

MARKETING | RESEARCH ARTICLE

Service Quality and Innovation as Drivers of Customer Loyalty: The Mediating Role of Customer Satisfaction in the Context of Indonesian Railways

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ARTICLE HISTORY

Received: May 23, 2025

Revised: July 03, 2025

Accepted: July 30, 2025

DOI

<https://doi.org/10.52970/grmapb.v6i1.1327>

ABSTRACT

The increasingly tight competition in the post-pandemic transportation industry has encouraged service providers to improve service quality and innovate to maintain customer loyalty. This study aims to analyze the effect of service quality and innovation on customer loyalty with customer satisfaction as a mediating variable at PT Kereta Api Indonesia Divre II West Sumatra. A quantitative approach was used through surveys and Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis, and processed with SmartPLS software. The sample in this study consisted of 180 respondents who were active users of train services in the region. The study's results indicate that service quality and innovation have a positive and significant effect on customer satisfaction, and customer satisfaction significantly mediates the effect of service quality and innovation on customer loyalty. However, the direct effect of innovation on customer loyalty is not significant. This finding suggests that improving service quality and adequate innovation can strengthen satisfaction, which leads to loyalty. This study recommends that PT KAI management focus more on integrating digital services and physical comfort in the customer experience. Theoretically, the results of this study enrich the literature on marketing management in the transportation sector.

Keywords: Service Quality, Innovation, Customer Satisfaction, Customer Loyalty.

JEL Code: M31,L92,C38.

I. Introduction

The transportation industry in Indonesia has been under tremendous pressure since the COVID-19 pandemic hit in early 2020. The Large-Scale Social Restrictions (PSBB) policy, limiting operational capacity and increasing public concerns about the risk of virus transmission, has caused a significant decline in passenger volumes on various modes of transportation, including train services. One of the operational areas affected is PT Kereta Api Indonesia Divre II West Sumatra. Based on ticket sales data, there has been a significant decline in the number of passengers from year to year. In 2019, the number of passengers was recorded at 1,474,934, then dropped drastically to 595,509 people in 2020. Although it showed a recovery trend in 2022, the decline occurred significantly in 2023, with only 171,486 passengers recorded. This fluctuation shows that customer confidence in post-pandemic services has not yet recovered.



Table 1. Train Passenger Volume on Drive II West Sumatra in the period 2019-2023

No	Year	Number of Passengers (People)
1	2019	1474934
2	2020	595509
2	2021	642827
3	2022	1292250
4	2023	171486

Table 1 shows a decrease in the number of passengers, which reflects changes in external conditions and can also be an early indicator of declining customer satisfaction. Continued dissatisfaction can reduce customer loyalty, ultimately impacting the company's sustainability and competitiveness. In this context, the issue of customer loyalty becomes increasingly important to study in depth, especially in the post-pandemic public transportation sector. Service quality and innovation are two main internal factors that play a role in creating a positive customer experience. Innovation, such as developing the Access by KAI application, is expected to improve service efficiency and convenience. However, innovation without an increase in service quality will not be enough to maintain customer loyalty in the long term. Therefore, customer satisfaction is an important element that can bridge the relationship between service quality and innovation to customer loyalty. Changes in customer behavior and expectations are new challenges for the transportation industry. Currently, customers demand fast, efficient, and digital technology-based services. If innovations such as the Access by KAI application are not supported by adequate service quality, customer loyalty will be difficult to build and maintain.

Customer loyalty is important in maintaining business sustainability, especially post-pandemic. Loyal customers make repeat purchases consistently and tend to recommend services to others, impacting the company's long-term growth and sales even during a pandemic. Customer loyalty is a customer's commitment to using a product or service repeatedly (Nadia & Firmansyah, 2025). To identify the problems faced, researchers conducted a pre-survey of 20 PT Kereta Api Indonesia Divre II West Sumatra customers. The results showed that only 58% of customers were satisfied with the services provided, while 42% said they were dissatisfied. Common complaints included the limited number of trains, which caused some passengers to stand because they did not get a seat, especially during peak hours and holidays. In addition, supporting facilities such as waiting rooms, Wi-Fi access, and charging stations were considered inadequate, thus reducing customer comfort and experience. Regarding service quality, 82.5% of respondents stated that they were satisfied with the services provided by PT KAI Divre II West Sumatra. In comparison, 17.5% stated that they were dissatisfied, especially in terms of seat availability and cleanliness of train facilities. Good service quality is important in creating comfort and supporting increased customer loyalty. On the other hand, innovation is also an important aspect.

The results of the pre-survey on innovation showed that only 38% of customers were satisfied with the innovations made by PT Kereta Api Indonesia Divre II West Sumatra, especially in using the Access by KAI application. Meanwhile, 62% stated they were dissatisfied because the application often experienced technical problems, inadequate features, and a slow ordering process. Dissatisfaction with this digital aspect can hinder the company's efforts to create overall customer satisfaction and loyalty. Thus, the decline in passenger volume is an issue of customer satisfaction and loyalty that is important to analyze in depth. The decline in the number of passengers reflects external changes post-pandemic and can also indicate declining customer satisfaction levels. Continued dissatisfaction has the potential to reduce customer loyalty, ultimately impacting the company's sustainability and competitiveness in the long term. This study will further analyze how service quality and innovation affect customer loyalty of PT Kereta Api Indonesia Divre II Sumatera Barat, with customer satisfaction as a mediating variable. The primary focus of this study is the community who have used Kereta Api Indonesia Divre II Sumatera Barat because they have direct experience of the quality of service and innovation offered, so their perceptions and assessments are key to understanding the dynamics of

customer satisfaction and loyalty. This study is expected to provide insight for PT Kereta Api Indonesia Divre II Sumatera Barat in improving service quality and innovation to meet user needs and maintain customer loyalty. This study examines the effect of service quality and innovation on customer loyalty, which is mediated by customer satisfaction at PT KAI Divre II Sumatera Barat. The research questions to be answered are: (1) Does service quality affect customer satisfaction and loyalty? (2) Does innovation affect customer satisfaction and loyalty? (3) Does customer satisfaction mediate the relationship?

The results of this study are expected to provide theoretical contributions in the development of literature on customer loyalty in the post-pandemic transportation sector. Practically, the findings of this study can be utilized by the management of PT Kereta Api Indonesia Divre II West Sumatra in designing service strategies and innovations that are more adaptive to current customer needs. In addition, the results of this study also have implications for regulators and policymakers in the transportation sector, especially in formulating public transportation policies that are more responsive to customer satisfaction and loyalty, including strengthening infrastructure and digitalizing services.

II. Literature Review and Hypothesis Development

Innovation is important in increasing competitive advantage and customer loyalty, especially in the transportation industry. In this context, innovation is not only limited to technological development, but also includes new approaches in service that are more adaptive to customer needs. According to Frizni & Adnan (2024), Innovation is the creation or development of ideas that are required in the form of new technology, more efficient business models, or a service approach that is more responsive to customer needs so that it can provide added value to a company. Meanwhile, Setyawati et al. (2022) stated that high and difficult-to-imitate innovation can reduce the risk of products being imitated by competitors, so that innovation plays an important role in creating competitive advantage by understanding consumer needs in depth. This is in line with the opinion of Erniati et al. (2021), who also emphasized that the more difficult it is for competitors to imitate innovation, the smaller the chance of counterfeit products. This will strengthen the company's position in the market if the innovation is oriented towards customer satisfaction. However, previous studies have shown that the impact of innovation on customer loyalty is not always directly significant. Siti Maryam & Tiurniari Purba (2023) and Sonjaya & Ruyani (2023) found that customer loyalty does not necessarily increase just because of innovation, but depends on customer perceptions of the direct benefits of the innovation. Therefore, further examining the mediating role of other variables, such as customer satisfaction, is important. The concept of innovation in this study is closely related to the main question, namely, how innovation can build customer loyalty, both directly and indirectly through customer satisfaction as a mediator. Therefore, a deep understanding of innovation is the basis for explaining its influence on other variables. The leading indicators of innovation include the novelty of innovation, solutions provided by innovation, perceived benefits, and compatibility with customer needs (Rima Nurmalah et al., 2024).

2.1. Service Quality

Service quality is the primary determinant in shaping customer satisfaction and loyalty in the service sector, including transportation. Good service quality can create positive perceptions, comfort, and trust in service providers. Service quality is a product or service that customers expect to meet their needs and desires, so that it can consistently exceed customer expectations of the products or services they receive (Riset et al., 2024). If the service exceeds expectations, customers will feel satisfied and loyal. In this study, service quality is analyzed as an independent variable that affects customer loyalty, both directly and indirectly through customer satisfaction. Thus, understanding service quality is very important in answering the research questions. Service quality indicators refer to the SERVQUAL model: Reliability, Responsiveness, Assurance, Tangible evidence, and Empathy. Research by Akbar & Am (2022) shows that perceptions of service quality greatly determine customer satisfaction and the decision to continue using the service.

2.2. Customer Satisfaction

Customer satisfaction is a psychological condition that arises when customer expectations are met or exceeded by the service received. Satisfaction is an important mediating variable in this research model because it bridges service quality and innovation towards customer loyalty. According to Akbar & Am (2022), Customer satisfaction is important in providing better, effective, and efficient service so that customers feel happy and satisfied with the products or services received, so that they compare their expectations with the reality they feel. If customers are dissatisfied with the company's service, the service can be considered ineffective, and vice versa; therefore, this is very important to note. According to Asrizal Efendy Nasution & Nasution (2021), Customer satisfaction is a key factor because every company tries to compete in providing the best to customers so that it can maintain the sustainability of the company. According to Kotler in Putra (2021), the leading indicators of customer satisfaction include: (1) Fulfillment of consumer expectations, (2) Recommendation to others, (3) Providing high-quality services that include punctuality, comfort, and safety, (4) Encouraging passenger loyalty, and (5) Strategic and easily accessible location. By understanding the strategic role of customer satisfaction, companies can focus more on designing effective interventions to increase customer loyalty through service improvement and innovation.

2.3. Customer Loyalty

Customer loyalty is a form of ongoing commitment from customers to reuse the same service in the future and recommend it to others. In the service industry, loyalty indicates successful service and customer retention. According to Rahman et al. (2021), customer loyalty is a commitment held by customers, which also becomes one of the important elements in achieving a company's business goals. In a business context, loyalty is also the availability of customers to continue to want to re-subscribe to a company in the long term. According to Griffin in Sulistyorini & Pramudyo (2023), loyalty is not only in the form of behavior (repeat purchases), but also a positive attitude towards a brand or company. Loyalty is the primary dependent variable in this study. Therefore, it is important to measure loyalty comprehensively to answer the core question regarding the influence of service quality and innovation. The leading indicators of customer loyalty include: Making regular or repeat purchases, Satisfaction with the various services offered, Recommendations to others, and Resilience to competitors. By understanding these four main concepts, namely innovation, service quality, customer satisfaction, and customer loyalty, this study attempts to empirically explain the causal relationship between these variables. The literature has been updated and refers to trusted academic sources from 2020 to 2024, to ensure relevance to the post-pandemic context and current developments in the transportation industry.

2.4. Hypothesis Development

2.4.1. The influence of innovation on customer loyalty

Innovation has no significant direct effect on customer loyalty. Customers are not necessarily loyal just because the company innovates, especially if the innovation is not optimally utilized. This study is supported by several previous studies, such as research by Sonjaya & Ruyani (2023), which shows that innovation has an insignificant effect on customer loyalty in Eiger Coffee Bandung customers. This study explains that although innovation contributes positively to customer loyalty, it is not statistically significant enough to form stable customer loyalty. Similar research was also obtained by Siti Maryam & Tiurniari Purba (2023), who examined the effect of Perception of Convenience, Trust and Innovation on Trans Batam Bus Passenger Satisfaction. This study explains that innovation makes a positive contribution to customer loyalty, but the magnitude of this influence still needs to be supported by other factors such as service quality, customer satisfaction, trust, competitive prices, and ease of access to services. So that customer loyalty can be

built optimally. Thus, the innovation implemented needs to be accompanied by improvements in service quality and customer experience to strengthen long-term customer relationships. The explanation above strengthens the results that although innovation can drive loyalty, its influence is not necessarily statistically significant if the innovation has not been utilized optimally or is not in line with customer needs. This relates to implementing the Access by KAI application at PT Kereta Api Indonesia Divre II West Sumatra. Based on existing developments, the hypothesis in this study is:

H1: Innovation has a positive and significant effect on Customer Loyalty

2.4.2. The Influence of Innovation on Service Quality

Innovation is important in improving service quality because innovation can speed up the service process, increase user convenience, and resolve customer complaints. This study aligns with previous studies, which show that innovation positively and significantly influences service quality. Research by Primadi et al. (2024) discusses the influence of Service Quality and Application of Technology and Information Systems on Customer Satisfaction at PT KAI. This study states that innovation can continuously update the service process, thereby increasing efficiency, effectiveness, and user satisfaction with the services provided. Similar research was also obtained by Rima Nurmalah et al. (2024), who examined the influence of Innovation in the Access by KAI Application on Service Quality at PT. KAI Regional Operations (Daop) 2 Bandung. The results of this study indicate that the higher the level of innovation in the Access by KAI application, the better the quality of service felt by users of the application. Based on existing developments, the hypothesis in this study is:

H2: Innovation has a positive and significant effect on service quality

2.4.3. The Influence of Innovation on Customer Satisfaction

Innovation is essentially one of the important activities whose results will affect customer satisfaction. Innovation has an insignificant direct effect on customer satisfaction. This study is supported by several previous studies, research by Muhammad Nur Fadillah and Eka Ludiya (2024), which examined the Effect of Innovation and product Quality on Repurchase Interest of Kasuka Noodles in Leuwigajah Village, Cimahi City. The results of this study indicate that Kasuka noodle customers do not see innovation as a positive thing in influencing customer satisfaction, because the advantages of innovation can easily decrease in value if other competitors easily copy an innovation. Similar results were also found by Ricardianto et al. (2024), who examined the effect of service quality and security perceptions on passenger satisfaction and loyalty attitudes in ride-hailing services in Indonesia. The results of this study indicate that innovation has not had a significant direct effect on passenger satisfaction. In the case of the Access by KAI application, the application has been introduced as an innovation to improve the user experience in accessing train services. However, although this application offers various new features, such as online ticket booking and train schedule information, users still face various obstacles, such as disruptive technical problems. This study aims to test the significant effect of innovation on customer satisfaction across all of these studies. The hypothesis in the study is formulated as follows.

H3: Innovation (X2) positively and significantly affects customer satisfaction.

2.4.4. The influence of service quality on customer loyalty

Service quality has a direct and significant influence on customer loyalty. According to Tsalisa et al. (2022), who studied the influence of Maxim Online Transportation Services in Semarang City, these results indicate that an increase in service quality will follow an increase in customer loyalty. This happens because

good service forms a positive perception, increases satisfaction, and creates trust, so customers remain loyal to the service. Similar research was also obtained by Sulistyorini & Pramudyo (2023), who studied the influence of Facilities, Variety of Services, and Customer Satisfaction on Customer Loyalty at Mini's Salon Yogyakarta. These results indicate that the more diverse the services offered by Mini's Salon, the higher the level of customer loyalty. This happens because the variety of services provides more choices for customers according to their needs and preferences, thus creating a sense of satisfaction and comfort. Customers who feel that their needs and desires are completely met will be more likely to return to the service and recommend it to others. The explanation above strengthens the results that the quality and variety of services are important factors that significantly influence customer loyalty. At PT Kereta Api Indonesia Divre II West Sumatra, quality services such as punctuality of departure and arrival, friendliness of officers, and comfort of facilities are crucial in forming positive customer perceptions, which can build long-term relationships with customers and increase their loyalty to train services. Based on existing developments, the hypothesis in this study is:

H4: Service quality has a positive and significant effect on customer loyalty

2.4.5. The Influence of Customer Satisfaction on Customer Loyalty

Customer satisfaction has a significant direct influence on customer loyalty. Satisfied customers return to use the service and recommend it to others. This study is supported by previous studies, which show that customer satisfaction significantly influences customer loyalty. According to Putu Satya Nitya Ananda & Putu Yudi Setiawan (2024), who studied the effect of Customer Satisfaction on GO-JEK Customer Loyalty in Denpasar, stated that increasing customer satisfaction in using Go-Jek services will also increase customer loyalty. Similar research was also obtained by Sembiring et al. (2025), who studied the effect of Satisfaction on Customer Loyalty at Suite Pakar Hotel Berastagi. These results explain that if a customer is satisfied, the consumer will not move to another place and will always use services that make consumers feel satisfied. A customer's satisfaction arises because of the comfort of the services provided and the meeting of the customer's expectations. Based on the explanation above, it strengthens the results that the higher the satisfaction customers feel towards the services of PT Kereta Api Indonesia Divre II West Sumatra, the greater the possibility that these customers will remain loyal to using these transportation services on an ongoing basis. Based on the existing developments, the hypothesis in this study is:

H5: Customer satisfaction has a positive and significant effect on customer loyalty.

2.4.6. The influence of service quality on customer satisfaction.

The study's results indicate that service quality has a positive and significant effect on customer satisfaction; the better the quality of service provided by PT Kereta Api Indonesia Drive II Sumatera Barat, the higher the customer satisfaction felt. Services such as punctuality of departure, ease of ordering tickets through the application, and friendly attitudes of officers are essential elements to consider in creating customer satisfaction. This study is supported by several previous studies, which show that service quality significantly influences customer satisfaction. According to I Putu Satya Nitya Ananda & Putu Yudi Setiawan (2024), who studied the influence of Customer Satisfaction in Mediating the Influence of Service Quality on GO-JEK Customer Loyalty in Denpasar, these results reveal that factors such as driver response speed, ease of access via the application, safety, comfort, and politeness and professionalism of the driver are important elements that shape customer perceptions of service quality. Customers will feel satisfied and trust the services when these elements are adequately met. Similar results were also found by Tsalisa et al. (2022), who studied the influence of Maxim Online Transportation Services in Semarang City. These results explain that service quality, which includes punctuality of pick-up, ease of use of the application, and polite driver behavior, significantly influences customer satisfaction. The better the quality of service customers feel, the higher the

level of satisfaction formed, which can increase loyalty to the service. Based on the explanation above, it strengthens the results that the better the quality of service provided by PT Kereta Api Indonesia Drive II West Sumatra, the higher the level of satisfaction that customers will feel in PT Kereta Api Indonesia Drive II West Sumatra transportation. Based on existing developments, the hypothesis in this study is:

H6: Service quality has a positive and significant effect on customer satisfaction

2.5. Conceptual Framework

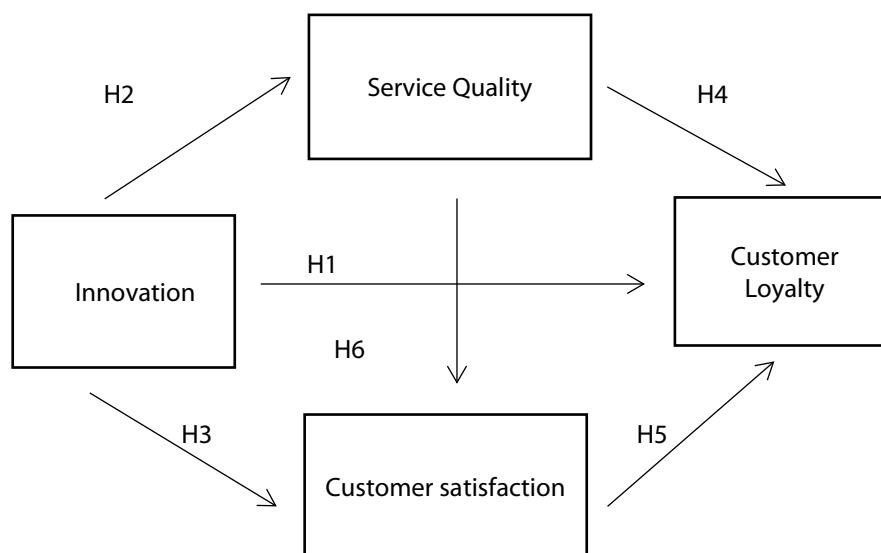


Figure 1. Conceptual framework

III. Research Method

This study uses a quantitative approach through a survey method. The survey effectively obtains a comprehensive picture of customer perceptions of the variables studied. In this approach, data is collected from a group of individuals through a questionnaire by compiling all questions related to the research, and will be answered by respondents. These questions cover aspects of respondent beliefs and behavior. The questionnaire was distributed online via Google Form and compiled using a Likert scale. In this study, respondents' answers were given points, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). This study was conducted from January to June 2025, covering all stages of implementation, from compiling instruments, collecting field data, analyzing data using PLS-SEM, to compiling the final report. This study aims to identify the extent to which service quality and innovation play a role in influencing customer loyalty mediated by customer satisfaction.

3.1. Population

The object of this study is the community that has used train transportation in Drive II, West Sumatra. Nasution & Maharani (2025) state that population is a generalization area that includes objects or subjects with special characteristics and characteristics relevant to the study. In this case, the study focuses on users of train transportation in Drive II, West Sumatra, which is expected to provide important insights into the influence of service quality and innovation on customer loyalty mediated by customer satisfaction.

3.2. Sample

The sample in this study is part of the population that describes the number and characteristics of the population (Nasution & Maharani, 2025). The sample was taken using a purposive sampling method with the following criteria: selected respondents are 17 years old and over, have used the Drive II West Sumatra train transportation at least twice, have used the Access by KAI application, and are domiciled in West Sumatra. The number of samples in this study is determined based on the guidelines of Hair et al. Asri & Dwiayanto (2022) recommend that the minimum sample size is 10 respondents for each indicator, then the minimum sample size is 180 respondents ($18 \times 10 = 180$). Thus, it can be concluded that the sample of this study amounted to 180 people who had used the Drive II West Sumatra train transportation. Quantitative methodology through surveys and SEM-PLS analysis was chosen to address gaps in the literature, especially regarding the inconsistent relationship between innovation and customer loyalty.

3.3. Data Collection Technique

Quantitative data is obtained in numbers or numerics, which can be calculated and measured, and comes from the research object. The measured data will be analyzed using the Partial Least Squares - Structural Equation Modeling (PLS-SEM) method with the help of SmartPLS software. This tool will test the validity, reliability, significance, and influence of each variable in this study.

Table 2. Respondent Demographics

Category	Criteria	Frequency	Percentage (%)
Respondent's age	<17 years	2	1,1%
	17-25 years	169	93,9%
	26-30 years	6	3,3%
	31- 36 years	1	0,6%
	> 50 years	2	1,1%
Gender	Man	27	15%
	Woman	153	85%
Respondent's Occupation	Student	5	2,8%
	Student	153	85%
	Does not work	2	1,1%
	Private employees	14	7,8%
	Other	6	3,3%
Respondent's Income (In Rupiah)	<500.000	39	21,1%
	500.000-1.000.000	79	43,9%
	>2.000.000	42	23,3%
	1.000.000-2.000.000	20	11,1%
Purchase frequency in the last 3 months	<1	25	13,9%
	15-50	99	55%
	51-100	33	18,3%
	>150	23	12,8%

Respondents most often use the Drive II West Sumatra train transportation. The respondents who primarily use the West Sumatra Divre II train transportation are women, which is 153 people (85%). Students are the largest group in the occupation, with 153 people (85%). Seventy-nine respondents (43.9%) have a monthly income of 500,000-1,000,000. This shows that consumers with lower middle incomes make many purchases on Indonesian train transportation in Divre II, West Sumatra. The frequency of purchases in the last three months shows that 55% of respondents use 15-50 times Indonesian train transportation in Divre II West Sumatra, while 18.3% use 51-100 times Indonesian train transportation in Divre II West Sumatra. This shows that consumers tend to make repeat purchases. Overall, Indonesian train transportation in Division II, West

Sumatra has a reasonably large market share among students with middle to upper education levels and lower middle incomes. To increase sales, marketing strategies can focus more on the respondents' age segment, with the most significant number being 17-25 years, namely 169 people (93.9%), and middle income by offering attractive promotions.

IV. Results and Discussion

4.1. Statistical Results

4.1.1. Convergent validity

Table 3. Outer Loading Value (Convergent Validity)

	Innovation	Quality Service	Customer Satisfaction	Customer Loyalty
Innovation 1	0.945			
Innovation 2	0.963			
Innovation 3	0.959			
Innovation 4	0.952			
Quality Service 1		0.972		
Quality Service 2		0.936		
Quality Service 3		0.937		
Quality Service 4		0.943		
Quality Service 5		0.956		
Customer satisfaction 1			0.981	
Customer satisfaction 2			0.950	
Customer satisfaction 3			0.960	
Customer satisfaction 4			0.969	
Customer satisfaction 5			0.965	
Customer Loyalty 1				0.912
Customer Loyalty 2				0.853
Customer Loyalty 3				0.899
Customer Loyalty 4				0.728

Thus, it can be concluded that the indicators in this study meet the criteria of convergent validity, so that the measurement results can be said to be reliable and valid in explaining the variables studied. This provides a strong basis for proceeding to the next stage in hypothesis testing using a structural model.

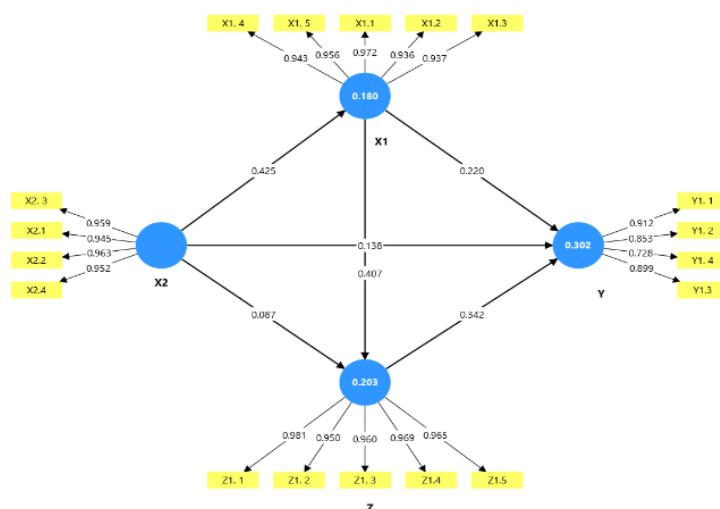


Figure 2. Structural Model

4.1.2. Discriminant Validity

Discriminant validity tests the extent to which indicators in a construct do not have a high correlation with other constructs, so that they can show apparent differences between variables. This test is carried out through cross-loading analysis by comparing the correlation value between the indicator and its construct with its correlation value against other constructs. The following are the results of cross-loading between indicators and each construct:

Table 4 Initial Cross-Loading Output Test Results

	Innovation	Quality Service	Customer satisfaction	Customer Loyalty
Innovation 1	0.945	0.452	0.258	0.293
Innovation 2	0.963	0.390	0.246	0.327
Innovation 3	0.959	0.377	0.236	0.286
Innovation 4	0.952	0.398	0.250	0.316
Quality Service 1	0.395	0.972	0.405	0.404
Quality Service 2	0.396	0.936	0.376	0.434
Quality Service 3	0.408	0.937	0.451	0.407
Quality Service 4	0.414	0.943	0.446	0.376
Quality Service 5	0.401	0.956	0.425	0.423
Customer satisfaction 1	0.282	0.441	0.981	0.481
Customer satisfaction 2	0.288	0.460	0.950	0.425
Customer satisfaction 3	0.240	0.418	0.960	0.443
Customer satisfaction 4	0.180	0.422	0.969	0.468
Customer satisfaction 5	0.260	0.401	0.965	0.477
Customer Loyalty 1	0.272	0.410	0.496	0.912
Customer Loyalty 2	0.297	0.337	0.418	0.853
Customer Loyalty 3	0.286	0.377	0.397	0.899
Customer Loyalty 4	0.233	0.340	0.278	0.728

The results in Table 4 show that all indicators have the highest loading values on the measured constructs, compared to other constructs. For example, indicators INV1–INV4 have the highest loading values on the Innovation construct, not Service Quality, Satisfaction, or Loyalty. Likewise, other indicators show adequate discriminant validity. Therefore, it can be concluded that each indicator has succeeded in representing its construct variables uniquely and does not overlap with other constructs. This strengthens the validity of the measurement model used in the study and shows that the constructs in the model do not experience redundancy or multicollinearity problems.

4.1.3. Reliability Test

Reliability testing aims to assess the internal consistency of the indicators used in measuring each construct by referring to Cronbach's Alpha and Composite Reliability values. The Cronbach's Alpha value is declared qualified if more than 0.6, while the Composite Reliability value must be above 0.7. The results of testing the two reliability indicators are presented in the following table.

Table 5. Output Cronbach's alpha and Composite Reliability

	Cronbach's alpha	Composite reliability
Innovation	0.968	0.976
Quality Service	0.972	0.978
Customer satisfaction	0.981	0.985
Customer Loyalty	0.871	0.912

Table 4 shows that all constructs have Cronbach's Alpha values above 0.70 and Composite Reliability above 0.90, indicating that all latent variables in this study meet the criteria for excellent reliability. The highest value is seen in the customer satisfaction construct, which reflects strong internal consistency between its indicators. Structural Model Test (Inner Model) and Hypothesis Test

4.1.4. Structural Model Test

This test is conducted to see the causal relationship between exogenous (independent) and endogenous (dependent) variables. One of the leading indicators in testing the feasibility of a structural model is the R-square (R^2) value, which shows how much the independent variable contributes to explaining the dependent variable. The R-squared value is only applied to the dependent variable. The higher the R^2 value, the better the model explains the construct's variability. In this study, the R-square results are shown in the following table:

Table 6. R-square Test Output Value (R^2)

	R-square	R-square adjusted
Quality Service	0.180	0.176
Customer satisfaction	0.203	0.194
Customer Loyalty	0.302	0.290

Based on Table 5, the R-square value shows that the combination of innovation and service quality explains 20.3% of the variation in customer satisfaction. In comparison, customer loyalty can be explained by 30.2% by all independent variables. Although classified as moderate, this value shows that the structural model is feasible in social and customer behavior.

4.1.5. Hypothesis Testing

This test uses the bootstrapping method on SmartPLS software version 4.0. This test aims to determine the significance of the relationship between variables in the model. The two leading indicators used are:

- t-statistic > 1.96 (for a significance level of 5%)
- p-value < 0.05 indicates a significant relationship.

The test results are divided into two parts: direct effects and indirect effects.

Table 7. Direct Hypothesis

	Original sample	T statistics	P values
innovation-> Quality Service	0.425	6.554	0.000
Innovation -> Customer satisfaction	0.087	1.260	0.208
Innovation -> Customer Loyalty	0.138	1.946	0.052
Quality Service-> Customer satisfaction	0.407	5.814	0.000
Quality Service-> Customer Loyalty	0.220	2.720	0.007
Customer satisfaction-> Customer Loyalty	0.342	4.185	0.000

Table 7 shows that service quality significantly impacts customer satisfaction and loyalty. Conversely, innovation does not significantly affect customer satisfaction or loyalty, although it does show a positive trend.

Table 8. Indirect Hypothesis

	Original sample	T statistics	P values
innovation-> Quality Service-> Customer satisfaction	0.173	4.401	0.000
innovation-> Customer satisfaction -> Customer Loyalty	0.030	1.224	0.221
innovation-> Quality Service-> Customer Loyalty	0.094	2.417	0.016

	Original sample	T statistics	P values
Quality Service-> Customer satisfaction -> Customer Loyalty	0.139	3.281	0.001
innovation-> Quality Service-> Customer satisfaction -> Customer Loyalty	0.059	2.975	0.003

The results indicate that the influence of innovation on customer loyalty occurs indirectly through two stages of mediation, namely through service quality and customer satisfaction. This strengthens the important role of mediation in this model and shows that the influence of innovation is not direct but depends on the implementation of quality services and the creation of customer satisfaction.

4.2. Discussion

4.2.1. The Influence of innovation on service quality

The analysis results show that innovation positively and significantly affects service quality, producing a path coefficient of 0.425, t-statistic 6.554, and p-value 0.000 (>0.05), so the hypothesis is accepted. This finding supports previous theories and research, such as that by Rahman et al. (2021), which states that implementing innovation can increase the efficiency and effectiveness of services. However, the pre-survey results showed that customers still face technical obstacles such as system instability and less-than-optimal Access to the KAI application features. This difference can be explained by the fact that implementing immature innovation can hinder its full benefits. The management of PT Kereta Api Indonesia Divre II West Sumatra needs to ensure that every digital innovation is thoroughly tested before being implemented for the public. In addition, intensive training for the technical and customer service teams is essential so that they can handle system disruptions quickly and responsively, so that customers continue to feel an increase in service quality.

4.2.2. The influence of innovation on service satisfaction

The analysis results show that innovation does not directly affect customer satisfaction, with an O of 0.087, a T-statistic of 1.260, and a P-value of 0.208, so the hypothesis is rejected. This result differs from previous research by Fauzi & Mandala (2019), which stated that innovation had a significant positive effect on satisfaction. This difference can be caused by the customer perception that innovation has not directly answered their needs. For example, application features that are not intuitive or that often experience technical problems can create frustration rather than convenience. PT KAI needs to adopt a user-centered design approach when developing digital features. Customer involvement in the trial phase or user experience (UX) surveys can be an important strategy to ensure that the innovations implemented add value to the customer experience.

4.2.3. The influence of innovation on customer loyalty

Innovation The effect of innovation on customer loyalty is also directly insignificant, with an O of 0.138, a T-statistic of 1.946, and a P-value of 0.052, so the hypothesis is rejected. This value is close to the significance threshold ($\alpha = 0.05$), but is still outside the specified limits. This shows that innovation alone cannot create customer loyalty without satisfaction or good service perceptions. This aligns with the view that loyalty results from a comprehensive experience, not just based on novelty or new features alone. To increase loyalty, management needs to socialize the real benefits of innovation to customers through intensive education and communication, for example, through social media, email, or an informative application onboarding.

4.2.4. Quality of service towards customer satisfaction

Service quality significantly affects customer satisfaction, with an O of 0.407, a T-statistic of 5.814, and a P-value of 0.000, so the hypothesis is accepted. This finding aligns with the SERVQUAL theory and previous studies (Sonjaya & Ruyani, 2023), which state that superior service quality is the main factor in creating customer satisfaction. Companies should improve fundamental service aspects such as punctuality, train cleanliness, staff friendliness, and travel safety. Continuous frontline training is essential to improve customer perceptions of quality and drive satisfaction.

4.2.5. Quality of service towards customer loyalty

Service quality also significantly affects customer loyalty with an O value of 0.220, T-statistic 2.720, and P-value 0.007, so the hypothesis is accepted, meaning that service quality creates satisfaction and encourages customers to continue using train services and recommend them. This is in line with the concept of customer loyalty by Taufan & Santoso (2023), which states that a positive experience with a service will strengthen the customer's long-term relationship with the company. Service standardization must be strengthened at all service points, including on local trains. Empathy-based customer service training and responsiveness need to be provided continuously.

4.2.6. Customer satisfaction mediates customer loyalty

Customer satisfaction is a mediating variable that significantly affects customer loyalty, with an O value of 0.342, a T-statistic of 4.185, and a P-value of 0.000, so the hypothesis is accepted. These results support research from Nadia and Firmansyah (2025) that shows that satisfaction plays an important role in building loyalty. Customers who are satisfied with the service will be more willing to make repeat purchases and will not easily switch to competitor services. Management must maintain continuity between innovation, service, and overall customer experience. The customer journey mapping strategy can be used to identify critical touchpoints that have the most influence on customer satisfaction and loyalty.

V. Conclusion

Based on the results of hypothesis testing, this study concludes that service quality has a significant direct effect on customer satisfaction and loyalty. In contrast, innovation only significantly affects service quality, but not directly on customer satisfaction or loyalty. This finding indicates that in public transportation services such as PT Kereta Api Indonesia Divre II West Sumatra, customers have not fully felt innovation directly, especially if increased service quality does not accompany it. In addition, customer satisfaction has been shown to play an important mediating role in the relationship between service quality and innovation on customer loyalty. This confirms that loyalty is not formed solely from new features or technologies, but from a comprehensive and satisfying service experience. Theoretically, this study strengthens the role of consumer satisfaction as a mediator in the relationship between service quality and innovation. This finding strengthens the theory that customer loyalty is influenced by the perception of customer satisfaction and user experience with the service. Managerial implications: For businesses, the study results indicate that increasing customer loyalty depends on optimal service quality and requires practical application innovation. Improving routine staff training, simplifying the Access by KAI application interface, and customer feedback systems must be prioritized to create satisfaction and sustain long-term loyalty. However, this study has limitations in geographical scope and the number of respondents. Therefore, further research is recommended to cover more operational areas of PT Kereta Api Indonesia and consider additional variables such as price, comfort, and brand image to provide a more comprehensive understanding of customer loyalty in the transportation sector.

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