

Article

Determining Factors Affecting Passenger Satisfaction of “Jeepney” in the Philippine Urban Areas: The Role of Service Quality in Sustainable Urban Transportation System

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Abstract: Jeepneys are the most accessible and affordable public transportation in urban areas of the Philippines. The goal of this research was to explore passenger satisfaction with the overall service quality of a jeepney. A total of 600 jeepney passengers voluntarily answered an online questionnaire consisting of 59 questions. Different factors such as Passenger Expectation, Cleanliness and Comfort, Ambiance, Safety, Driver Behavior, Service Adequacy, Route Efficiency, Information Materials, Value for Money, Passenger Satisfaction, and Future Intentions were examined simultaneously by utilizing the structural equation modeling (SEM) approach. SEM indicated that safety was found to have the highest effect on passenger satisfaction, followed by the driver’s behavior, value for money, service adequacy, and information materials. This is the first complete study that explores passenger satisfaction with the overall service quality of jeepneys. The findings of this study can be utilized by the government and jeepney operators to enhance the overall service quality by focusing on safety and the behavior of drivers. This would result in increased passenger satisfaction and, consequently, a positive intention on using the mode of transportation.

Keywords: jeepney; service quality; structural equation modeling; passenger satisfaction

1. Introduction

Jeepneys are 12 to 16-seater vehicles widely used for public transportation in the Philippines [1]. They are known for being one of the most accessible and affordable modes of transportation in the country [2], making them also one of the icons of the Philippines. The current face of the jeepney was derived by Leonardo S. Sarao from the vehicles used during World War II [3]. Researchers and academicians from different sectors have aimed to enhance the overall quality of jeepneys, addressing environmental, safety, and efficiency concerns [4] to maximize passenger satisfaction. In the Philippines, jeepneys are widely utilized due to their price, efficiency, and availability. However, the evaluation of service quality and customer satisfaction have been underexplored for this public utility vehicle.

Recently, studies have focused on several public transportation and public utility vehicles, and how the different service quality affects customer satisfaction due to the current globalization in the transportation sector [5]. In 2011, Randheer et al. [5] considered the SERVQUAL dimensions to measure the perception of customers to service quality of public transportation in the cities of Hyderabad and Secunderabad. They showed how the service quality, preceded by different factors, could measure the quality needed by the transportation section. Mokonyama and Venter [6] considered a conjoint analysis to bridge the gap between service quality and customer satisfaction through the measurement of different attributes. Their study provided insight into factors that may be considered aside from the SERVQUAL dimensions to highlight how satisfaction may be measured. In addition, performance was highlighted to have a significant impact when comparing public and private transportation [6]. In 2019, Zhang et al. [7] considered several factors such as comfort, reliability, service, value, expectation, and reliability to measure passenger satisfaction. Utilizing PLS-SEM, their study demonstrated how the different factors would lead to a positive effect on the overall satisfaction of customers.

Before the COVID-19 pandemic, several studies in 2020 evaluated public utility vehicles. Tahanisaz and Shokuhyar [8] considered the Kano Model to determine key factors that would lead to customer satisfaction with airlines. Their study focused on developing a marketing strategy for airlines that could be adopted by other public utility vehicle industries. Under the same industry, Shah et al. [9] utilized confirmatory factor analysis to measure service quality using the five dimensions of the SERVQUAL model. Their result showed how satisfaction acts as a mediator for service quality and the behavioral intention of passengers. In addition, Ni et al. [10] considered several factors similar to Zhang et al. [7] to measure perceived quality, which precedes perceived value and passenger satisfaction. Their study showed how measuring passenger satisfaction could be measured through the consideration of other external factors adopted from different studies. Similarly, Isa et al. [11] measured passenger satisfaction with airlines considering several factors highlighting the environment, facility, access, and services. They suggested that ambience would be the key indicator for overall passenger satisfaction.

During the COVID-19 pandemic, Ong et al. [12] suggested how the behaviors of customers should be reevaluated since adaptation to the situation changed perspectives and actions. Services also changed due to different protocols in different countries to mitigate the COVID-19 virus spread [13]. Chuenyindee et al. [14] showed how the types of COVID-19 protocols would significantly affect customer satisfaction for public utility vehicles during the pandemic. Their study suggested that other factors should be highlighted in addition to the five dimensions of the SERVQUAL model to measure passenger satisfaction. Passenger satisfaction is a more specific type of customer satisfaction used in the field of transportation [15–17]. It is a measure of passenger happiness and satisfaction with a certain mode of transportation's services [17]. Numerous studies have been conducted to enhance overall passenger satisfaction [5,18–22]. There are several approaches to enhancing passenger satisfaction and one of the most widely utilized approaches is the service quality approach [7,23].

The service quality approach is a research instrument created to collect and observe a consumer's perception and expectations towards a product or service. It consists of different factors and dimensions that are essential to measuring service quality [24]. Service quality is widely utilized in enhancing the quality of service in the field of transportation as it is easier to interpret its findings [25]. Hong et al. [20] utilized service quality to determine the differences in service satisfaction between customers and service providers in an airport. Additionally, service quality was also utilized by Tahanisaz and Shokuhyar [8] to determine how airlines can satisfy their customers by considering the diversity in pre-purchase expectations. Hence, the service quality approach can also be utilized to explore passenger satisfaction with transportation services.

Several studies have utilized the service quality approach to enhance passenger satisfaction. In Saudi Arabia, Randheer et al. [5] utilized the service quality approach to

examine commuters' perception of the service quality of public transportation and showed that responsiveness, assurance, and reliability are important dimensions of overall service quality. In Pakistan, Shah [9] also utilized this approach to investigate the relationship between the dimensions of service quality and passenger behavioral intentions with the involvement of passenger satisfaction as the mediator at Pakistan International Airport. Results of the study showed that service quality positively affected passenger behavior intentions with passenger satisfaction as the mediator [9]. Despite the availability of studies that focused on the service quality of transportation using the service quality approach, there were very limited studies focusing on jeepneys. Thus, it is valuable to apply the service quality approach for analyzing the service quality of the jeepney.

The goal of this research was to explore passenger satisfaction with the overall service quality of a jeepney by utilizing an adaptation of the service quality approach. Different factors such as Passenger Expectation, Cleanliness and Comfort, Ambiance, Safety, Driver's Behavior, Service Adequacy, Route Efficiency, Information Materials, Value for Money, Passenger Satisfaction, and Future Intentions were examined simultaneously using structural equation modeling (SEM). This is the first complete study that explores passenger satisfaction with the overall service quality of jeepneys. The findings of this study can be utilized by the government and jeepney operators to enhance the overall service quality by focusing on safety and the behavior of drivers. This would result in increased passenger satisfaction and, consequently, a positive intention on using the mode of transportation.

2. Conceptual Framework

Figure 1 shows the Conceptual Framework of the current study. Although the service quality model proposed by Parasuraman et al. [24] is extensively used in measuring service quality, modifications were necessary to fit the context being explored. Unlike other studies that utilized the service quality model [21,23], this study utilized adapted service quality dimensions that are suitable in the jeepney context that affect the overall service quality. The final goal was to examine the factors that most affect passenger service quality satisfaction in a jeepney, similar to the study explored by Lai and Chen [26]. However, this study opted to include more external factors adopted from different studies.

The service quality model is utilized in field transportation to determine the gap between passenger expectations and perceived service quality in the field of transportation [27,28]. Customer expectation is a combination of the customer's predictions about what is likely to happen during the service transaction [29]. It has a significant effect on perceived service quality [29,30] and service satisfaction [30,31]. Additionally, the contrasting idea between the customers' expectations and the performance provided by the service or product results in customers' satisfaction [32]. Meeting the expectations of customers with the service by adapting to their standards may significantly improve customer satisfaction and loyalty [33]. Thus, it was hypothesized that:

H1. *Passenger Expectation has a significant direct effect on Passenger Satisfaction.*

A service provider's overall appearance, including its cleanliness, comfort, and ambiance, is important in assessing service quality [30]. In a study by Liu and Jang [34], they discovered that first-time customers often base their perceptions on the establishment's physical appearance. Furthermore, the physical state of a service has a significant effect on the customer's perception of service quality [35,36] and maintains maximum productivity [37]. Zhang et al. [7] showed how other factors such as comfort and overall quality would have an effect on passenger satisfaction. Thus, the following were hypothesized:

H2. *Cleanliness and Comfort have a significant direct effect on Passenger Satisfaction.*

H3. *Ambiance has a significant direct effect on Passenger Satisfaction.*

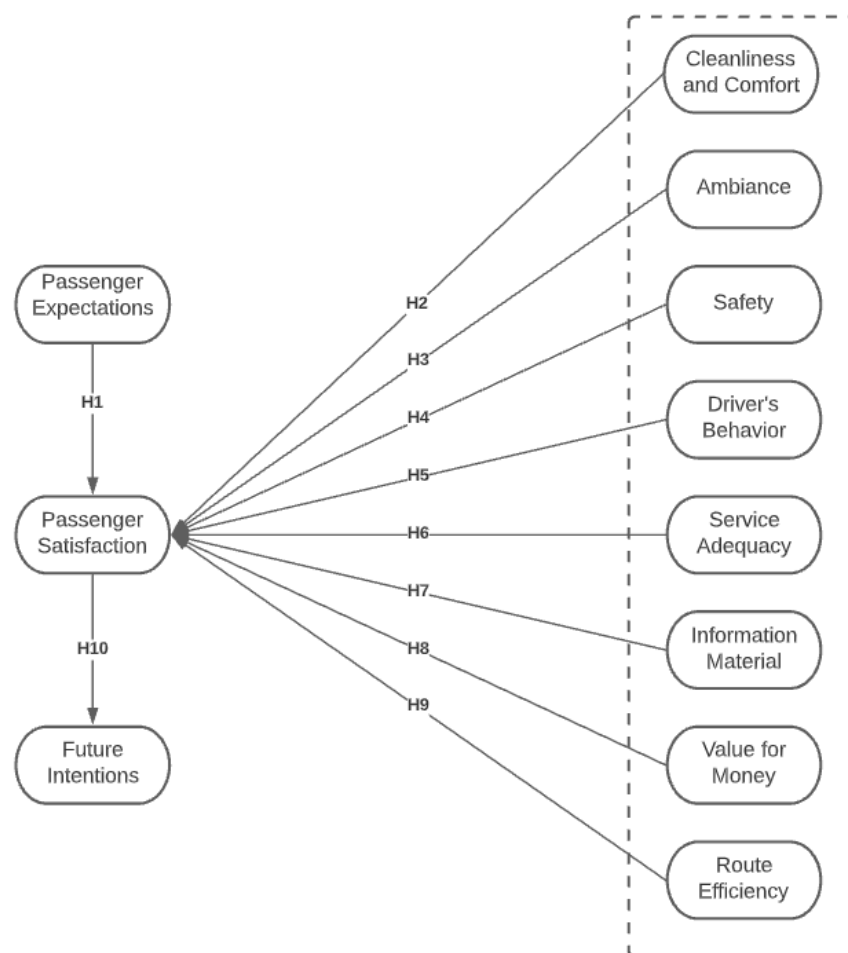


Figure 1. Conceptual Framework for Determining Passenger Service Quality Satisfaction in a Jeepney.

Safety is the utmost priority of an individual when trying out different things [38]. Based on previous research, customers easily create perceptions of a service's service quality based on the safety measures done by the service provider [39]. Tahanisaz and Shokuhyar [8] and Ong et al. [12] provided insights into the satisfaction of passengers and customers when there is safety and the behavior of the person in charge. This is supported by Zefreh et al. [40] in their study on creating a model to assess passenger satisfaction. Employee interactions such as driver behavior and safety were evident factors for customers to consider public transportation. Therefore, the following were hypothesized:

H4. *Safety has a significant direct effect on Passenger Satisfaction.*

H5. *Drivers' behavior has a significant direct effect on Passenger Satisfaction.*

According to Tayag [41], humans are wired to choose the most efficient way of doing anything. Passengers that use different modes of transportation waste 42 h a year because of congested roads [42]. Passengers usually compare different transportation routes to determine which is the best choice to use [17]. Additionally, the overall travel time is used by passengers to determine the transportation's service quality [43]. Suki [17] presented how tangible factors were less likely to be considered by customers. Rather, passengers would consider the service being provided and the efficiency of transportation before utilizing a transportation method [17]. Thus, the following were hypothesized:

H6. *Service Adequacy has a significant direct effect on Passenger Satisfaction.*

H7. *Route Efficiency has a significant direct effect on Passenger Satisfaction.*

Information materials are used to present content to a certain audience that fits their needs and situation [44]. In public transportation, it also allows passengers to know details about the ride, the driver, and what to do while inside the vehicle. Zefreh et al. [40] also provided information regarding how provisions being provided to passengers would lead to a factor preceding passenger satisfaction. It was seen that, when passengers are aware of the fare, destination, and related information, this would increase passenger satisfaction. Moreover, value for money is a concept of merit, worth, and significant use of service or resources [45]. Since the quality of service is often associated with the amount of money paid [46], individuals tend to invest more money in services with good returns [47]. Tsafarakis et al. [48] also highlighted how value for money affects customer satisfaction when the price is set to be reasonable. In addition, it was shown that value for money is proportional to the expected service being provided [48]. Hence, it was hypothesized that:

H8. *Information Materials have a significant direct effect on Passenger Satisfaction.*

H9. *Value for Money has a significant direct effect on Passenger Satisfaction.*

The service provided is related to the overall satisfaction of the customers [49]. The service quality perception is based on the thinking perceived in the experience. It is affected by the expected and perceived service based on the service offered. If the service provides the expected quality, then it is satisfactory; if the service exceeds the expected quality, the customers will label it as excellent [24]. Customer satisfaction relies on the experience that the customer felt toward the service [50].

Service efficiency, satisfaction, and behavioral outcome measures were loyalty and the re-examination of public service intentions [51]. From a managerial perspective, customer loyalty could be affected by several factors including customer satisfaction [49]. The perceived value contributes directly to customer satisfaction, which in turn leads to behavioral intention [52,53]. Thus, it was hypothesized that:

H10. *Passenger Satisfaction has a significant direct effect on passenger Future Intentions.*

3. Methodology

3.1. Participants

The study utilized convenience sampling to gather participants who use jeepneys in the Philippines (600 out of 712 respondents). The survey was distributed online since it was not feasible to conduct a physical survey due to the COVID-19 pandemic. Distributed through different social media platforms, the survey was open from 2 October 2020 to 24 November 2020. A total of 600 Filipinos between the ages of 15 and 51 answered the online survey, which contains 59 questions. Following the study of German et al. [54], the average generalized population count for the Philippines would be around 400 using the Yamane–Taro formula as seen in equation 1. With a 62.6 million total population count, a 95% significance was considered and showed a value of 399.997. This justifies the contention that those 600 respondents among passengers of the country are acceptable as being representative.

Table 1 presents the demographic information of the respondents. Among the 600 respondents, 57.83% were female and 42.17% were male. Most respondents were between 15 and 29 years old (94.33%). About 2.67% of respondents were elementary graduates, 37.50% were junior high school graduates, 44.33% were senior high school graduates, and 15.5% were college graduates. Ong et al. [55] stated that the majority of respondents are younger due to the distribution method of the questionnaire. They stated that younger generations are more active online, thus, supporting the descriptive statistic

results. Moreover, 15–29 year-olds make up most of the working class in the Philippines and are accustomed to utilizing public utility vehicles such as jeepneys [56].

Table 1. Respondents’ descriptive characteristics (n = 600).

Characteristics	Category	N	%
Gender	Male	254	42.33%
	Female	346	57.67%
Age	15 to 29	566	94.33%
	30 to 39	9	1.50%
	40 to 49	20	3.33%
	50 to 51	5	0.83%
Education	Elementary graduate	16	2.67%
	Junior high school graduate	225	37.50%
	Senior high school graduate	266	44.33%
	College Graduate	93	15.5%
Monthly Salary/ Allowance	Less than 15,000	462	77.00%
	15,000–30,000	87	14.50%
	30,000–45,000	20	3.33%
	45,000–60,000	14	2.33%
	60,000–75,000	4	0.67%
	More than 75,000	13	2.17%
Frequency of use of jeepney (weekly)	1 to 5	378	63.00%
	6 to 10	125	20.83%
	11 to 15	58	9.67%
	16 to 20	11	1.83%
	More than 20	28	4.67%

Approximately 77.00% of respondents have a monthly salary of less than Php 15,000. Among the respondents were 14.50% with a monthly salary of between Php 15,000 and Php 30,000. About 3.33% received a monthly salary of between Php 30,000 and Php 45,000, while 2.33% had a salary of between Php 45,000 and Php 60,000. About 0.67% had a salary of between Php 60,000 and Php 75,000, and 2.17% received a salary that is greater than Php 75,000. Most of the respondents (378 = 63.00%) used the jeepney 1–5 times per week, 125 (20.83%) used it 6–10 times per week, 58 (9.67%) uses it 11–15 times a week, 11 (1.83%) of the respondents uses it 16–20 times a week, and 28 (4.67%) used the jeepney more than 20 times a week. It is evident from the results that most respondents are from lower-income groups. Since jeepneys cost a minimum of 10 Php to 25 Php (\$0.20–\$0.50), it is most likely that Filipinos will utilize this public utility vehicle due to cost and efficiency.

3.2. Questionnaire

A questionnaire adapted from the literature was created to examine the factors of service quality in jeepneys that affect passenger satisfaction (Table 2). The questionnaire utilized a five-point Likert Scale to measure the responses. It consisted of thirteen sections that affect the satisfaction of the passengers which are: (1) Respondents’ demographic information (age, gender, location, education, salary/allowance, jeepney usage), (2) Passenger Expectations, (3) Cleanliness and Comfort, (4) Ambiance, (5) Safety, (6) Driver’s Behavior, (7) Service Adequacy, (8) Route Efficiency, (9) Information Materials, (10) Value for Money, (11) Passenger Satisfaction, (12) Complaints, and (13) Future Intentions.

Table 2. The construct and measurement items.

Construct	Items	Measurement	Supporting Reference(s)
Passenger Expectation	PE1	I expect a high quality of service from jeepneys	Zhang et al. [7]
	PE2	I expect jeepneys to be clean and comfortable	Zhang et al. [7]
	PE3	I expect jeepneys to be safe	Zhang et al. [7]
	PE4	I expect jeepney good behavior from jeepney drivers	Zhang et al. [7]
	PE5	I expect jeepney fare to be reasonable	Zhang et al. [7]
Cleanliness and Comfort	CC1	The seats in jeepneys are in a sanitary state	Shaaban & Kim [19]
	CC2	The rail handles are in a sanitary state	Shaaban & Kim [19]
	CC3	There is enough headroom for the passengers	Shaaban & Kim [19]
	CC4	There is enough legroom for the passengers	Shaaban & Kim [19]
	CC5	The seats inside the jeepney are comfortable to use	Shaaban & Kim [19]
	CC6	The jeepney has proper ventilation	Shaaban & Kim [19]
	CC7	The jeepney has entrances and exits that are easy to use	Shaaban & Kim [19]
	CC8	There is enough seating space inside the jeepney	Shaaban & Kim [19]
	CC9	The quality of the ride was smooth	Shaaban & Kim [19]
Ambiance	AM1	The jeepney doesn't emit loud and unpleasant sounds	Chuenyindee et al. [14]
	AM2	The jeepney has a pleasant smell	Chuenyindee et al. [14]
	AM3	The temperature inside the jeepney is not too hot/not too cold	Chuenyindee et al. [14]
	AM4	The lighting inside and outside the jeepney is appropriate	Chuenyindee et al. [14]
Safety	SF1	I feel safe when using jeepney as a mode of transportation	Zhang et al. [7]
	SF2	I feel safe with the loading and unloading stops of jeepney	Zhang et al. [7]
	SF3	I feel safe inside the jeepney	Zhang et al. [7]
	SF4	I feel safe with how the driver is driving	Zhang et al. [7]
Drivers' Behavior	DB1	Jeepney drivers are polite to the passengers	Shaaban & Kim [19]
	DB2	Jeepney drivers follow and respect traffic laws	Shaaban & Kim [19]
	DB3	Jeepney drivers observe defensive driving	Shaaban & Kim [19]
	DB4	Jeepney drivers are honest in terms of fare and giving change	Shaaban & Kim [19]
	DB5	Jeepney drivers are knowledgeable about routes	Shaaban & Kim [19]
Service Adequacy	SA1	Jeepneys are always available (daytime, nighttime, weekdays, weekends)	Shaaban & Kim [19]
	SA2	The travel time is not too long	Randheer [5]
	SA3	The seating capacity is sufficient	Randheer [5]
	SA4	The jeepney follows the recommended seating capacity (not overloaded)	Shaaban & Kim [19]
	SA5	The interval between the jeepneys' arrival is short	Shaaban & Kim [19]
	SA6	The driver acknowledges discounts on special passengers (students, senior citizens, PWDs)	Shaaban & Kim [19]
Route Efficiency	RE1	The route is desirable for my destination/origin	Suki [17]
	RE2	The route being taken is the most efficient	Suki [17]
	RE3	The route chosen is safe	Suki [17]
Information Materials	IM1	The signages are easy to read	Tsafarakis et al. [48]
	IM2	The route signages in the jeepney are easy to understand	Tsafarakis et al. [48]
	IM3	Signages provide sufficient information on the route of the jeepney	Tsafarakis et al. [48]
	IM4	The signage does not block the field of vision of the driver	Tsafarakis et al. [48]
	IM5	The contact information of the driver and its operator is available	Tsafarakis et al. [48]
Value for Money	VFM1	Considering the money I pay, the service quality of jeepneys is fair	Zefreh et al. [40]
	VFM2	Considering the quality of service I receive, the fare price is fair	Zefreh et al. [40]
	VFM3	Considering the cleanliness and comfort of jeepneys, the fare price is fair	Zefreh et al. [40]
	VFM4	Considering the safety of riding the jeepney, the fare price is reasonable	Zefreh et al. [40]
	VFM5	Considering the distance traveled, the fare price is reasonable	Zefreh et al. [40]

Table 2. Cont.

Construct	Items	Measurement	Supporting Reference(s)
Passenger Satisfaction	PS1	I am satisfied with the overall service of the jeepney	Zhang et al. [7]
	PS2	The service quality of jeepneys exceeded my expectations	Zhang et al. [7]
	PS3	I am satisfied with the cleanliness and comfort in the jeepney	Zhang et al. [7]
	PS4	I am satisfied with the overall ambiance inside the jeepney	Zhang et al. [7]
	PS5	I am satisfied with the overall safety of using jeepney as a mode of transportation	Zhang et al. [7]
	PS6	I am satisfied with the jeepney driver's behavior	Zhang et al. [7]
	PS7	I am satisfied with the efficiency of the route taken by the jeepney	Zhang et al. [7]
	PS8	I am satisfied with the effectiveness of information materials in jeepneys	Zhang et al. [7]
Future Intention	FI1	I will use the jeepney again in the future as a mode of transportation	Ong et al. [12]
	FI2	I will use the jeepney more frequently as a mode of transportation	Ong et al. [12]
	FI3	I will give positive feedback to the service quality of jeepney	Ong et al. [12]
	FI4	I will recommend using jeepney as a mode of transportation to my peers	Ong et al. [12]
	FI5	I will choose jeepney over other modes of transportation	Ong et al. [12]

3.3. Structural Equation Modeling

Structural Equation Modeling (SEM) is primarily designed to explain the causal relationship between constructing latent variables [57–64]. Maximum Likelihood Estimate along with the SEM program in AMOS 26 was used to run the model. Figure 2 shows the framework construct, having five latent variables with four endogenous latent variables (Perceived Service Quality, Passenger Satisfaction, Complaints, and Future Intentions) and one exogenous latent variable (Passenger Expectation).

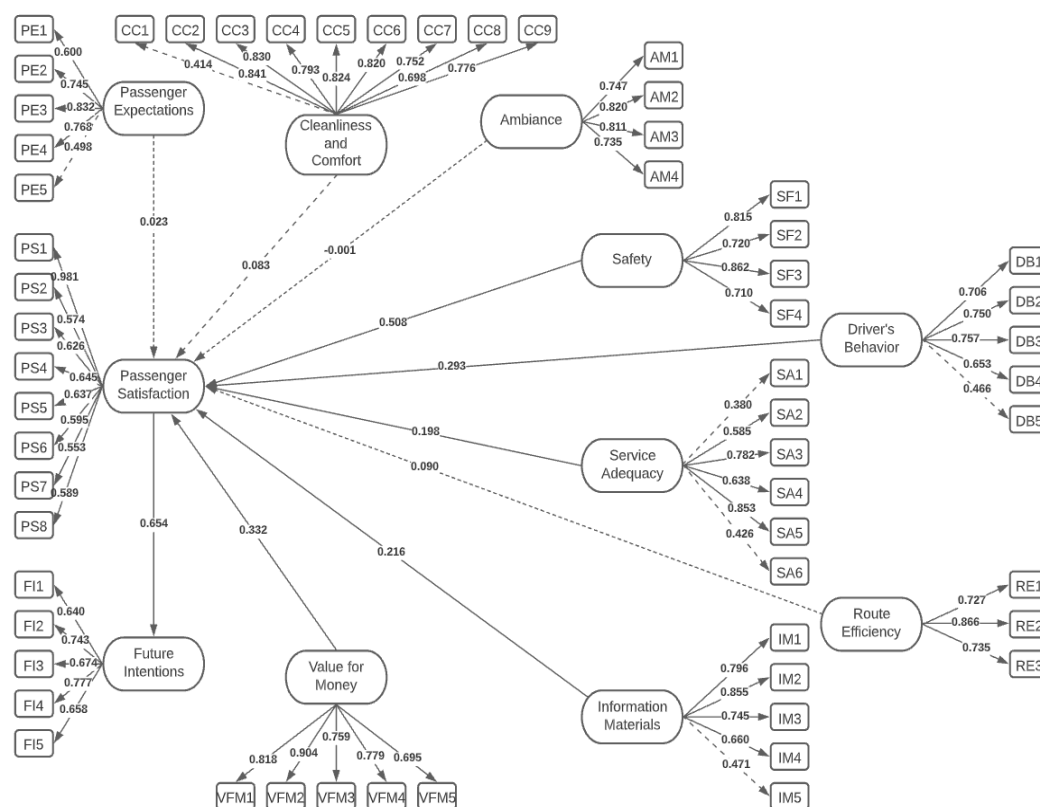


Figure 2. Initial SEM for Exploring Jeepney Service Quality Satisfaction Among Filipinos.

4. Results

Figure 2 demonstrates the initial SEM for exploring jeepney service quality satisfaction among Filipinos. The latent variables (factors) were considered to be unobserved variables that were measured through the different items considered in this study (Table 2). Through a five-point Likert Scale survey questionnaire, different indicators would represent the variance in response to the different factors considered in this study [12,14,20,64]. The different perception of respondents is then a representation of how a factor would be measured, leading to the causal relationship among the different latent variables considered to measure customer satisfaction and customer intention [64].

It could be seen from the structure that the different latent variables such as Passenger Expectation, Cleanliness and Comfort, Ambiance, and Route Efficiency did not have any significant effect on passenger satisfaction leading to future intention to use jeepneys in the Philippines. Following the suggestion of Hair [64], latent variables with a relationship value greater than 0.05 should be removed as they are considered insignificant.

Following the study of Yingfei et al. [65], the initial SEM for exploring jeepney service quality satisfaction among Filipinos was reconstructed to have a better model fit by removing non-significant factors. Factor loading lower than 0.50 could also be removed to enhance the model fit of the study [12]. Hair [64] indicated that the p -value should be less than 0.05 while factor loading should be greater than or equal to 0.50 to have an acceptable model. Figure 3 represents the final SEM for passenger satisfaction and its relationship to passenger future intention toward utilizing jeepney services.

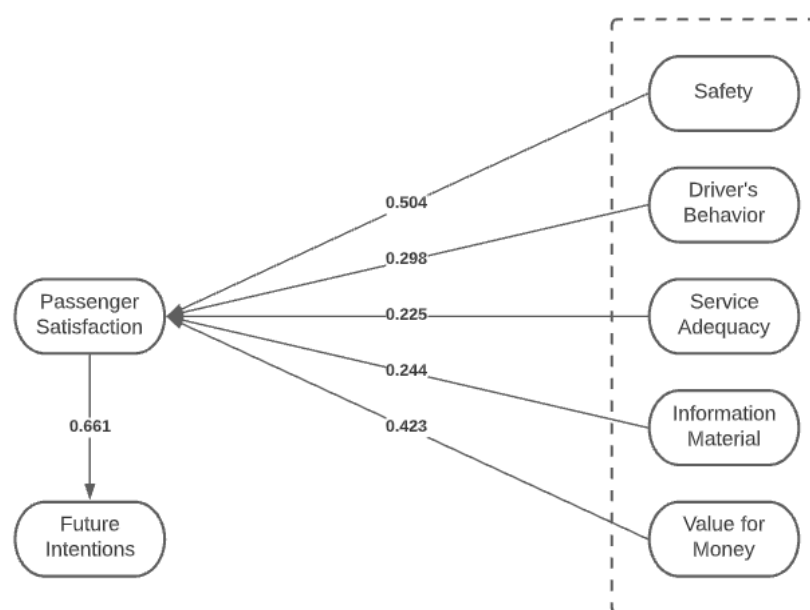


Figure 3. Final SEM for exploring jeepney service quality satisfaction among Filipinos.

Table 3 presents the descriptive statistics of the initial and final factor loading. It can be seen that the indicators under the different significant factors (safety, driver's behavior, service adequacy, information material, value for money, passenger satisfaction, leading to future intentions) had a good fit to the SEM.

In order to ensure that each construct represents what it is supposed to, an evaluation of reliability and validity was conducted. Table 4 presents the reliability and validity of the constructs measured by Cronbach's α , Average Variance Extracted (AVE), and Composite Reliability (CR). Cronbach's α and CR require a value higher than 0.7 and AVE needs to be higher than 0.5. Since all values surpass the required standards, each construct from this model can be considered valid and reliable.

Table 3. Indicators statistical analysis.

Factor	Item	Mean	StD	Factor Loading	
				Initial Model	Final Model
Safety	SF1	3.1550	1.01293	0.815	0.843
	SF2	3.0200	1.03023	0.720	0.713
	SF3	2.9850	0.96937	0.862	0.841
	SF4	3.1500	0.94816	0.710	0.744
Driver's Behavior	DB1	3.5667	0.81854	0.706	0.735
	DB2	3.3950	1.01523	0.750	0.720
	DB3	3.3017	0.90666	0.757	0.777
	DB4	3.7850	0.96626	0.653	0.601
	DB5	4.4200	0.81530	0.466	-
Service Adequacy	SA1	4.1367	0.95543	0.580	0.767
	SA2	3.5350	0.99855	0.585	0.775
	SA3	3.3150	1.01365	0.782	0.772
	SA4	2.7167	1.27374	0.638	0.670
	SA5	3.3883	0.96389	0.583	0.589
	SA6	4.1583	0.98058	0.426	-
Information Material	IM1	3.9183	0.91819	0.796	0.811
	IM2	4.0167	0.87807	0.855	0.868
	IM3	3.9867	0.90620	0.745	0.722
	IM4	4.0383	0.97045	0.660	0.649
	IM5	3.6017	1.18124	0.471	-
Value for Money	VFM1	4.0483	0.88918	0.818	0.749
	VFM2	4.0017	0.89237	0.904	0.841
	VFM3	3.6283	1.00093	0.759	0.783
	VFM4	3.7150	0.93017	0.779	0.738
	VFM5	4.1400	0.91932	0.695	0.759
Passenger Satisfaction	PS1	3.7517	0.81102	0.681	0.715
	PS2	3.2250	0.89202	0.574	0.786
	PS3	3.1433	0.97350	0.626	0.772
	PS4	3.2550	0.93707	0.645	0.752
	PS5	3.3733	0.96722	0.637	0.629
	PS6	3.4583	0.86574	0.595	0.732
	PS7	3.8700	0.89130	0.553	0.677
	PS8	3.6600	0.95355	0.589	0.592
Future Intention	FI1	4.2333	0.91849	0.640	0.690
	FI2	3.7633	1.06734	0.743	0.730
	FI3	3.7467	0.94903	0.674	0.704
	FI4	3.8483	1.01178	0.777	0.773
	FI5	3.2517	1.19752	0.658	0.657

Table 5 presents the model fit of the final SEM, all terms of which are within the parameters set by recent studies. According to the study of Gefen et al. [66] and Yingfei et al. [65], values for IFI, TLI, CFI, GFI, and AGFI could be considered acceptable with values greater than 0.80. Moreover, the results of RMSEA with values less than 0.07 was considered acceptable [67].

Comparing the results from several studies where the constructs were obtained [5,7,12,14,17,19,40], it could be highlighted that safety, driver's behavior, service adequacy, information material, and value for money are key indicators for passenger satisfaction and future intention to utilize public utility vehicle such as jeepney. Zhang et al. [7] showed how safety and operation service (adequacy) are service quality variables that affect passenger satisfaction. In addition, Zefreh [40] highlighted the behavior of employees

such as drivers, which would positively affect satisfaction. Moreover, value for money and information material were also seen to be key variables for satisfaction [45–48]. Thus, it could be deduced that aside from the five SERVQUAL dimensions, other factors affecting service quality could be utilized to measure passenger satisfaction with transportation, as indicated by Chuenyindee et al. [14] and proved by Zhang et al. [7].

Table 4. Reliability and Validity.

Factor	Cronbach's α	Average Variance Extracted (AVE)	Composite Reliability (CR)
Safety	0.858	0.620	0.866
Driver's Behavior	0.801	0.506	0.802
Service Adequacy	0.719	0.516	0.841
Information Material	0.844	0.588	0.850
Value for Money	0.892	0.600	0.882
Passenger Satisfaction	0.911	0.504	0.890
Future Intention	0.872	0.507	0.837

Table 5. Model Fit.

Goodness of Fit Measures of SEM	Parameter Estimates	Minimum Cut-Off	Suggested by
Incremental Fit Index (IFI)	0.823	>0.80	[66]
Tucker Lewis Index (TLI)	0.824	>0.80	[66]
Comparative Fit Index (CFI)	0.822	>0.80	[66]
Goodness of Fit Index (GFI)	0.818	>0.80	[66]
Adjusted Goodness of Fit Index (AGFI)	0.804	>0.80	[66]
Root Mean Square Error (RMSEA)	0.067	<0.07	[67]

Since this study extended and utilized more factors for the passenger perceived quality by Zhang et al. [7], it could be posited that the presented model could be utilized as additional extended variables for passenger service quality dimensions. In their study, passenger-perceived quality dimensions such as comfort, reliability, safety, operational service, and convenience were considered precedents of passenger expectation, while this and the aforementioned latent variables affected the passenger-perceived value and overall satisfaction. The latent variables of this study may be considered as other significant factors that may affect overall satisfaction or even service quality for jeepneys—alongside SERVQUAL 5 dimensions. If extended, these latent variables may also measure the continuance intention of passengers for public utility vehicles. In subsequent public transportation studies that utilized the perceived quality dimension for passenger satisfaction like airlines [8,9,16,17], buses [16,18], and trains [26], these variables were seen to provide adequate factors confirmation for measuring satisfaction.

5. Discussion

Jeepneys are one of the most common and frequently used modes of public transportation in the Philippines. They are also widely known as one of the icons of the Philippines. The aim of this study was to explore passenger satisfaction with the overall service quality of a jeepney by utilizing an adapted service quality approach. In addition, the relationship among different factors such as Passenger Expectation, Passenger Satisfaction, Cleanliness and Comfort, Ambiance, Safety, Drivers' Behavior, Safety Adequacy, Route Efficiency, Information Materials, Value for Money, Complaints, and Future Intentions were examined using Structural Equation Modelling (SEM). This is the first study that utilized an adapted service quality approach in the jeepney context.

Safety was found to be a significant variable that affects the satisfaction of the passengers towards the service quality of the jeepney (β : 0.504, $p = 0.001$). The safety inside the jeepney, at the loading and unloading stops, and the driving style of the driver were the main contributors to determining the satisfaction of the passengers towards the safety of the jeepney. The result is supported by the study of Shaaban and Kim [19], which stated that safety plays an important role in maintaining a high level of service in any mode of transportation. In contrast, the findings of Shen et al. [68] showed that safety was not a significant variable in determining passenger satisfaction. However, it was also stated in their study that safety should always be observed by all service providers. This is highlighted in the study of Zhang et al. [7], where safety has been established as one of the key factors in the passenger-perceived quality of public transportation that highlights the overall satisfaction of passengers, which supports the results of this study.

Value for Money (VFM) as a latent variable was also found to have a significant effect on passenger satisfaction in jeepneys (β : 0.423, $p = 0.001$). The main determinant in this variable is how the price was reasonable considering the service experienced by passengers in the jeepney in terms of safety and efficiency. This is supported by the study of Bezerra and Gomes [69], which noted that value for money plays an important role in assessing the satisfaction and loyalty of passengers. It is evident that a low price range is one of the considerations of the passenger to arrive at a nearby destination. This is why value for money is the second highest factor with significance to passenger satisfaction. Similar to the results of Tsafarakis et al. [48], value for money would be a significant key determinant of passenger satisfaction in that it is directly proportional to the service being provided. Their study justified how higher service provided could have high value for money and vice-versa.

Drivers' Behavior was also found to be significant in determining passenger satisfaction with the service of the jeepney (β : 0.298, $p = 0.001$). The main contributors to this variable were the drivers' attitude toward the passenger, driving style, honesty, and traffic law obedience. The study of Shaaban and Kim [19] supports this finding by stating that driver behavior is an important contributor to the level of passenger satisfaction. In addition, Frinaldi et al. [70] also stated that the driver's quality greatly influences passenger satisfaction. Zefreh et al. [40] supports the results of this study, explaining how the behavior of employees such as drivers would be one of the factors passengers would consider upon their utilization of a public vehicle—in this case, jeepneys.

Moreover, Information Materials were also found to have a significant effect on passenger satisfaction in the jeepneys (β : 0.244, $p = 0.001$). This is supported by the study of Shen et al. [68], which proved that information materials have a large influence on passenger satisfaction. Information Materials includes the factors: readability and clarity of route signage, driver's information, and the jeepney operator's information. It should be clearly stated in the vehicle any materials needed to avoid confusion and complications among passengers. In addition, Zefreh et al. [40] showed how the information provision provided among passengers would lead to their acknowledgment of their travel. In this way, they would understand and know what and where the destination is, how much they would be spending, and how the public transportation would proceed. Thus, information materials are important for public transportation to increase passenger satisfaction.

Additionally, the Service Adequacy (SA) latent variable was also found significant in affecting passenger satisfaction in jeepneys (β : 0.225, $p = 0.001$). Provided by Drivers, the SA latent variables would be considered by passengers as important [69,70]. This is supported by the studies of Thampan et al. [71] and Tiglaio et al. [72], wherein findings from their study stated that Service Adequacy has an important role in determining passenger satisfaction. The study by Shaaban and Kim [19] also supported this finding, as they stated that the time traveled has a large influence on passenger satisfaction. The indicators of service adequacy include waiting time, travel time, seating capacity, and availability. Since jeepneys are found almost everywhere in the Philippines, it is readily available for passengers to use. Together with SA and VFM, jeepneys are the primary source of cheap

and reliable public utility vehicles (PUVs) in the Philippines to reach a specific location. This leads to high passenger satisfaction and significant future intentions to use. Suki [17] explained how the services of people handling public vehicles are significant compared to tangible factors. In this case, the provided services of jeepneys were seen to be significant; thus, it is considered a preceding factor for passenger satisfaction.

Passenger Satisfaction was found to have a significant effect on passenger future intentions (β : 0.661, $p = 0.001$). This includes several factors such as positive feedback, future frequency of use, future transportation choice, and recommendations to peers. This finding is supported by the studies of Hussain et al. [21] and Bezerra and Gomes [69], in which both studies stated that along with the brand image, customer satisfaction also plays a vital part in the customer's future intentions. With high passenger satisfaction, it would be undoubtedly significant to have future intentions in riding the jeepneys again.

At the same time, several latent variables were found to be not significant contributors to passenger satisfaction towards the service of jeepneys. These variables include cleanliness and Comfort inside the jeepney—based on the results, passengers do not expect jeepneys to be clean and comfortable. This finding can be supported by the study of Bezerra and Gomes [69], in which they stated that cleanliness and comfort do not greatly affect passenger satisfaction. Conversely, a study by Ponrahono et al. [43] stated that cleanliness and comfort significantly affect the satisfaction of the passengers in jeepneys. However, this] focused on buses. Furthermore, this finding could also be contradicted by a study by Shen et al. [68] in which they stated that cleanliness and comfort are one of the most common factors in passenger satisfaction. However, this study was mainly focused on trains. Both buses and trains are more expensive compared to a single jeepney ride, which is why passenger satisfaction is significant. Currently, one jeepney ride costs around 10.00 Php or about 0.21 USD. This is also the reason why Ambiance is also not a significant factor in this study.

The Ambiance variable, which includes the thermal, acoustic, and olfactory atmosphere inside the jeepney, was also found to be non-significant in determining passenger satisfaction towards jeepneys. The study of Bezerra and Gomes [69] supports this by stating that the overall atmosphere of a service does not affect customer satisfaction, especially in public transportation. Conversely, the study of Okeke [73] states that ambiance is important in the customer's experience. According to his study, the ambiance has a powerful effect on the customer's attitude, behavior, emotions, and overall satisfaction. However, this study focused more on the business aspect. The article indicated ambiance in a corporate setting.

Additionally, Route Efficiency was also found to be non-significant in determining passenger satisfaction in jeepneys. This variable includes factors such as route safety and route choice. However, jeepneys are designed to only have one specific route per indicated travel. With that, it is considered non-significant because passengers generally know what route the jeepney they are in is following.

The findings of this study also showed that passenger expectation does not have a significant effect on the satisfaction of passengers toward the service quality of jeepneys. This finding was similar to that of Bezerra and Gomez [69] in which it was stated that the expectation of passengers does not greatly influence the satisfaction of passengers towards the quality of service. Furthermore, past experiences of using the service might have influenced the expectations of the passengers towards the overall service quality of the jeepney. A more realistic expectation of the service will not have a significant effect on passenger satisfaction [70].

5.1. Theoretical Contribution

To gather data, an online questionnaire was created, which was able to attain a total of 600 responses and data samples. SEM was used to examine the relationships between twelve (12) latent variables and their contributions to passenger satisfaction. These variables were Passenger Expectation (PE), Cleanliness and Comfort (CC), Ambiance (AM), Safety (SF), Driver's Behavior (DB), Service Adequacy (SA), Route Efficiency (RE), Information Materials (IE), Value for Money (VFM), Passenger Satisfaction (PS), Complaints (CP), and

Future Intentions (FI). Based on the results, the variables Safety, Driver's Behavior, Service Adequacy, Information Materials, and Value for Money are the significant factors affecting passenger satisfaction. The results could be considered by other public utility vehicles in attempting to increase future intentions of use from passengers.

In addition, the factors considered in this study could be applied and extended as passenger-perceived quality dimensions to measure customer satisfaction with public utility vehicles. Zhang et al. [7] considered convenience, safety, reliability, comfort, and operational service as dimensions for perceived quality, while this study presented safety, driver's behavior, service adequacy, information material, and value for money as determinants of passenger satisfaction. Since this study wanted to prove how other factors may be explored to measure satisfaction, combining other factors and the five SERVQUAL dimensions to measure service quality. As an extension, the model considered in this study may be utilized solely or used as an extension with other models and theories to assess public utility vehicles.

5.2. Practical Implications

In this study, safety and driver behavior were found to be two of the most important factors affecting passenger satisfaction with the service of jeepneys. This satisfaction then turns into positive intentions of the passengers in using jeepneys as a mode of transportation. Considering these findings, the government and jeepney operators should focus on these two factors to improve passenger satisfaction toward the overall service quality of jeepneys. As long as passengers perceived the public utility vehicle to be safe (despite its price), satisfaction and continuous utilization among customers would be positive. Passengers utilize vehicles mainly as transportation from one point to the next, and thus their ability to reach their destination safely is the main concern.

In order to increase passenger satisfaction with the service, it is suggested that the government and jeepney operators should improve safety inside and outside the jeepneys. This includes periodic maintenance checks on jeepney units to avoid mechanical problems that may result in road accidents. Additionally, ensuring the safety of passengers at loading and unloading stops would increase the level of safety and satisfaction with the overall service. As for the drivers, defensive driving and attitude towards the passengers should be put into focus. It is important for drivers to have proper training in driving and knowledge of traffic laws to ensure the quality of service received by the passengers. Moreover, conducting periodic behavioral analyses of drivers would help ensure drivers provide quality and safe service to the passengers. These actions will significantly affect passenger satisfaction, as our results showed that safety and the driver's behavior are important for service satisfaction. Thus, it could be deduced that, as long as the passenger reaches their destination safely, positive satisfaction is observed for low-cost public utility vehicles. Therefore, low-cost public utility vehicles may utilize the findings and framework of this study to measure and promote their services worldwide.

5.3. Limitations and Future Research

Despite the substantial contributions, the researchers would like to state and acknowledge several limitations of this study for future research. First, the study was mainly focused on the jeepney at a nationwide level. A future study implementing this will result in more precise findings that can be used in improving the jeepney system based on the needs of a specific location with different jeepney designs. As another extension, other public utility vehicles may be considered; specifically or generally for the conceptual framework developed. The analysis may indicate its generalizability, applicability, and extension.

Second, the data were gathered through an online survey and most of the respondents were between 15 and 29 years old. Conducting face-to-face interviews and surveys may lead to a more detailed result. For future research, the evaluation of demographic factors and clustering for satisfaction and future intentions may help in developing comprehensive suggestions for the utility of jeepneys, and if extended, public utility vehicles.

Third, the study was conducted during the COVID-19 pandemic, which limited the use of public transportation such as jeepneys. Prolonged time of not using the service and the pandemic situation could affect respondents' perception of the service being provided. Lastly, the incorporation of machine learning algorithms may be applied to extend and deduce the limitations of the multivariate tool used in this study [74].

6. Conclusions

The jeepney is one of the most popular modes of transportation in the Philippines due to its affordability and accessibility. It is a public utility vehicle that can carry 12–16 passengers at the same time [1,2]. This study integrated an adapted service quality approach in examining the satisfaction of commuters towards the overall service of jeepneys. A total of 600 valid jeepney passengers voluntarily answered an online questionnaire that consists of 59 questions. Different factors such as Passenger Expectation, Cleanliness and Comfort, Ambiance, Safety, Driver Behavior, Service Adequacy, Route Efficiency, Information Materials, Value for Money, Passenger Satisfaction, and Future Intentions were examined simultaneously by utilizing the structural equation modeling (SEM) approach.

The SEM revealed that safety was the most significant factor affecting passenger satisfaction. In addition, driver behavior, value for money, service adequacy, and information materials were also found to have significant effects on passenger satisfaction. Surprisingly, cleanliness and comfort, and ambiance were found to be not significant factors. This is the first complete study that explores passenger satisfaction with the overall service quality [74] of jeepneys. The results of this study can be utilized by government agencies and jeepney operators to enhance the service given by jeepneys. Moreover, the findings of having a low-cost public utility vehicle may be patronized as long as the customers' destination is reached safely are significant [72,75].

It was also acknowledged in this study that the limitation of a nationwide response, low diversity of responses, and the COVID-19 pandemic may present results applicable only to the current situation. The need to explore passenger satisfaction after the COVID-19 pandemic [76,77], a wider age range of respondents, and studying a specific location may produce results relative to design, new normal behavior, and generalizability for all types of passengers. Despite these limitations, the model presented was considered applicable and could therefore be applied and extended to measure other public utility vehicles in different countries. Lastly, the results of this study could be extended and integrated among other models and theories to enhance the available structures to holistically measure passenger satisfaction worldwide.

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