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Research Article

Determinants of User Satisfaction and Loyalty in Jakarta's Light Rail Transit: The Role of Environment, Vehicle Characteristics, Safety, and Cost

Firmansyah Wahyudiarto [1,*], Agus Maolana Hidayat [1], Mahir Pradana [1]
[1] *Department of Business Administration, School of Economic and Business, Telkom University, Bandung, Indonesia*
[*] *Corresponding Email: firmansyah.wahyudiarto@gmail.com; Tel.: +62 852-9300-8811*

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ABSTRACT

This study aims to analyze the factors influencing customer satisfaction and loyalty in public transportation (PT) services, specifically among users of Jakarta Light Rail Transit (LRT). The study uses the Partial Least Squares Structural Equation Model (PLS-SEM) to examine customer satisfaction and loyalty based on parameters such as environment, vehicle characteristics, safety, and cost. Data were collected through an online questionnaire distributed to 107 participants in the Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) areas who had used the Jakarta LRT services as a regular transport. The analysis shows that cost, vehicle characteristics, and safety have a significant direct effect on customer satisfaction, while environment does not. Customer loyalty is significantly influenced by customer satisfaction, environment, vehicle characteristics, and cost, but not by safety. The study concludes that improving customer satisfaction has a direct impact on customer loyalty. It is recommended that companies adopt affordable and competitive pricing strategies, ensure comfortable vehicles, and prioritize passenger safety to enhance the overall transportation experience and strengthen customer loyalty.

Keywords: public transportation, customer satisfaction, customer loyalty, light rail transit, partial least squares structural equation model

1. Introduction

Public transportation can be defined as any type of transportation system that is accessible to the general public, either for hire or for a fee. Such systems may include trains, buses, taxis, and air and sea services *(Preston, 2009)*. Public transportation systems can be differentiated in terms of cost and capacity, ranging from low-capacity systems such as taxis and mini-microbuses to high-capacity variants such as Demand Responsive Transport (DRT) and Personal Rapid Transport (PRT) systems *(Preston, 2009)*. Medium-capacity public transportation systems include buses, trams, and Light Rail Transit (LRT) systems *(Preston, 2009)*. LRT systems operate in urban areas on designated lines or corridors using light rail vehicles to transport passengers *(Vuchic, 2005)*. LRT systems are designed for short to medium distances, frequent stops (at stops or stations), and lower passenger capacity than large-capacity ones such as conventional long-distance trains *(LRT Jakarta, n.d.)*. The Jakarta Government has been making efforts to build a public transportation network through the Public Service Obligation scheme to facilitate public access and reduce traffic congestion in the capital city of Jakarta *(Ministry of Transportation of the Republic of Indonesia, 2024)*. One of the measures being taken is the provision of Jakarta LRT transportation services. The Jakarta LRT's operational area is confined to a 5.8-kilometre radius encompassing six stations, with its route commencing from Pegangsaan Dua Station, North Boulevard Station, South Boulevard Station, Pulomas Station, Equestrian Station, and concluding at Velodrome Station *(Jakarta LRT, 2023)*. The fare structure for passengers, irrespective of the distance travelled, is a flat fee of IDR 5,000, as stipulated in DKI Jakarta Governor Regulation No. 34 of 2019 *(Provincial Government of DKI Jakarta, 2019)*.

Figure 1. Jakarta LRT Route
(Source: Jakarta LRT Annual Report 2023, 2024)

In the aftermath of the global pandemic of Coronavirus (COVID-19), the Indonesian capital city of Jakarta experienced an increase in its population, in accordance with the mobilisation of the population for employment, education and economic activities, all of which require a transportation system that is accessible, reliable and integrated with various modes of transport *(Rianawati et al., 2022)*. Jakarta's congestion is worsened by population growth, rapid urbanization, and increasing density *(Nanditho & Yola, 2022)*. The imbalance between the volume of private vehicles and the capacity and development of road infrastructure, particularly during peak hours, is a contributing factor to congestion *(Novwidia et al., 2021)*. This issue is further compounded by Jakarta's ranking as the 10th most congested city globally, as reported *(Pishue, 2024)*. In order to encourage individuals to opt for alternative modes of transportation, public transportation systems must demonstrate a competitive edge over private vehicles in terms of safety, reliability, efficiency, comfort, and seamless integration *(Göransson & Andersson, 2023)*. Public transportation is expected to offer time and cost efficiency, particularly in facilitating the commuting needs of workers, while also prioritising environmental sustainability, a crucial criterion for effective urban public transportation systems *(Kamaruddin et al., 2012)*. The environmental challenges posed by the transportation sector, including high CO2 exhaust emissions, have become a pressing global concern *(Alomari et al., 2022)*. According to the Ministry of Transportation, Indonesia is listed as the largest contributor to CO2 emissions in the world in 2022, with a minimum of 1.3 giga tons of CO2 being generated, of which 50.6 percent of the emissions were produced by the energy sector, with over 80 percent of these emissions being attributable to transportation modes such as cars and motorbikes. In light of this, the Government of Indonesia has expressed its commitment to reducing greenhouse gas emissions in accordance with global agreements, as outlined in the Enhanced Nationally Determined Contribution (E-NDC) document *(Ministry of Transportation of the Republic of Indonesia, 2024)*. In 2022, the nation successfully reduced emissions by 91.5 million tons of CO2 from its target of 91 million tons. This achievement was partly facilitated by various programmes encouraging individuals to opt for environmentally-friendly public transportation options such as Electric Rail Trains (KRL), Mass Rapid Transit (MRT), and LRT, as opposed to private vehicles *(Ministry of Transportation of the Republic of Indonesia, 2024)*. The Jakarta LRT is a prime example of this commitment, aiming to promote the adoption of eco-friendly electric modes of transportation in line with greenhouse gas emission reduction programmes.

The Jakarta Special Region Government has implemented a range of programmes with the objective of providing a variety of modes of transport for its citizens. However, despite these initiatives, public transport remains underutilized, with the majority of the population opting for private vehicles *(Ministry of Transportation, 2022)*. A study identified several key disadvantages to using public transport in Indonesia, including crowding (48%), crime (45%), limited routes (43%), long journey times (39%), and limited operating hours (37%) *(JAKPAT, 2024)*. Another study, conducted across Indonesia, found that the feasibility of facilities and infrastructure accounted for 14.4% of public transport users' comfort levels *(Sayekti, 2024)*. The ability to secure a seat without physical discomfort (14.4%) and the completeness of facilities (14.4%) were also identified as contributing factors *(Sidik, 2023)*. This assertion is further substantiated by the extensive discourse surrounding the optimal fare or price for utilizing public transportation, as individuals evaluate factors such as travel time, distance travelled, amenities, and financial capacity *(CXO Media, 2023)*.

In connection with the facilities aspect, one of the characteristics of the disturbances that often occur in LRT vehicles is the presence of electrification disturbances such as Static Inverter, Variable Voltage Variable Frequency

disturbances, and other facility disturbances that cause disruption of train operations *(LRT Jakarta, 2024)*. Therefore, comfortable vehicle conditions and minimal disruption are safety factors and provide opportunities for people to switch from private transportation to public transportation *(Urbanek, 2021)*. Crime is also one of the factors that influence the preference of Indonesians to switch to public transportation *(Urbanek, 2021)*. For example, PT Kereta Api Indonesia recorded 200 criminal cases during 2022-2024 in the KRL station area, ranging from cases of sexual harassment to pickpocketing *(Kumparan News, 2024)*. It is necessary to guarantee safety and security for passengers both in the station area and inside the train to provide comfort while driving *(Stjernborg, 2024)*.

Previous research on the Jakarta LRT discussed the relationship between customer satisfaction and service quality which emphasizes the services provided by officers, reliability in serving passengers, responsiveness, empathy, and tangibles aspects *(Alfazri et al., 2020)*. This study also uses different dimensions from previous research to measure attributes affecting customer satisfaction in Indonesia's railway company, PT Kereta Api Indonesia, focusing on service quality aspects such as reliability, responsiveness, assurance, empathy, and tangibles *(Yunani et al., 2024)*. There are gaps in both studies that have not emphasized environmental attributes, train facilities, safety, and also price as factors that affect the satisfaction and loyalty of Jakarta LRT users. Thus, this study provides a perspective on the various attributes from several research studies regarding the factors influencing satisfaction and loyalty in the public transportation sector in Indonesia, particularly in the railway industry.

2. Literature Review

Public transportation involves facilities such as buses, planes, ships, trains, mass rapid transit, and other modes of transportation operated by public and private sector companies *(Black, 2020)*. LRT is one of the train-based transportation that provides solutions to reduce congestion in big cities, increase population mobility, and reduce carbon emissions through reducing the use of private vehicles *(Sharma & Newman, 2017)*.

2.1. Environment

Rail-based transportation has been shown to emit lower levels of greenhouse gases per passenger-kilometre than private vehicles *(Chester & Horvath, 2010)*. This is due to the energy efficiency and greater carrying capacity of rail. Furthermore, environmental strategies, such as green marketing, have been demonstrated to increase passenger loyalty *(Vicente et al., 2020)*. Research conducted in Klang Valley, Malaysia, has demonstrated a positive correlation between environmental factors and satisfaction among LRT transportation users *(Kamaruddin, Osman, & Che Pei, 2012; Hoo et al., 2023)*. Consequently, the provision of environmentally friendly transportation is imperative to attract and retain users.

2.2. Vehicle Characteristic

Factors such as capacity, speed, interior comfort and accessibility influence passengers' perceptions of service quality *(Cervero, 1998; van Lierop, Badamia, & El-Geneidy, 2020)*. Vehicle conditions, including temperature, humidity, air circulation and noise, are also important considerations for passengers *(Rohayu et al., 2021)*. In Brazil, poor vehicle quality and high maintenance costs are major constraints for transport services *(Barbosa et al., 2017)*. Thus, vehicle characteristics related to comfort play an important role in increasing the attractiveness of public transport for users.

2.3. Safety

Transport safety consists of protecting users from physical and psychological risks. Concerns about crime and inhumane acts can reduce user confidence *(Sham et al., 2019)*. Research shows that safety is a major factor influencing the satisfaction and loyalty of transport users *(Githui, Okamura, & Nakamura, 2010; Hansson, 2019)*. In the context of the Jakarta LRT, safety focuses on supporting crime-free operations and improving passenger comfort.

2.4. Cost

Affordable cost and quality of service are factors in public transport user satisfaction *(Zeithaml, 1988; Ingvardson & Nielsen, 2019)*. A study by *Sianipar (2019)* shows that positive cost perceptions increase customer satisfaction. It can therefore be concluded that cost includes not only fares, but also the value of convenience, reliability and time efficiency, all of which contribute to user decisions.

2.5. Satisfaction

Customer satisfaction occurs when services meet or exceed user expectations *(Kotler, 2018)*. In public transport, dimensions such as schedule reliability, cleanliness and station facilities have a significant impact on satisfaction *(van Lierop, Badamia, & El-Geneidy, 2020)*. Studies on public transport in Palembang and Jakarta show that service quality and convenience increase people's preference for the mode of transport used *(Sembada, Hariyani, & Setyono, 2020)*.

2.6. Loyalty

Customer loyalty is the consistency in choosing a service based on positive experiences and satisfaction *(Griffin, 2002)*. For customers to be trusted and loyal, business services must understand and meet their customers' desires *(Irsa & Pradana, 2024)*. Factors such as cleanliness, safety and environmental sustainability values contribute to the loyalty of public transport users *(Vicente et al., 2020; van Lierop, Badamia, & El-Geneidy, 2020)*. Research in Jordan has shown that satisfaction, service quality and environmental impact directly influence user loyalty, potentially shifting users from private cars to public transport *(Alomari et al., 2022)*. The positive experiences that customers have with services can lead to emotional satisfaction, making these services their primary choice and encouraging them to recommend them to others *(Azzahra et al., 2023)*.

2.7. Measurement Model

Table 1 presents the research constructs, items and questions designed to measure the level of customer satisfaction and loyalty to public transport service attributes. All questions are structured consistently to fit the theme of this research, which is to evaluate the factors that influence customer satisfaction and loyalty in the context of public transport services.

Table 1. Research Constructs and Questions

Construct	Item	Description
Environment	LI1	The Jakarta LRT helps reduce traffic noise on the highway.
	LI2	Using the Jakarta LRT helps reduce traffic congestion on the highway.
	LI3	Using the Jakarta LRT helps reduce air pollution in the city.
	LI4	Using the Jakarta LRT helps reduce the risk of road accidents.
	LI5	Using the Jakarta LRT helps to save fuel.
Vehicle Characteristic	KK1	The trains of the Jakarta LRT have a modern design.
	KK2	The interior of the Jakarta LRT train is kept clean.
	KK3	The air conditioning (AC) system inside the Jakarta LRT train works properly and adequately.
	KK4	The air circulation system inside the LRT train works well.
	KK5	The seats on the Jakarta LRT train are comfortable.
	KK6	The Jakarta LRT train provides adequate comfort and privacy.
	KK7	I get a seat when I use the Jakarta LRT train.
Safety	KAM1	Safety is guaranteed on the Jakarta LRT train.
	KAM2	Security at Jakarta LRT stations is good and reliable.
	KAM3	Using the Jakarta LRT remains safe during the day.
	KAM4	It is safe to use the Jakarta LRT at night.
	KAM5	Jakarta LRT trains and drivers are reliable and trustworthy.

Construct	Item	Description
Cost	HG1	Jakarta LRT ticket prices are affordable (Rp.5,000 flat).
	HG2	Using the Jakarta LRT helps to reduce monthly transportation costs.
Satisfaction	PUA1	The Jakarta LRT service makes me happy while travelling.
	PUA2	In general, the service of the Jakarta LRT is satisfactory.
	PUA3	The quality of the Jakarta LRT service meets my expectations.
	PUA4	In general, the Jakarta LRT provides confidence and safety (when travelling alone).
Loyalty	LOY1	I would recommend the Jakarta LRT as it is comfortable and reliable.
	LOY2	I strongly believe in the service quality of the Jakarta LRT.
	LOY3	Jakarta LRT is one of the best choices for public transport (for the North Jakarta area).
	LOY4	I plan to use Jakarta LRT for regular trips.

2.8. Conceptual Model and Hypotheses Development

There is considerable research on the factors that influence transportation customer satisfaction and loyalty. The relationship of some of these factors is broadly taken from research by Alomari et al. (2023). In Figure 1 is a model in this study to determine the attributes that affect customer satisfaction and loyalty, namely from the aspects of environmental impact, vehicle characteristics, factors on safety, and also the price or tariff of services.

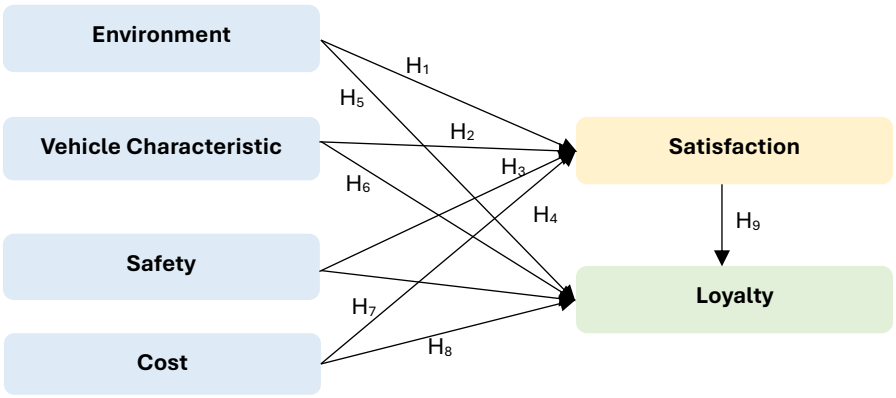

Figure 2. Conceptual Model
Source: Alomari et al. (2022); Vicente et al. (2020)

The following nine hypotheses are derived from the conceptual model:

H1: Environmental impact has a positive effect on LRT user satisfaction.

H2: Vehicle characteristics have a positive effect on LRT user satisfaction.

H3: Safety factors have a positive effect on LRT user satisfaction.

H4: Cost (travel fares) has a positive effect on LRT user satisfaction.

H5: Environmental impact has a positive effect on LRT user loyalty.

H6: Vehicle characteristics have a positive effect on LRT user loyalty.

H7: Safety factors have a positive effect on LRT user loyalty.

H8: Cost (travel fares) has a positive effect on LRT user loyalty.

H9: Satisfaction has a positive effect on LRT user loyalty.

The development of hypotheses in this study in more detail is based on several previous studies which have been summarized in Table 2 below:

Table 2. Hypothesis Relationship with Previous Study

Hypotheses	Item	Previous Study	Result
H1	Environment → Satisfaction	Alomari et al., 2022; Hoo et al., 2023; Vicente, et al., 2020.	No effect (weak) Positively Influenced Positively Influenced
H2	Vehicle Characteristic → Satisfaction	Seerden, 2019; Van Lierop et al., 2018.	Positively Influenced Positively Influenced
H3	Safety → Satisfaction	Alomari et al., 2022; Van Lierop et al., 2018.	Positively Influenced Positively Influenced
H4	Cost → Satisfaction	Alomari et al., 2022.	Positively Influenced
H5	Environment → Loyalty	Alomari, et al., 2022; Kamaruddin et al., 2011; Vicente, et al., 2020.	Positively Influenced Positively Influenced Positively Influenced
H6	Vehicle Characteristic → Loyalty	Van Lierop et al., 2018.	Positively Influenced
H7	Safety → Loyalty	Van Lierop et al., 2018.	Positively Influenced
H8	Cost→ Loyalty	Alomari et al., 2022.	Positively Influenced
H9	Satisfaction → Loyalty	Ricardianto et al., 2024; Alomari et al., 2022; Vicente et al., 2020; Saribanon et al., 2016; Kamaruddin et al., 2011.	Positively Influenced Positively Influenced Positively Influenced Positively Influenced Positively Influenced

3. Methodology, Data, and Analysis

Data collection began after determining the variables, hypotheses, and sample size based on statistical methods. The research sample is a user of the Jakarta LRT service who has used it as a regular transport. Through the purposive sampling method, information was collected from respondents by distributing online questionnaires to users who reside in the areas of Jakarta, Bogor, Depok, Tangerang and Bekasi. All respondents voluntarily participated in this

study, and 107 people participated in this study. This number is based on the calculation of the minimum sample using the Slovin formula with a margin of error of 0.1, and since the total number of LRT users in 2024 is 1,226,984 people, the minimum number of respondents is 100 people *(Sugiyono, 2018)*.

In the measurement aspect, six constructs or variables are measured, namely environment (three items), vehicle characteristics (seven items), safety factors (five items), price (two items), satisfaction (four items), and loyalty (four items). The questionnaire consisted of 27 items and was distributed online through social media to all users who had used the Jakarta LRT service. Each statement is rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Details on the characteristics of the respondents are shown in Table 3.

Table 3. Demographic Profile of the Respondents

Variable	Category	Frequency	Percentage
Gender	Male	53	49,53%
	Female	54	50,47%
	Total	**107**	**100%**
Domicile	Jakarta	60	56,07%
	Bogor	2	1,87%
	Depok	4	3,74%
	Tangerang	10	9,35%
	Bekasi	23	21,50%
	Outside Jabodetabek Area	8	7,48%
	Total	**107**	**100%**
Age	18 – 24 years	14	13,08%
	25 – 34 years	70	65,42%
	35 – 44 years	19	17,76%
	44 – 54 years	2	1,87%
	> 55 years	2	1,87%
	Total	**107**	**100%**
Education	Elementary/Junior High School	0	-
	or equivalent	7	6,54%
	Senior High School or equivalent	94	87,85%
	Diploma/Bachelor's degree	6	5,61%
	Postgraduate (S2/S3)	**107**	**100%**
	Total		
Occupation	Student	4	3,74%
	Employee	80	74,77%
	Self-employed	8	7,48%
	Professional (Pilot, Doctor,	7	6,54%
	Lawyer)	8	7,48%
	Other	**107**	**100%**
	Total		
Income	< Rp. 5.000.000,-	12	11,21%
	Rp. 5.000.000 - Rp.	54	50,47%
	10.000.000,-	28	26,17%
	Rp. 10.000.000 - Rp.	11	10,28%
	20.000.000,-	2	1,87%
	> Rp. 20.000.000,-	**107**	**100%**
	No own income		
	Total		

Variable	Category	Frequency	Percentage
Frequency of Use	1-2 times per month	71	66,36%
	1-2 times per week	25	23,36%
	3 or more times per week	5	4,67%
	Every day	6	5,61%
	Total	**107**	**100%**

Source: Author's Processing Results.

Descriptive statistics obtained based on the questionnaire data distributed to 107 respondents, there is a demographic profile of research respondents that shows the diversity of characteristics of Jakarta LRT users. There is a majority of female respondents (50.47%) with most respondents residing in Jakarta (56.07%), followed by Bekasi (21.50%) and Tangerang (9.35%). The respondents are dominated by the productive age group, namely 25-34 years old (65.42%), while 35-44 years old reached 17.76%. The educational level of the majority of respondents is Diploma or Bachelor (87.85%), reflecting a highly educated population. Most respondents work as employees (74.77%), with a dominant income in the range of IDR 5,000,000 - 10,000,000 (50.47%). In terms of frequency of use, the majority of respondents rarely use this service (66.36%), while only 5.61% use it regularly (every day).

4. Result and Discussion

Based on the results of processing the respondents' data using SmartPLS 4.0 software, a number of research findings were obtained as a basis for testing validity, reliability and also hypotheses.

Table 4. Loading Factor, Construct Reliability dan Validity.

Variable	Item	Item Reliability	Convergent Validity			Evaluation Result
		Loadings	CR	AVE	Cronbach Alpha	
Environment	LI1	0.847	0.911	0.672	0.878	Valid
	LI2	0.859				
	LI3	0.866				
	LI4	0.759				
	LI5	0.759				
Vehicle Characteristic	KK1	0.861	0.938	0.717	0.921	Valid
	KK2	0.838				
	KK3	0.878				
	KK4	0.821				
	KK5	0.830				
	KK6	0.849				
Safety	KAM1	0.909	0.948	0.785	0.931	Valid
	KAM2	0.882				
	KAM3	0.915				
	KAM4	0.872				
	KAM5	0.852				
Cost	HG1	0.968	0.967	0.936	0.932	Valid
	HG2	0.967				
Satisfaction	PUA1	0.890	0.925	0.805	0.879	Valid
	PUA2	0.914				
	PUA3	0.887				
Loyalty	LOY2	0.865	0.882	0.714	0.802	Valid
	LOY3	0.850				
	LOY4	0.820				

Source: Author's Processing Results.

Table 4 explains the results of the loading factor value in the research, where the value that is ideally acceptable and met is when it has more than 0.7 *(Hair et al., 2019)*. The test data shows that the correlation value of the indicators with their constructs has a good relationship because it has a value of more than 0.7. Therefore, the measurement model has met the relevance and validity as a model. To measure the reliability and validity of a construct, whether it is consistent and accurate in explaining indicators, in this study it is measured by measuring the value of Cronbach's Alpha, Composite Reliability (CR) and Average Variance Exctracted (AVE). The Cronbach's Alpha measurement is said to be consistent if the value is more than 0.7 *(Ghozali & Latan, 2015),* for CR it is said to be reliable if the value is > 0.7 *(Sarstedt et al., 2017)* and AVE is declared to be convergent valid if it meets the value > 0.5 *(Sarstedt et al., 2017)*. The results in the study according to Table 4 above have constructs that have a Cronbach's Alpha value> 0.7, CR> 0.7 and AVE> 0.7, so they are valid.

Table 5. Disciminant Validity of Constructs

Variable	Cost	Environment	Loyalty	Safety	Satisfaction	Vehicle Characteristic
Discriminant Validity: Heterotrait-Monotrait Criterion						
Cost						
Environment	0.551					
Loyalty	0.650	0.697				
Safety	0.374	0.555	0.750			
Satisfaction	0.590	0.622	0.896	0.823		
Vehicle Characteristic	0.252	0.479	0.727	0.844	0.775	
Discriminant Validity: Fornell-Larcker Criterion						
Cost	0.968					
Environment	0.488	0.819				
Loyalty	0.566	0.598	0.845			
Safety	0.348	0.509	0.659	0.886		
Satisfaction	0.535	0.555	0.762	0.744	0.897	
Vehicle Characteristic	0.240	0.445	0.639	0.785	0.704	0.847

Source: Author's Processing Results.

The results of the construct discriminant validity test using the Heterotrait-Monotrait (HTMT) criterion show that all HTMT values between variables are below the 0.90 threshold *(Henseler et al., 2015)*, indicating that each construct has sufficient discriminant validity. Furthermore, based on the Fornell-Larcker criteria, the square root of the average variance extracted (AVE) for each construct (diagonal value) is greater than the correlation between other constructs (off-diagonal value). This is in line with Fornell and Larcker's (1981) criteria that discriminant validity is met when the AVE value is greater than the variance shared with other constructs. Thus, discriminant validity was met in this study according to these two test procedures.

Table 6. Statistical Result (Hypotheses Testing)

Hypotheses	Relationship	Path Coefficient	*p*-values	Relation	Result	Significance
H1	Environment → Satisfaction	0.094	**0.329**	Positive	Rejected	Not Significant
H2	Vehicle Characteristic → Satisfaction	0.325	0.009	Positive	Accepted	Significant
H3	Safety → Satisfaction	0.339	0.013	Positive	Accepted	Significant
H4	Cost → Satisfaction	0.293	0.001	Positive	Accepted	Significant
H5	Environment → Loyalty	0.165	0.042	Positive	Accepted	Significant
H6	Vehicle Characteristic → Loyalty	0.209	0.038	Positive	Accepted	Significant
H7	Safety → Loyalty	0.074	**0.454**	Positive	Rejected	Not Significant
H8	Cost → Loyalty	0.223	0.005	Positive	Accepted	Significant
H9	Satisfaction → Loyalty	0.349	0.001	Positive	Accepted	Significant

The results of hypothesis testing in this study show that out of the nine hypotheses tested, seven hypotheses are accepted because they have a p-value <0.05, in accordance with the statistical significance criteria proposed by Hair et al. (2019). Hypotheses H2, H3, H4, H5, H6, H8 and H9 show a positive and significant relationship, with the path coefficient indicating the strength of the relationship between the variables. However, H1 and H7 were rejected due to p-values > 0.05, indicating that the relationships were not statistically significant. Overall, these results suggest that factors such as vehicle features, safety, cost and satisfaction play a significant role in establishing relationships with satisfaction and loyalty. This approach is consistent with the path analysis methodology used in structural equation modelling (SEM), as recommended by Hair et al. (2019).

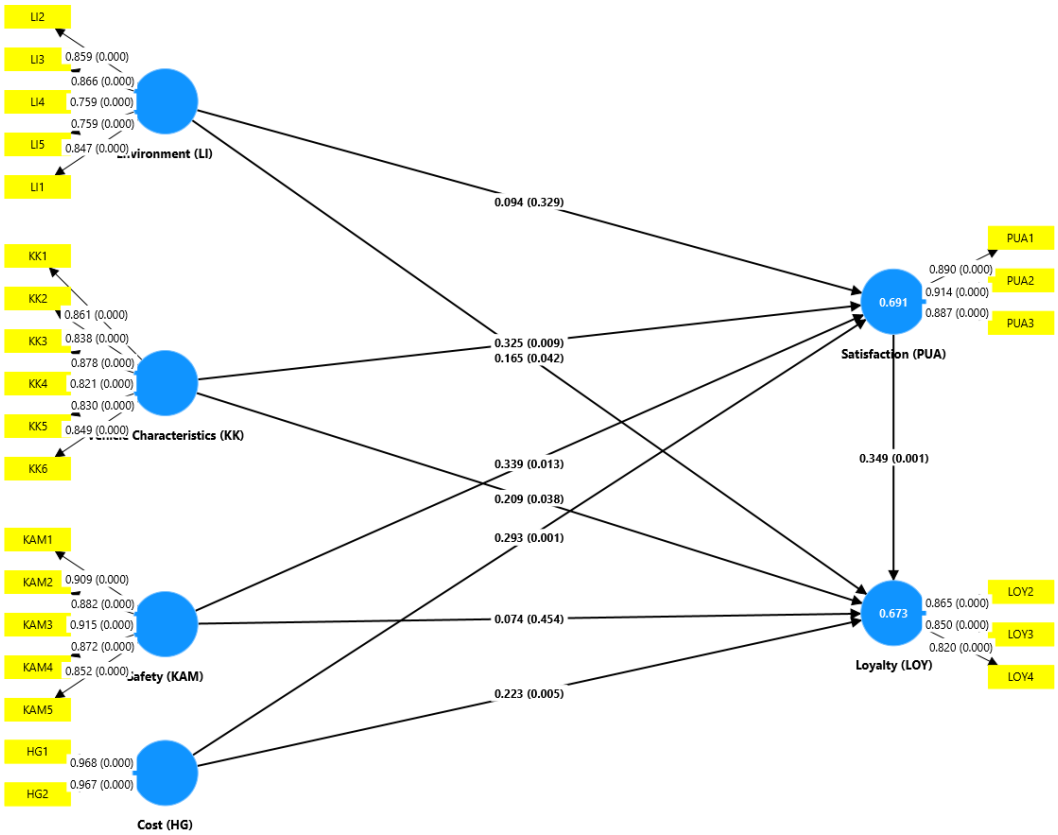

Figure 3. Structural Model (*Bootstrapping*)
Source: Author's Processing Results.

Figure 3 shows the R-square results for structural (inner) model testing, which is used as a statistical measure of how well the independent variables explain the variation in the dependent variable. According to Sarstedt et al. (2017), an R-square of 0.75 is considered strong, 0.50 is moderate and 0.25 is weak. In this study, the R-square for the loyalty variable is 0.673, which is moderate to strong, and the satisfaction variable is 0.691, which is also moderate to strong.

Table 7. Path Coefficients for Indirect Effects.

Relationship	Beta (β)	*t*-values	*p* values	Result
Safety → Satisfaction → Loyalty	0.118	1.754	0.080	Not Supported
Vehicle Characteristic → Satisfaction → Loyalty	0.114	2.174	0.030	Supported
Cost → Satisfaction → Loyalty	0.102	2.584	0.010	Supported
Environment → Satisfaction → Loyalty	0.033	0.866	0.387	Not Supported

The results of the indirect effects analysis show that the four indirect paths tested, two paths have a significant effect with a p value <0.05, in line with the statistical significance criteria proposed by Hair et al. (2019). The Vehicle Characteristics → Satisfaction → Loyalty and Cost → Satisfaction → Loyalty paths have significant indirect effects with p values of 0.030 and 0.010, respectively, indicating that satisfaction is a significant mediator in the relationship. On the other hand, the paths safety → satisfaction → loyalty and environment → satisfaction → loyalty are not significant with p-values of 0.080 and 0.387 respectively, which means that the indirect effect through satisfaction is not strong enough. These results confirm the importance of vehicle features and cost in building loyalty through user satisfaction.

5. Conculsion

This research shows that factors such as the environment, vehicle characteristics, safety and cost have a significant impact on the satisfaction and loyalty of users of the Jakarta LRT. As an environmentally friendly electric-based transport mode, the Jakarta LRT plays an important role in reducing greenhouse gas emissions and providing a more sustainable transport alternative. However, to increase its attractiveness, it is necessary to improve the quality of service, such as improving the feasibility of facilities, minimising operational disruptions, and ensuring the safety of users on the train and at the station.

Customer satisfaction was found to be a key variable mediating the relationship between service factors and user loyalty. Service dimensions such as schedule reliability, facility comfort and time efficiency play an important role in meeting user expectations. Affordability is also an important driver of satisfaction, while value-added services such as environmental sustainability and a safe and comfortable travel experience increase user loyalty to the Jakarta LRT service.

Therefore, to encourage people to switch from private vehicles to public transport, especially the Jakarta LRT, it is necessary to implement a sustainable strategy that focuses on improving service quality and strengthening safety and comfort aspects. This will not only increase user satisfaction and loyalty, but also contribute to reducing congestion and carbon emissions in urban areas, so that this implementation will support Jakarta as an environmentally friendly and transport integrated city.

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