Journal of Marketing Management Research

Vol.1
No.2

Journal homepage: https://journal.uny.ac.id/publications/jmmr/index
e-ISSN: 3109-5240

The Effects of Punctuality, Tariff, and Service Quality on Customer Satisfaction of Commuter Line Palur-Solo-Yogyakarta

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ABSTRACT

This study aims to find out: (1) The effect of punctuality on customer satisfaction, (2) The effect of tariffs on customer satisfaction, (3) The effect of service quality on customer satisfaction, and (4) The effect of punctuality, tariffs, and service quality on customer satisfaction of the KRL Commuter Line Lintas Palur-Solo-Yogyakarta. This research was conducted in the Surakarta Residency area and the Special Region of Yogyakarta. The type of research is a quantitative research using a survey strategy. The population in this study is all passengers who have used the KRL Commuter Line service across Palur-Solo-Yogyakarta. The sampling technique in this study uses *the Purposive Sampling* technique and *the Accidental Sampling* technique. The number of samples in this study was 160 respondents. The data analysis technique uses *SmartPLS 4 software* with *the Structural Equation Modeling – Partial Least Square* (SEM-PLS) model. The results of the study show that punctuality, rates, and service quality partially or simultaneously have a positive and significant effect on customer satisfaction. The *Adjusted R Square* value was obtained at 0.778, which shows that punctuality, tariffs, and service quality have an influence of 77.8% on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.

Keywords:
Punctuality, Rates, Service Quality, and Customer Satisfaction

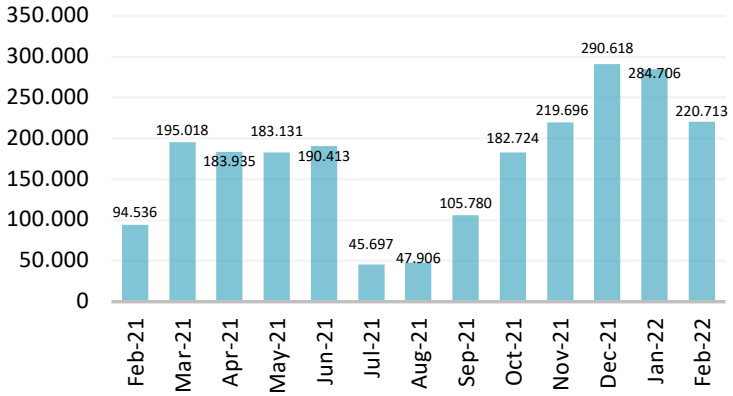
1. Introduction

The development of public transportation in Indonesia has progressed very rapidly in line with the increasing mobility of the community. One of the mainstay modes of mass transportation is the KRL Commuter Line which is managed by PT KAI Commuter Indonesia (PT KCI), a subsidiary of PT KAI (Persero). The KRL Commuter Line is an efficient, affordable, and environmentally friendly transportation solution, especially for urban communities. The service also

supports congestion reduction and the use of private vehicles in densely populated areas.

As a form of service expansion, PT KCI presents KRL (Electric Rail Train) in various areas of Java Island, including in the Operational Derah (Daop) 6 Yogyakarta. At Daop 6 Yogyakarta, the KRL Commuter Line serves the Solo-Yogyakarta route which began operating in 2021. This service replaces the Prambanan Express Train (Prameks) which is currently still operating on the Yogyakarta-Kutoarjo route. This change of service increases travel efficiency, with the travel time from Solo-Yogyakarta to 75 minutes to only 68 minutes.

Picture 1. Number of KRL passengers Commuter Line Solo-Yogyakarta one year after its operation

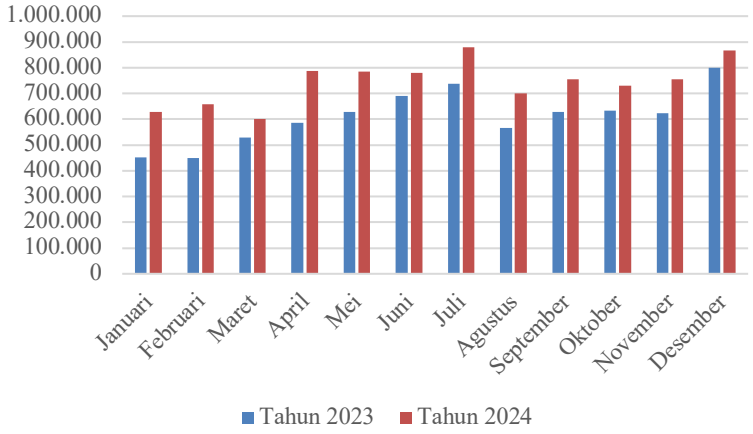


Source: Social Media @commuterline

Figure 1. shows the number of passengers of the KRL Commuter Line across Solo-Yogyakarta during one year of operation, from February 2021 to February 2022. During that period, the service has served more than 2.2 million passengers at 11 stations with a frequency of 20 trips daily. The high enthusiasm of the community encourages PT KCI to expand its service range. The operational line was then extended to Palur Station, which is located on the border between Karanganyar Regency and Surakarta City.

The KRL line was extended to Palur Station along 6.2 kilometers through Solo Jebres Station and inaugurated in 2022. This step aims to improve connectivity between regions while reducing congestion on the crossing. The extension of this line has also encouraged a significant increase in the number of passengers which reflects the high dependence of the public on KRL services as an efficient daily mode of transportation.

Picture 2. Number of passengers on the KRL Commuter Line between Palur-Solo-Yogyakarta in 2023 and 2024



Source: Social Media @commuterline

Figure 2. shows that the number of passengers on the KRL Commuter Line across Palur-Solo-Yogyakarta in 2023 was recorded at 7,320,149 people, and increased significantly in 2024 to 8,928,183 passengers, or an increase of 21.97%. This increase mostly occurs during the holiday season and the end of the year, which shows the high dependence of people on this mode of transportation to support their mobility. However, this increase raises a number of challenges, such as delays due to sharing lines with Long-Distance Trains (KAJJ), flat fares, passenger density, and limited facilities at several stations.

Customer satisfaction is an important indicator of the success of public transportation services. According to Kotler & Keller (2009), customer satisfaction is the feeling of being happy or disappointed after comparing expectations with the reality of the service received. Punctuality, fare, and service quality are the three main factors that affect customer satisfaction, especially in the context of public transportation. These three factors play a direct role in shaping customer perception and experience while using the service.

Punctuality is the range from booking to service received on schedule (Handoko, 2010). Based on opinion Apriyadi (2017), punctuality in the context of a train refers to the scheduled departures and arrivals in the Railway Travel Chart (GAPEKA). Punctuality reflects the consistency of the operator in running the service and has a great effect on customer satisfaction. However, the Palur-Solo-Yogyakarta KRL still often experiences delays because of sharing the line with KAJJ, which has an impact on customer satisfaction.

Next is the tariff, which according to Kotler dan Armstrong (2006), is one of the elements of the marketing mix that reflects the value of a product or service. The KRL fare on the Palur-Solo-Yogyakarta route is set flat at Rp 8,000 for a distance of about 65 km. Although most users consider this fare affordable, some passengers consider it unfair because it applies equally to short and long trips. Indrasari (2019) mentioning that good tariff indicators include affordability, suitability with benefits and service quality, can affect decision-making, and competitiveness with other modes of transportation.

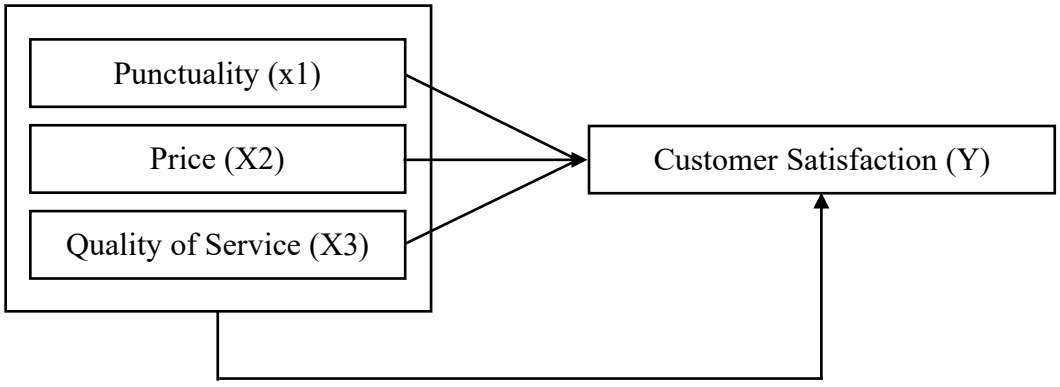
Furthermore, service quality is also an important factor in shaping customer satisfaction. Krisdayanto *et al*. (2018) stating that the quality of service can be measured by the difference between the customer's expectations and reality of the services received. Meanwhile, Tijptono (2019) identify the five main dimensions of service quality, namely *Tangible*, *responsiveness*, *insurance*, *reliability*and *Empathy*. Although KCI has provided various facilities such as *passenger gate digital*, elevators, facilities for people with disabilities, and other facilities, a number of complaints still arise, such as passenger density, the absence of women-only carriages, and platforms that have not covered the train series at several stations.

Previous studies have also strengthened the theory that punctuality, rates, and service quality are important factors in shaping customer satisfaction. Jonah *et al*. (2023) proving that punctuality, price, and service quality have a positive and significant effect on customer satisfaction. Similar results were also shown by Attamimi *et al*. (2020) and Sanuri *et al*. (2024) which confirms that these three variables have a partial and simultaneous influence on consumer satisfaction.

These studies are in line with the theory from Kotler & Keller (2009) which states that customer satisfaction arises when service performance meets or exceeds expectations. In addition, the results of the study also support the views of Tjiptono (2019) and Krisdayanto *et al*. (2018) regarding the importance of service quality as a determining factor in customer perception and satisfaction. Therefore, the previous findings are a strong basis for this study to review the influence of punctuality, fare, and service quality on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.

Based on the theoretical foundation and the results of previous research that have been described previously, a framework of thinking can be prepared as described in Figure 3., which shows the relationship between the variables of punctuality, tariffs, and service quality on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.

Picture 3. Frame of Mind



2. Method

This study uses a quantitative approach with a survey method. Data was collected through a Google Form questionnaire with a sample of 160 respondents selected using *purposive sampling* and *accidental sampling techniques*. Data

analysis used multiple linear regression analysis techniques with the help of *SmartPLS* 4 software based on *the Structural Equation Modeling-Partial Least Square* (SEM-PLS) model. The test is carried out through three stages, namely *the Outer Model* which includes validity tests (Outer Loading, AVE, Fornell-Larcker, and HTMT) and reliability tests (Cronbach's Alpha and Composite Reliability); *Inner Model* which includes R-Square, F-Square, Q-Square, Inner VIF, and GoF analysis; as well as hypothesis tests using t-statistical values and p-values.

3. Results and Discussion

3.1. Result

This study aims to analyze the influence of punctuality, tariffs, and service quality on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta by involving 160 respondents. The data was analyzed descriptively and inferentially using the SEM-PLS method with the help of *SmartPLS 4 software* .

3.1.1. Descriptive Analysis

The results of the descriptive analysis showed that the respondents' perception of all research variables was in the medium category. Punctuality was rated as moderate by 70.63% of respondents, fares by 73.13%, and service quality by 68.13%. Meanwhile, customer satisfaction was also dominated by the medium category of 69.38%. This indicates that in general the KRL service has been received quite well by users, although there is still room for improvement.

3.1.2. Inferential Analysis

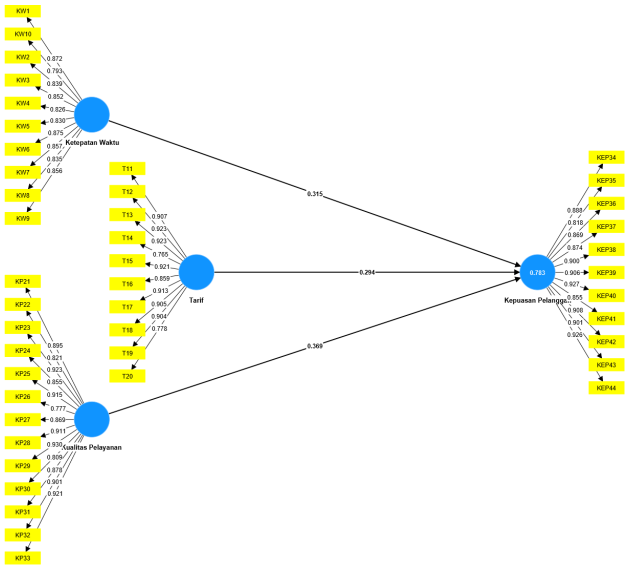
Inferential analysis in this study was carried out using *the Structural Equation Modeling-Partial Least Square* (SEM-PLS) method with the help of *SmartPLS* 4 software. This analysis consists of three main stages, namely *the Outer Model* test, *the Inner Model*, and the Hypothesis Test.

A. Evaluation of Measurement Models (*Outer Model*)

Outer Model used to evaluate the validity and reliability of indicators, including testing the convergent and discriminant validity of constructs in the study (Ghozali & Kusumadewi, 2023). This test aims to ensure that the indicators used are able to accurately measure constructs.

1. Convergent Validity Test (*Convergent Validity*), tested through the *Outer Loading* and *Average Variance Extracted* (AVE). An indicator is declared to be valid convergently if the value of *outer loading* above 0.70 and AVE above 0.5 (Hair) *et al*., 2017).

Picture 4. Result *Outer Loading*



Source: *SmartPLS* Output Version 4.1.1.2

Based on the results of *the outer loading* test in Figure 4., all 44 indicators from the four constructs showed values above the predetermined threshold, which was 0.70. This shows that each indicator has a strong and consistent contribution in reflecting its own constructs, so it can be said to be convergently valid.

Table 1. Result *Average Variance Extracted* (AVE)

Variabel	AVE Value
Timeliness	0.712
Tariff	0.777
Quality of Service	0.772
Customer Satisfaction	0.790

Source: *SmartPLS* Output Version 4.1.1.2

Based on Table 1., all variables in this study had an AVE value above the threshold of 0.50, which indicates that the indicators are able to explain the construct well. This indicates that each latent variable meets the convergence validity requirements, so that all indicators used can represent the construct consistently.

2. Discriminative Validity Test (*Discriminant Validity*), tested using *Fornell-Larcker Criterion* and Heterotrait-Monotrait Ratio (HTMT). A model is declared to be discriminatically valid if the value *Fornell-Larcker Criterion* greater than its correlation to other constructs (Fornell & Larcker, 1981) and HTMT value less than 0.90 (Henseler *et al*., 2015).

Table 2. Result *Fornell-Larcker Criterion*

	Customer Satisfaction	Timeliness	Quality of Service	Tariff
Customer Satisfaction	0.889			
Timeliness	0.787	0.844		
Quality of Service	0.810	0.696	0.878	
Tariff	0.803	0.734	0.755	0.882

Source: *SmartPLS* Output Version 4.1.1.2

The results of the discriminant validity test using the *Fornell-Larcker Criterion* approach in Table 2. show that all constructs meet the set criteria. The *Fornell-Larcker Criterion values* for each construct, namely Punctuality (0.844), Rate (0.882), Quality of Service (0.878), and Customer Satisfaction (0.889), are greater than the correlations of other constructs. This indicates that the model does not suffer from discriminatory validity issues.

Table 3. HTMT Test Results

	Customer Satisfaction	Timeliness	Quality of Service	Tariff
Customer Satisfaction				
Timeliness	0.807			
Quality of Service	0.827	0.711		
Tariff	0.824	0.752	0.771	

Source: *SmartPLS* Output Version 4.1.1.2

Based on Table 3., the entire HTMT value between variables is below 0.90, which shows that each construct, namely Punctuality, Rate, Service Quality, and Customer Satisfaction, has an adequately distinct correlation. Therefore, all latent variables meet the criteria of discriminant validity and are suitable to proceed to the reliability test stage.

3. The Reliability Test is carried out to measure the consistency and stability of research instruments in representing a construct. This test uses two indicators, namely Cronbach's Alpha and Composite Reliability, which show the internal consistency between items in a single variable. A construct is declared reliable if Cronbach's Alpha and Composite Reliability values are above 0.70 respectively (Ghozali & Kusumadewi, 2023).

Table 4. Cronbach's Alpha and Composite Reliability Test Results

Variabel	*Cronbach's Alpha*	Composite Reliability	Information
Timeliness	0.955	0,961	Reliabel
Tariff	0.968	0,972	Reliabel
Quality of Service	0.975	0,978	Reliabel
Customer Satisfaction	0.973	0,976	Reliabel

Source: *SmartPLS* Output Version 4.1.1.2

Based on Table 4., all variables in this study had Cronbach's Alpha and Composite Reliability values above 0.70, which means that they have met the reliability requirements. Thus, the constructs in this study are declared reliable and feasible to proceed to the evaluation stage of the structural model (*inner model*).

B. Evaluation of Structural Models (*Inner Model*)

Inner Model is used to show how strong the relationships or influences between latent variables (constructs) are in a research model (Ghozali & Kusumadewi, 2023). That is, *the inner model* describes the path or direction of influence from one variable to another, making it easier for analysis to assess the influence of a construct and the magnitude of the influence.

1. Coefficient of Determination (R2)

Table 5. Result Coefficient of Determination (R2)

Variabel	*R-Square*	*Adjusted R-Square*
Customer Satisfaction	0.783	0.778

Source: *SmartPLS* Output Version 4.1.1.2

Based on the results of data processing presented in Table 5., the *Adjusted R-Square* value for the Customer Satisfaction variable was 0.778 or 77.8%. This shows that the Customer Satisfaction variable is influenced by three independent variables, namely Punctuality, Tariff, and Service Quality, by 77.8%. Meanwhile, the remaining 22.2% was influenced by other factors outside of this research model.

2. *Effect Size* (F2)

Table 6. Result *Effect Size* (F2)

	Customer Satisfaction	Timeliness	Quality of Service	Tariff
Customer Satisfaction				
Timeliness	0.190			

Quality of Service	0.242
Tariff	0.138

Source: *SmartPLS* Output Version 4.1.1.2

Based on Table 6., the results of *the F-Square* test show that punctuality (0.190) and service quality (0.242) have a moderate influence on customer satisfaction, while the rate (0.138) falls into the category of minor influence. These results indicate that punctuality and service quality are the dominant factors in shaping customer satisfaction, compared to tariffs.

3. *Predictive Relevance* (Q2)

Table 7. Result *Predictive Relevance (Q2)*

Variabel	*Q Square*	Information
Customer Satisfaction	0.610	Strong

Source: *SmartPLS* Output Version 4.1.1.2

Based on Table 7., it is known that *the Q-Square* value is 0.610. Referring to the required value limit, i.e. a Q2 value > 0 indicates relevant predictive ability and a value of 0.35 or more is categorized as strong, then the results show that this research model has a very strong predictive ability on customer satisfaction variables.

4. *Variance Inflation Factor* (VIF)

Table 8. Inner VIF Test Results

	Customer Satisfaction	Timeliness	Quality of Service	Tariff
Customer Satisfaction				
Timeliness	2.411			
Quality of Service	2.587			
Tariff	2.889			

Source: *SmartPLS* Output Version 4.1.1.2

Based on the test results presented in Table 8., the Inner VIF values for each independent variable are within acceptable limits. Referring to the threshold value that is required that a good Inner VIF value is less than 5, the Inner VIF value in the variables of punctuality, tariff, and service quality shows that there is no problem of multicollinearity between variables in this study.

5. *Goodness of Fit* (GoF)

$$\text{GoF} = \sqrt{average\ AVE \times average\ \mathrm{R}^2}$$
$$= \sqrt{0{,}762 \times 0{,}783} \quad \text{..... (1)}$$
$$= \sqrt{0{,}597}$$
$$= 0{,}772$$

The GoF value was obtained at 0.772, which indicates that this research model has a very high level of conformity. Based on categories, a GoF value of 0.36 or more is categorized as large, so a value of 0.772 indicates that the constructed structural model is very feasible to use.

C. Uji Hypothesis

Hypothesis testing was carried out using *the bootstrapping method* to evaluate the direct influence between latent variables. The significance criteria were set at a p-value of < 0.05 (significance of 5%) and a t-statistic > 1.96. If these criteria are met, then there is a significant influence between the free variable and the bound variable. The results of hypothesis testing in this study are presented as follows.

Table 9. Partial Hypothesis Testing

Hipotesis	*Estimate*	*T Statistic*	*P Value*	Information
Timeliness → Customer Satisfaction	0.315	4.373	0.000	Positive, Significant
Customer → Satisfaction Rate	0.294	3.240	0.001	Positive, Significant
Quality of Service → Customer Satisfaction	0.369	3.945	0.000	Positive, Significant

Source: *SmartPLS* Output Version 4.1.1.2

The results of the hypothesis test in Table 9. It shows that the three hypotheses that test the direct relationship between variables show significant influence. The following is a more detailed explanation of the results of each hypothesis test.

1. The results of the first hypothesis test show that Punctuality has a positive and significant effect on Customer Satisfaction. This is evidenced by a *t-statistic* value of 4.373 > 1.96 and a *p-value* of 0.000 < 0.05. In addition, the estimated coefficient value of 0.315 indicates a positive relationship direction, which means that the higher the timeliness of the KRL service, the higher the level of customer satisfaction. Thus, the hypothesis that punctuality has a positive and significant effect on customer satisfaction is **acceptable**.
2. The results of the second hypothesis test show that the Tariff has a positive and significant effect on Customer Satisfaction. This is evidenced by a *t-*

statistic value of 3.240 > 1.96 and a *p-value* of 0.001 < 0.05. In addition, the estimated coefficient value of 0.294 indicates a positive relationship direction, which means that the more affordable the KRL service tariff, the higher the customer satisfaction rate. Thus, the hypothesis that tariffs have a positive and significant effect on customer satisfaction is **acceptable**.

3. The results of the third hypothesis test show that Service Quality has a positive and significant effect on Customer Satisfaction. This is evidenced by a *t-statistical* value of 3.945 > 1.96 and a *p-value* of 0.000 < 0.05. In addition, the estimated coefficient value of 0.369 indicates a positive relationship direction, which means that the better the quality of service provided by the KRL, the higher the level of satisfaction felt by customers. Thus, the hypothesis that states that service quality has a positive and significant effect on customer satisfaction is **acceptable**.

Table 10. Simultaneous Hypothesis Testing

Hipotesis	F Calculate	F Table	*P Value*	Information
Punctuality, Rates, and Service Quality → Customer Satisfaction	184,326	2,66	0.000	Positive, Significant

Source: *SmartPLS* Output Version 4.1.1.2

Based on the results of simultaneous hypothesis testing presented in Table 10., it can be seen that the variables of Punctuality, Tariff, and Service Quality together have a significant effect on Customer Satisfaction. This is evidenced by the Fcal value of 184.326 which is much greater than the Ftable value of 2.66 (184.326 > 2.66). In addition, the *p-value* of 0.000 < 0.05 also supports that the influence of the three independent variables on the bound variables is significant. Thus, the hypothesis that the timeliness, rates, and quality of service have a positive and significant effect on customer satisfaction are **acceptable**.

3.2. Discussion

3.2.1. The Effect of Punctuality on Customer Satisfaction

The results of the study show that punctuality has a positive and significant effect on customer satisfaction of the KRL Commuter Line across Palur-Solo-Yogyakarta. This is shown by a t-statistical value of 4.373 (> a critical value of 1.96) and a p-value of 0.000 (< sig 0.05), with an estimated coefficient of 0.315. This means that the more punctual, the higher the level of customer satisfaction. The accuracy of departure and arrival schedules has proven to be an important factor in shaping positive user perceptions.

3.2.2. The Effect of Tariffs on Customer Satisfaction

This study shows that the fare has a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta,

with a *t-statistic* of 3.240 (> a critical value of 1.96) and a p-value of 0.001 (< sig 0.05). The estimated coefficient of 0.294 shows that the more affordable the tariff applied, the higher the satisfaction felt by customers.

3.2.3. The Effect of Service Quality on Customer Satisfaction

The results of the study showed that the quality of service had a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta, with a t-statistic of 3.945 (> a critical value of 1.96) and a p-value of 0.000 (< sig 0.05). The estimated coefficient of 0.369 indicates a positive relationship direction. This means that the better the quality of service provided, such as the friendliness of the officers, the clarity of information, and the comfort and cleanliness of the facilities, the higher the level of customer satisfaction.

3.2.4. The Effect of Punctuality, Rates, and Service Quality on Customer Satisfaction

Simultaneously, punctuality, fares, and service quality have a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta. This is shown by the Fcal value of 184.326 (> Ftable 2.66) and the p-value of 0.000 (< sig 0.05). This means that the combination of schedule accuracy, affordable rates, and good service quality together will increase customer satisfaction with KRL services.

4. Conclusion

a. Punctuality has a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.
b. The fare has a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.
c. The quality of service has a positive and significant effect on customer satisfaction of the KRL Commuter Line across Palur-Solo-Yogyakarta.
d. Punctuality, fares, and service quality simultaneously have a positive and significant effect on customer satisfaction of the KRL Commuter Line crossing Palur-Solo-Yogyakarta.

Conflict of Interest

Funders do not play a role in the design of the study; in data collection, analysis, or interpretation; in the writing of the manuscript, or in the decision to publish the results.

Financing

This research does not require any external funding.

Acknowledgments

I would like to thank the supervisor of my Final Project and the staff of the Marketing Management Study Program D-IV, Faculty of Vocational, Yogyakarta State University, for their cooperation and support during the research period.

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