Institute of Technology. He has expertise certificate of road pavement from the Construction Services Regulatory Agency. And he is still active in road planning project in Indonesia.

**Dr.-Ing. Joewono Prasetijo**, born in Pontianak on 18 October 1969. He earned his Engineer title in Civil Engineering in Tanjungpura University, Pontianak, Indonesia in 1993. He earned his Master of Science in Road and Transportation Engineering from Delft University of Technology, The Netherlands in 1996 He earned his Doctor Ingenieur from Ruhr-Universität Bochum, Germany in 1996. Now he is a Head of Department of Rail Transportation Engineering Technology, Faculty of Engineering Technology, Tun Hussein Onn University Malaysia.