

# Examining Passengers' Satisfaction with Public Transportation in The Rise of Health Concerns

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## ABSTRACT:

As the most frequently used mode of public transportation, train service providers must ensure the safety of passengers since the rise in health concerns. PT KAI has implemented health regulations in line with government recommendations. However, it is necessary to understand, measure, and accommodate passengers' perceptions of service quality as a way of enhancing safety. This study employs a quantitative approach by collecting online questionnaires from 404 passengers who use long-distance train services in Bandung Station. The data analysis is carried out using SPSS and SEM-PLS methods. The result shows that passengers perceived the safety, service quality, satisfaction, and reuse intention positively. Then, perceived safety and perceived service quality influenced passengers' satisfaction. In addition, the satisfaction increased willingness to reuse intentions for long-distance train services. Thus, companies must be able to build a positive experience for their passengers and convince them that it is safe and suitable to use public transportation.

## Keywords:

*Perceived Safety, Perceived Service Quality, Passenger Satisfaction, Reuse Intention, Long-Distance Transportation*

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## 1. INTRODUCTION

Transport plays a vital role to access locations such as workplaces, schools, stores, sporting events, and tourist spots (Abdulkarim et al., 2021). To guarantee the mobility of people and commodities, transportation has a crucial position. Public transportation was selected because it offers convenient, safe, and cost-effective access (Ismail et al., 2013). Thus, public transportation is a sustainable way of travel that can enhance the health and well-being of urban populations.

Trains seem to be the preferred mode of public transportation in Indonesia and around the world (Afifah, 2021). The train can accommodate many passengers in a quick, safe, cost-effective, and efficient way. PT. Kereta Api Indonesia (Persero) is responsible for rail transportation in Indonesia. PT. KAI is a state-owned enterprise (BUMN) that is responsible for handling the whole train transportation (Arrasy et al., 2021). Compared to other modes of transportation such as planes and ships, trains were the most popular mode of long-distance transportation for the nation with 30,9 million passengers (Databoks.katadata.co.id, 2017).

During the outbreak of COVID-19 in Indonesia, the public transportation sector was the most impacted industry. The number of PT KAI's daily passengers began to decrease sharply compared to normal conditions (balitbanghub.dephub.go.id, 2020). People tend to avoid taking public transportation for fear of COVID-19, social limitations rules, and the trend of working from home as these reasons contribute to the reduction in people's mobility. This situation is getting worse by the growing assumption that public transportation is more dangerous due to the possibility of unavoidable contact with other passengers (Primayandi & Gunawan, 2022; Tirachini, 2020).

Through the variables of perceived safety and perceived service quality, this study identifies new factors that influence the satisfaction of long-distance rail passengers. The lower the person's perception of the safety of public transportation, the less they intend to use it. In the transportation literature, safety factors have been studied, but the influence of safety on passenger satisfaction with public transportation services has not been investigated (Su et al., 2021). Passengers directly use the service based on their perceptions and acquire a firm understanding of service quality (Soltanpour et al., 2018). Diverse research has revealed that an increase in public transportation passengers' perception and satisfaction with the system's quality can attract new users (de Oña, 2021).

Service providers must ensure the safety and security of passengers according to health concerns such as COVID-19. PT KAI has implemented health regulations in line with government recommendations, such as wearing masks, washing hands, and maintaining a safe distance (3M) (Hutabarat et al., 2021). However, these conditions need to be measured and need to be investigated because passenger perceptions of service quality tend to change and need to be accommodated in policies that anticipate health problems to improve safety.

## 2. LITERATURE REVIEW

Safety was one of the most essential and crucial factors influencing passenger satisfaction for mass transportation modes (Delbosc & Currie, 2012; Stradling et al., 2007). This mode of transportation's perceived level of safety is one of the primary aspects that contribute to passenger satisfaction. The lower the perceived safety level of public transport passengers, the less chance to utilize it (Su et al., 2021). According to a previous study, safety is the most

important element affecting Edinburgh bus passengers' satisfaction (Stradling et al., 2007). A previous study conducted in the United Kingdom revealed that at least 10 percent of passengers would consider using public transportation if their anxieties were eased (Concern, 2002) and the perception of safety got a significant impact on overall satisfaction (Dong et al., 2021). Better knowledge of passenger safety would improve travel sourcing companies in securing their passengers, then retaining and attracting more customers (Su et al., 2021).

H<sub>1</sub>: Perceived safety has a positive effect on passenger satisfaction with long-distance train passengers.

Service quality is the total quality of transport behavior from the perspective of the passenger. Customers subjectively evaluate perceived service quality; if passengers perceive higher service quality, they will become more satisfied with the service (Saravanan & Rao, 2007). Numerous studies work on evaluating the quality of mass transportation services and determining for-which components of service are most valued by passengers (Wang et al., 2020). According to a study of Taiwanese bus passengers, perceived service quality has a direct and positive impact on consumer satisfaction (Wen et al., 2005). In the case of transportation, the connection between perceived service quality towards perceived safety has not been explored in depth. However, a study by Su et al. (2021) indicates a positive correlation between perceived safety and perceived service quality. Consequently, the service quality assessment process helps identify criteria or quality attributes that have a direct influence on how peoples perceive public transport (Abdulkarim et al., 2021).

H<sub>2</sub>: Perceived service quality has a positive effect on the perceived safety of long-distance train passengers.

H<sub>3</sub>: Perceived service quality has a positive effect on passenger satisfaction with long-distance train passengers.

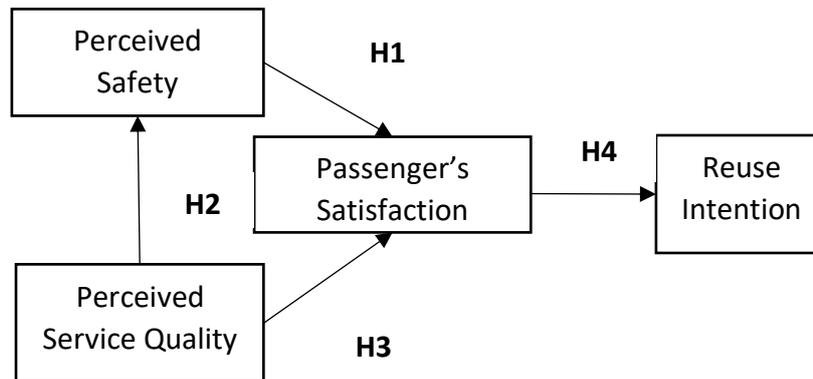
Satisfaction is a user's pleasure or displeasure that occurs from comparing their perceptions or impressions of service performance (Hsieh, 2020). According to research on passengers' satisfaction with transportation services, satisfied passengers are encouraged to retain the service. After using the service, the customer will come alongside this satisfaction (Lu et al., 2020; Su et al., 2021). By optimizing customer satisfaction, service quality can influence passengers' re-use intention. Satisfaction is the correlation between service quality and passenger reusing intentions (Wang et al., 2020). Consumer satisfaction is positively associated with reuse (Wang et al., 2020). Thus, customer satisfaction has a favorable effect on passengers' intention to use rail transportation again.

H<sub>4</sub>: Passenger satisfaction has a positive effect on the reuse intention of long-distance train passengers.

Reuse intention can be interpreted as the intention to purchase products or services, even if it is intended to purchase new or similar products and services that the consumer has purchased in the past or plans to purchase more frequently in the future (A. I. Gunawan et al., 2020; Homniem & Pupat, 2020). Through a better knowledge of passenger behavior,

transportation system management would be better prepared to generate effective marketing plans. Positive customer satisfaction is directly linked to customer reuse intention. Customer satisfaction serves as a link between service quality and passenger reuse intention (Wang et al., 2020). Prior research indicates that the quality of services has the greatest impact on private car users' intentions to use rail transportation (Kwan et al., 2020).

The interrelationship between all variables and the construction of the hypothesis are shown in Figure 1.



**Figure 1.** Research Model

### 3. METHODS

According to the study's aims, a descriptive cross-sectional design would be utilized to describe the correlations between long-distance passengers' safety and service quality perception on their satisfaction. A purposive sampling method was used to distribute an online questionnaire to the intended respondents. The respondents of this research are long-distance train passengers during the COVID-19 outbreak in Bandung Station (DAOP 2). Through social media, a questionnaire survey was distributed with a total of 404 respondents participating. There are perceived safety and perceived service quality as indicators to measure passenger satisfaction. Then, the level of satisfaction can shape the reuse intentions of passengers. To achieve the research objectives this study uses a quantitative approach. To test the hypotheses, it uses a two-stage PLS-SEM (Hair Jr et al., 2021).

The measurement scale in this study uses the outer model and inner model tests. The first stage tried to measure the reliability and validity of the construct variables. The reliability of the questionnaire was measured through factor loading, Cronbach's alpha, construct reliability, and average variance extracted (AVE). Besides, the discriminant validity was assessed by the Heterotrait-Monotrait Ratio of Correlations. The validity and reliability of indicators and constructs are measured using the PLS Algorithm. The results must show an AVE value greater than 0.5. then another measure is that Cronbach's Alpha is also above the limit value of 0.60 (Hair Jr et al., 2021). Furthermore, the values of construct validity (CR) and average variance extracts (AVE) are 0.70 and 0.50 which meet the cut-off value (Hair, Joseph F. Hult, G Thomas. Ringle, Christian M, 2015). As a complement, the Heterotrait-Monotrait Ratio of Correlations (HTMT) test was carried out to evaluate discriminant validity. The next stage is testing the structural model which is done by the path coefficient test to find the relationship between variables. (Goulet-Pelletier & Cousineau, 2018; Gunawan & Wiradinata, 2020; Hair, Joseph F. Hult, G Thomas. Ringle, Christian M, 2015; Henseler et al., 2015).

## 4. RESULTS AND DISCUSSION

### 4.1 Respondent Demographics

The demographic data in this study are presented in Table 1. There are six indicators in obtaining the demographic information used, including gender, age, education level, occupation, income, and frequency of using long-distance train services during the COVID-19 pandemic.

**Table 1.** Respondent Demographics

Characteristic	Frequency	%
<b>Gender</b>		
Man	170	42,1
Woman	234	57,9
<b>Age</b>		
17-22 years old	196	48,5
23-28 years old	140	34,7
29-34 years old	53	13,1
> 35 years old	15	3,7
<b>Level of Education</b>		
High School/equivalent	164	40,6
Diploma (D1-D3)	46	11,4
Bachelor (D4/S1)	186	46,0
Master-Doctoral (S2-S3)	8	2,0
<b>Occupation</b>		
Student	168	41,6
Private employees	147	36,4
Civil Servant	23	5,7
Entrepreneur	40	9,9
Others	26	6,4
<b>Income (per month)</b>		
<1.500.000	140	34,7
1.500.000-5.000.000	173	42,8
5.000.001-10.000.000	76	18,8
10.000.001-15.000.000	12	3,0
>15.000.000	3	0,7
<b>Frequency of Using Train in COVID-19 Pandemic</b>		
1-3	222	55,0
4-6	97	24,0
> 6	85	21,0

Respondents in this study amounted to 404 participants, dominated by women as many as 234 people (57.9%). Most respondents are aged 17-22 years with a job that is dominated as a student/college student and the dominant education is at the bachelor level. Most respondents have a monthly income of Rp. 1,500,000 – Rp. 5,000,000 in a total of 173 participants. During the COVID-19 pandemic, most respondents used long-distance train services 1-3 times. In demographic data, this respondent is dominated by the younger generation who travel using rail public transportation. This indicates that during a health crisis

such as the COVID-19 pandemic, young people are more dare to do activities and fight health risks. They also tend to be brave because of their excellent health condition compared to older people who are more susceptible to disease.

#### 4.2 Outer Model

The results of the outer model test were obtained to ensure the validity and reliability of the suggested indicators and constructs using the PLS Algorithm. The result of the outer model evaluation is presented in Table 2.

**Table 2.** Outer Model Testing result

<b>Construction</b>	<b>Loading</b>	<b>Cronbach Alpha</b>	<b>CR</b>	<b>AVE</b>
<b>Perceived Safety</b>		0.896	0.935	0.827
PS1	0.911			
PS2	0.891			
PS3	0.926			
<b>Perceived Service Quality</b>		0.908	0.923	0.522
PSQ10	0.621			
PSQ11	0.707			
PSQ12	0.764			
PSQ13	0.685			
PSQ2	0.724			
PSQ3	0.676			
PSQ4	0.722			
PSQ6	0.710			
PSQ7	0.713			
PSQ8	0.770			
PSQ9	0.738			
<b>Passenger's Satisfaction</b>	0.697	0.833	0.900	0.749
SA1				
SA2	0.875			
SA3	0.880			
<b>Reuse Intention</b>	0.842	0.810	0.857	0.501
RI1	0.720			
RI2	0.693			
RI3	0.718			
RI4	0.703			
RI5	0.756			
RI6	0.651			

Note: \*\*all of them are significant on  $p < 0.01$

It shows that the factor loadings of all variables have an AVE value greater than 0.5 and that all indicators are stated as eligible for research usage and can be used for further study (Ariyanto et al., 2020). The Cronbach's Alpha is also above the cut-off value of 0.60 for all the proposed constructs (Hair Jr et al., 2021). Furthermore, the value of construct validity (CR) and the average variance extracted (AVE) are 0.70 and 0.50 which meet the cut-off value (Hair, Joseph F. Hult, G Thomas. Ringle, Christian M, 2015). These results indicate that all the

indicators and variables are valid and reliable. The Heterotrait-Monotrait Ratio of Correlations (HTMT) test can be used to evaluate discriminant validity.

**Table 3.** The HTMT result

	PS	PSQ	RI	SA
PS				
PSQ	0.625			
RI	0.391	0.552		
SA	0.707	0.788	0.508	

Table 3 shows that the variables examined in this study have met all requirements, including validity and reliability. Based on these criteria, it may be declared that all variables are valid, as they satisfy all conditions for HTMT correlation (HTMT Value is smaller than one). (Henseler et al., 2015).

### 4.3 Inner Model

After evaluating the outer model, structural testing with the internal model is performed. The result is shown in Table 4.

**Table 4.** Path Analysis Result

Hypothesis	Path	Direct Effect			Remarks
		$\beta$	t-values	p-values	
H1	PS -> SA	0.326	7.427	0.000	Accepted
H2	PSQ -> PS	0.568	16.635	0.000	Accepted
H3	PSQ -> SA	0.504	11.543	0.000	Accepted
H4	SA -> RI	0.457	11.958	0.000	Accepted

The path analysis results are shown in Table 4. The first hypothesis (H1) has the original sample value of 0.326 and the t-statistics value of 7.427 that greater than 1.962. So, with a significance level of 5%, it indicates that perceived safety has a positive effect on passengers' satisfaction. Then, it can be concluded that H1 is accepted.

The second hypothesis (H2) test shows the original sample value of 0.568 and the t-statistics value of 16.635 that more than 1.962 with a significance level of 5%. It can be concluded that perceived service quality has a positive effect on perceived safety and H2 is accepted.

The third hypothesis (H3) test indicates the original sample value and t-statistics value greater than 1.962 with 0.504 and 11.543. Based on the test results, perceived service quality has a positive effect on passengers' satisfaction with a significance level of 5% and it shows that H3 is accepted.

The last hypothesis (H4) generates a test result of the original sample value of 0.457 with a significance level of 5% and the t-statistics value of 11.958 which was greater than 1.962. Due to these results, passengers' satisfaction has a positive effect on reuse intention. So, H4 is accepted.

## 5. DISCUSSION

The results showed several relationships between variables forming the satisfaction of train passengers. There is a positive and significant effect between perceived safety and perceived service quality on passenger satisfaction after increasing health problems. In line with these findings, the first hypothesis of the study is proven to be acceptable as perceived safety influences passenger satisfaction. This condition illustrates that public transportation passengers are very aware of health issues, and they always anticipate security conditions for health reasons. Public transportation providers have carried out security activities for health by the protocol and this has been felt directly by passengers, so this condition triggers passenger satisfaction. In conditions of very vulnerable health issues, it can be illustrated that when passengers feel safer, they will have a high level of satisfaction with the public transportation they use.

The second assumption test accepted in this study is that perceived service quality influences perceived safety. The quality of services provided by public transportation providers has a significant positive impact on the perceived safety of passengers. The quality of service felt by passengers is in a good condition as they can feel overall facilities and services provided physically and non-physically. Moreover, long-distance train users spend quite a long time on this mode of transportation, and they feel the quality of service that is good from the provider, so this condition can affect the sense of security for passengers.

The perceived service quality can affect passenger satisfaction as shown by the acceptance of the third hypothesis in this study. based on the literature and research that has been done previously the results of this study strengthen the correlation between service quality and passenger satisfaction. The high and low quality of service will certainly have an impact on passenger satisfaction. In conditions of very crucial health issues, passengers expect the quality of additional services that can minimize the risk of exposure to disease in public transportation. The health protocol carried out by public transportation providers is considered one of the mandatory additional services that need to be carried out.

Passenger satisfaction has proven to be able to re-use public transportation in conditions of health issues after the COVID-19 pandemic. Passenger satisfaction is an important element that is a concern for public transportation providers. It is necessary to consider various elements that can create passenger satisfaction. Long-distance transportation served by train must continue to create passenger satisfaction from various services, both physical and non-physical, as the creation of satisfaction will create the reuse of long-distance public transportation.

The results of this study further strengthen several theories and previous studies related to passenger satisfaction. Several variables can be a determining factor for satisfaction in using public transportation such as the safety factor (Abdulkarim et al., 2021; Delbosc & Currie, 2012; Stradling et al., 2007). Then, the service quality factor is a variable that is very much considered by passengers that affect passenger satisfaction (Agustien, 2021; Soltanpour et al., 2018; Su et al., 2021). The results showed that the variables perceived safety and service quality can affect passenger satisfaction which in the end was able to have a significant impact on the intention to reuse public transportation services, especially when health problems often arise lately. The condition of health problems that hit the world has

become a concern for passenger transportation and has been anticipated by service providers to be able to provide quality security and security services in the health sector.

### **5.1 Implication**

This research, in addition to contributing to the theoretical position of user satisfaction, also provides additional insights that have practical implications for increasing the satisfaction of public transport users during the post-pandemic health crisis. The results of research on mass transportation conducted in Indonesia show that post-pandemic conditions and health problems that occur are the dominance of public transportation users by the younger generation. This could be a phenomenon that occurs due to changes in behavior, or even the influence of demographic shifts. A relatively vulnerable age cluster (older) chooses not to use public transportation. This is one aspect that public transportation providers may need to pay attention to adjust their strategy.

Based on the results, public transportation providers need to adjust conditions related to health issues that continue to emerge after Covid-19 as many people believe that Covid-19 still exists. As the pandemic has given a valuable lesson to many people, maintaining health protocols to prevent the disease is still applicable until now.

The current unhealthy environmental conditions are certainly a major consideration for the public to use public transportation for their activities. Public transportation is one of the facilities that are most at risk of transmitting disease due to the high level of mass mobility. Therefore, public transport operators need to develop strategies in their operational activities by incorporating elements of security protocols for the benefit of health in every line of service.

Physical aspects in the form of facilities that are shared by passengers must be a concern so that passengers feel comfortable. These public facilities must be frequently sanitized, and there are signs of hygiene assurance such as safety seals (clean marks). One example is the hygienic seal that is applied to each seat for each passenger's departure and the hygienic seal that is attached to the food ordered by the passenger. This is a medium to reassure passengers and allay concerns about health risks.

Public transportation providers develop strategies that prioritize service quality based on health protocols and customer satisfaction whose needs and concerns are continuously verified for health problems. The provider must be able to create a prime security image in dealing with health problems so that there is no element of doubt for passengers to take advantage of this mode of transportation. Safety conditions for health that have been created need to be announced periodically to customers to create a sense of comfort and customers are willing to try public transportation services.

## **6. LIMITATION AND FUTURE RESEARCH**

The first limitation in this study is from the aspect of questionnaires distributed online as the Covid-19 outbreak is still ongoing and other health issues are also emerging. There was no direct involvement with the respondents. Secondly, although this research has accommodated the government regulations related to railways (Law Number 23 of 2007 concerning Railways), further specific research needs to be carried out as this study only

measures the level of security and service quality of railways based on infrastructure, facilities, and human resources aspects. Instead, the procedures for norms, criteria, requirements, and the operation of rail transportation have not been analyzed.

Further research is suggested to identify another aspect, for example by involving long-distance train services in different operational areas and indicators of reuse intention that are integrated into more complex models. The next research recommendation is to expand the scope of research indicators, for example by involving the legal regulations of the Minister of Transportation regarding Amendments to the Regulation of the Minister of Transportation Number PM 88 of 2018 concerning Criteria for Electronically Integrated Business Licensing in the Land Transportation Sector as recent study still lack in service indicators on trains, such as norms and standard operating procedures for land transportation.

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