The Effects of Service Quality of Public Transport Towards Passenger Preferences: Evidence from Major Cities in Sarawak State, Malaysia

Anita Rosli

Department of Social Science and Management, Faculty of Humanities, Management and Science, Universiti Putra Malaysia Bintulu Campus, Bintulu 97008, Malaysia

Corresponding Author Email: anitarosli@upm.edu.my

ABSTRACT

The increasing number of private vehicles has caused massive traffic congestion, and public transport (PT) services are one of the ways to reduce the problem. Even though few types of PT are provided to people, they still prefer private vehicles over the PT. Thus, to encourage them to use PT, we need to understand the factors that trigger people to use PT. This research aims to determine the effects of service quality dimensions on passenger preference for PT by using the structural equation model (SEM) approach. A study was conducted in the main cities of Sarawak state, Malaysia. A total of 199 respondents voluntarily participated in the survey. The result of PLS-SEM showed a significant relationship between customer service ($\beta=0.443$, $p<0.001$), safety ($\beta=0.199$, $p<0.001$), and accessibility ($\beta=0.175$, $p<0.001$) with passenger preferences towards PT services in main cities of Sarawak. The customer service achieved the highest coefficient and showed that customer service is an essential factor that PT providers need to consider in service delivery. Then, safety elements should be emphasized for passenger security, and PT providers should improve their accessibility to passengers' welfare by increasing the availability of PT when passengers need it.

1. INTRODUCTION

Public transportation (PT) accommodates people's movement within regions, states, and countries. There are three modes of public transportation, according to geographical area: land, air, sea, and river. Public transport services are the most well-known, reasonable, and broadly provided public transport modes in many nations' urban and rural zones [1]. However, public land transportation (PLT) is the most used. It is of interest to users, PT providers and the government of a country, especially in terms of service quality, user satisfaction, and passenger preferences. The National Transport Policy (NTP) Malaysia 2019-2030 sets out specific strategies to deliver an intelligent, connected, convenient, and safe public transport system that meets the needs of the people [2].

However, compared to PT, people prefer to use their vehicle for some reasons. It may be due to being more flexible and offering more accessible travel, where travellers can move from one place to another at any time based on their convenience [3] when people prefer to use their vehicles, which has caused the number of vehicles to increase yearly. According to the Malaysia Transportation Statistic, Malaysia recorded 736,783 new registrations of motorcars and 718, 416 new registrations of motorcycles for 2022. Compared with 2021, the percentage increase in new registrations was 40.5% (524,258) for motorcars and 16.9% (614,648) for motorcycles.

Meanwhile, Sarawak has been recorded as the third largest for new registration of motorcycles (17,675) and the fourth largest for new motorcars (9,929) in Malaysia for 2022 [2]. The increasing number of vehicles caused massive traffic jams, congestion, and road accidents. Apart from a systematic transportation system, PT usage could reduce road congestion and traffic jams.

Despite being the largest state in Malaysia, Sarawak's PT services lag behind those of the states in Peninsular Malaysia. There are just four forms of public transportation available in Sarawak at the moment: buses, taxis, e-hailing, and shared rental cars or vans. Meanwhile, in Klang Valley areas (Kuala Lumpur and Selangor), people can use other types of PT, such as commuter trains, Mass Rapid Transit (MRT), and Light Rail Transit (LRT). Each mode of transportation possesses distinct characteristics that affect customer preference and provide various advantages, whether passengers prioritize speed, convenience, or cost-effectiveness in their journeys [1].

Sarawak has implemented various efforts to improve its public transport services. In 2020, the Ministry of Transportation Sarawak (MOTS) also introduced the RM1 (USD0.212) Flat Rate Bus Fare Subsidy Program that involved routes within the district (not exceeding 40km) for a few cities in Sarawak, such as Kuching, Sibu, Miri, Bintulu, and Sarikei. Besides, for the modernization of Sarawak's public transport system, the MOTS is currently developing the Autonomous Rapid Transit (ART) system line in the state, and

the project is expected to be ready by the end of 2025 for the Kuching district (capital city of Sarawak). Then, the project will be expanded to other districts in Sarawak. With the ATR service that could carry up to 300 people at a time, people will have a new alternative for PT in Sarawak.

Even though few types of PT are provided to people, they still prefer private vehicles over PT. Thus, to encourage them to use PT, we need to understand the preferences factors that trigger people to use PT. Passengers prefer PT when PT is more efficient, affordable, clean, and convenient [4]. The previous research on PT preferences (buses) in Sarawak was conducted in Kuching City by using the stated preference technique found that the trip's purpose, fares, and comfortability were the primary factors that reflected the decisions of PT users [5]. Then, he also suggested to revitalize the aged bus fleet by substituting it with a more modern one in Sarawak. Since then, no extensive empirical studies have measured passenger preferences towards PT in other areas of Sarawak. Thus, this research aims to determine the service quality dimensions that influence passenger preference for PT in the four main cities of Sarawak (Kuching, Sibu, Bintulu and Miri) by using the structural equation model (SEM) approach. The SEM has been utilized in various studies to measure service quality and passenger preferences in the PT industry (refer to Table 1).

Table 1. Service quality dimensions for previous the PT preferences research

Authors	Location	Dimension/Attributes
[1]	Kelantan, Malaysia	Accessibility, convenience, safety
[6]	Filipina	Accessibility, comfort, cost, safety, concern for environment
[7]	Indonesia	Tariff, practicality, trust, comfort, safety
[8]	Singapore	Accessibility, comfort, customer care, safety, employment, tickets costs and affordability, reliability, preparation time, waiting time, travel time
[9]	Ghana	Affordability, accessibility, availability of mode options, length of waiting time, safety/security of mode, comfort/convenience, reliability of modes
[10]	Ghana	Fare affordability, safety, comfort, reliability, availability
[11]	United Kingdom	Service design, accessibility, safety & security, fare price
[12]	Ghana	Price, availability, comfort, distance, safety and security
[13]	India	Comfort, convenience, fare system, security, privacy, safety and social protection
[14]	Asia	Travel time, reliability, convenience, safety, fare, security
[15]	Germany	Convenience, price-performance balance, punctuality, availability, flexibility,
[16]	Europe	Waiting time, riding time, fare
[17]	Spain	Access time, in vehicle time public transport, fare, waiting time public transport, in vehicle time, cost of travelling, parking cost
[18]	Kuala Lumpur, Malaysia	Facility, comfortness, quality of services

The findings of this research will provide ideas and guidelines for the government, PT providers and relevant agencies to understand the service quality criteria they need to

meet to trigger people to use PT, especially when Sarawak is currently planning to transform the transportation system in the state through the ART system. It is crucial to comprehend the distinctions between PT user preferences and the elements that influence them [19].

2. LITERATURE REVIEW

Service quality is evaluated by customer perception, experience, and expectations towards goods and services, not by service providers. Service quality is a critical element for service industries, either the services provided by the government or the private sector. Parasuraman et al. [20] introduced SERVQUAL, which identified five service quality dimensions of tangibles: reliability, responsiveness, assurance, and empathy. The SERVQUAL has been utilized in various research in service industries and extends based on the nature of the research subjects. The dimensions for measuring service quality are challenging for service providers because services have many characteristics [21]. There are benefits gained when the service company maintains and improves its services and products, such as high customer satisfaction and increased preferences to use the products. In the PT context, satisfaction is defined by the customer's overall experience, pre-defined expectations, and customer preferences to use the service in the future based on previous experiences [22]. Thus, continuous quality improvement is an investment for the long term to generate greater profits. When firms provide high service quality, service delivery efficiency increases the business's profitability [23]. Besides, superior service quality is a tool to achieve a competitive advantage for the company [24].

Preference is a non-random behaviour shown by the purchase routine, where passengers know the benefits of certain goods or services and the requirements [25]. Alfonzo's theory also arranged factors or needs that influence travel decision-making into a five-level hierarchy consisting of feasibility, accessibility, safety, comfort and pleasurable [26]. Then, the quality of service is very subjective as it involves customers' intangible feelings that reflect the passenger's perception and preferences for using PT. Knowing passenger preferences makes it possible to improve transport models and help decision makers to predict the effects of different transport political actions that can make transport planning more efficient, public transport more attractive and economical, reducing traffic congestion and environmental problems [27]. When the passenger's overall evaluation of the services is positive, it will affect their present and future preferences [28]. Thus, it is commonly believed that when selecting mobility and transportation options, PT users have different preferences, and this idea is carried over into new developments and enhancements in PT services [19].

Table 1 shows several research studies on passenger preferences for PT based on service quality dimensions by using the SEM approach. Numerous service quality dimensions have been utilized to investigate the effects of service quality on passenger preferences for using PT. For this research, four service quality dimensions are chosen: customer service, safety, price, and accessibility.

2.1 Conceptual framework

This study forms a new conceptual framework to investigate

the relationship between the service quality of PT and passenger preference. The selection of variables and the construction of the model are subjective as they depend on two circumstances. First, researchers will use variables or attributes that consistently show a significant relationship with the dependent variable in the previous or similar research. Second, researchers will use variables or attributes based on their observations or preliminary surveys of the cases. Usually, the selection of variables is based on empirical findings that have been published. Safety, accessibility, and price variables consistently correlate significantly with passenger preferences (refer to Figure 1).

Meanwhile, customer service is an additional variable chosen to form the conceptual framework for this research. The recent PT research in Sarawak found that customer service has significantly influenced passenger satisfaction [29]. Thus, this research also wants to test whether customer service significantly affects passenger preferences. The details about each variable are as follows.
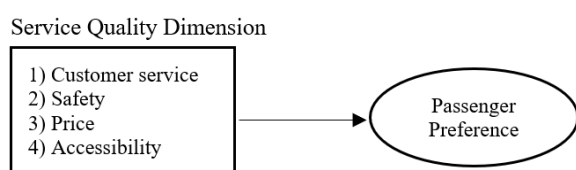

Figure 1. Conceptual framework

2.1.1 Safety

Safety is the aspect of security suggested for getting passengers transportation services and the most influential factor in passenger preferences in using PT [6, 7]. The absence of risk, danger, or threat of harm, injury, or loss to people or property, whether intentional or unintentional, is another definition of safety [1]. Meeting safety standards and providing comfortable and safe transport services provide a pleasant experience related to mode choice behaviour [30]. Safety is also measured by driving speed and driving attitudes. Travel speed and driver behaviour are the most critical factors driving PT will instil a sense of security in the passengers, allowing them to feel safe and confident that the e-hailing services will deliver them to their requested destination on time [31, 32]. For this research, safety elements, driving speed, driving attitudes, and security are indicators for the safety dimension.

2.1.2 Accessibility

Accessibility refers to the ease with which people can board and alight the vehicle, and an effective public transportation system must facilitate better access for passengers [22]. Accessibility is also defined as the extent of the service offered in terms of geography, transport modes, operating hours, and frequency [33]. Users' happiness will decrease if PT is late and has lengthy waits [29]. Accessibility, which is defined as the ability of users to reach transit facilities that contribute reasonably close from their locations of origin and destination, has been highlighted as one of the key factors that led to the adoption of transport modes [34]. Easy access to PT services, less waiting time, punctuality, and flexible schedule are indicators of accessibility dimensions for this research.

2.1.3 Price

In the service industry, price refers to the customer's perception of value for money. Commonly, passengers will choose the PT that could offer the lower price. However, when it comes to service quality, the price or fare that they spend for PT should be worth the service received. Users are primarily impacted by the link between price and quality in the fare [33]. Then, Rashedi et al. [35] revealed eliminating extra fees for passengers is a good way to enhance PT for trips involving regional commuting. Thus, the price should be affordable and reasonable, along with the service and destination.

2.1.4 Customer service

Customer service is crucial to determining customers' preferences for using PT. Customer care is about how the staff responds to help customers when they face problems with a service and the ability to handle customer complaints due to transactional failures [23, 36]. Kong et al. [8] defined customer service as the sufficient physical presence of staff, the quality of handling customer concerns, the ability to provide customer service support in an emergency, and the helpfulness of public transportation staff. Thus, PT staff and drivers should show good customer attitudes, be responsible, always ready to serve, and be responsive to passenger complaints.

2.2 Hypothesis of research

There are four hypotheses need to be tested in this research:
H1: Customer service has signification relationship with passenger preference towards public transportation.
H2: Safety has signification relationship with passenger preference towards public transportation.
H3: Price has signification relationship with passenger preference towards public transportation.
H4: Accessibility has signification relationship with passenger preference towards public transportation.

3. METHODOLOGY

Survey research was conducted in 2023 using questionnaires to collect passenger perceptions about PT preference factors in Sarawak. The questionnaire consists of two main sections, i.e., passenger profile and PT preference factors. The characteristics of service quality are measured by means of five Likert Scales, i.e. strongly disagree (1), disagree (2), neither disagree nor agree (3), agree (4), strongly agree (5). Four of the main cities in Sarawak were involved in this study, i.e., Kuching (capital city of Sarawak), Sibu, Bintulu, and Miri. (refer to Figure 2). Kuching, Sibu, Bintulu, and Miri are the main cities as these cities have high populations and are more developed than other cities in Sarawak.

The total population for the four main cities in Sarawak is based on the last census conducted in 2020 [37]. A convenient sampling method was applied to this study. The questionnaire was distributed to PT passengers who were voluntarily involved in this survey through Google Forms. One hundred ninety-nine respondents voluntarily participated in the survey, and the sample size is enough to conduct research (refer to Table 2). A sample size between 160 and 300 is usually well suited for statistical analysis, such as CB-SEM and PLS-SEM [38].

Two main analysis methods were used to achieve the research objectives: descriptive analysis and structural equation model (SEM). Descriptive analysis was conducted using IBM SPSS Statistics version 27, and the SEM was conducted using Smart-PLS 4.1.0. The profiles of respondents

and the frequency of replies to service quality criteria are compiled via descriptive analysis. On the other hand, measurements and structural models are analyzed using SEM. PLS-SEM offers greater flexibility and prediction-oriented outcomes compared to more traditional methods like CB-SEM or regression analysis. The PLS-SEM is an easy-to-use visual interface which enables researchers to simultaneously analyze relationships between observed and latent variables in a complex model and perform multiple robustness assessments [39, 40].

Figure 2. Map of Sarawak state

Table 2. Number of respondents

Division	Total Population (2020)	No. of Respondents	%
Kuching	812900	87	43.71
Miri	433800	46	23.11
Sibu	349700	37	18.59
Bintulu	266200	29	14.57
Total	1862600	199	100.00

The assessment of the measurement model is focused on reliability and validity, such as consistency reliability, convergent reliability (outer loadings and average variance extracted (AVE)), and discriminant validity. For SEM in Smart-PLS, two stages of analysis begin with a measurement model test followed by a structural model and then a bootstrapping approach with a sample of 5000 was applied to assess the path significance coefficients and loadings [41]. The evaluation of the measurement model is also known as confirmatory factor analysis, whereas the selection of appropriate indicators with construct variables is based on outer loading values. Structural models, also known as inner models, involve the evaluation of the constructs that are connected. Therefore, this evaluation is to obtain information about the relationship between the constructs in the path coefficient model, whether the relationship is significant or otherwise.

4. FINDINGS OF STUDY

4.1 Respondent's profile

Total of 199 PT users in four main cities in Sarawak were volunteers involved in this survey, whereas 52.76% were female and 47.24% were male (refer to Table 3). The majority (83.92%) of respondents are in the age category 21 to 50 years old. Malay, Iban, and Chinese are the most significant races in Sarawak and contribute to 81.41% of respondents. For

educational level, most (89.99%) respondents have attended a secondary school for a bachelor's degree. Then, based on income group, respondents from income category RM3719 and below represent almost 80% of the total respondents. As we expect, PT users are commonly in the low-income groups as they cannot afford personal vehicles compared to the medium and high-income groups. Next, PT is used by various people regardless of occupation type. From the survey, PT users consisted of private workers (48.24%), government servants (18.59%), self-employed (18.09%), and students (15.08%).

Table 3. Respondent's profile

Characteristics	Frequency	%
Gender		
Male	94	47.24
Female	105	52.76
Age (years old)		
20 and below	5	2.51
21 - 30	68	34.17
31 - 40	60	30.15
41 - 50	39	19.60
51 and above	27	13.57
Race		
Bidayuh	13	6.53
Melanau	13	6.53
Iban	62	31.16
Chinese	24	12.06
Malay	76	38.19
Others	11	5.5
Educational Level		
Primary School	13	6.53
Secondary School	91	45.73
Diploma	33	16.58
Bachelor	55	27.64
Master/Phd	7	3.52
Household Income (RM)		
B40 (3719 and below)	158	79.40
M40 (3720 - 8649)	27	13.57
T20 (more 8649)	14	7.04
Occupation		
Self-employed	36	18.09
Government servant	37	18.59
Private workers	96	48.24
Students	30	15.08

4.2 PT usage

PT usage pattern among respondents is represented in Table 4. Approximately 51% of respondents have been using e-hailing services, while 42.71%, 32.66% and 46% have used buses, sharing rental car or van, and taxis, respectively. Most respondents are frequent PT users (78.39%) who use PT more than five times yearly. Regarding the best service and the leading PT choice among respondents, e-hailing recorded the highest percentage compared to other types of PT because of the holding advantages of e-hailings over other PT. E-hailing services offering convenience, timeliness, and affordable fares are more attractive to users than other types of PT [30].

Based on Table 5, PT users will choose their PT preferences for several purposes or reasons. Buses are the best choice for interdistrict transportation and movement. As Sarawak state has a large area, e-hailing, taxis, and sharing rental cars are unsuitable for long-distance journeys. About 74% of respondents choose the bus for interdistrict movement compared to another type of PT. Even if other PT is possible

for interdistrict movement, the price is more expensive than the bus fares. For lengthy trips, most people would rather take public transportation than use private vehicles. Besides, for medium- and long-distance regional trips, cost is a more crucial factor than for short-distance regional trips [33].

Table 4. PT usage

PT Usage	Frequency	%
Type of Public Transport Used		
Bus	85	42.71
E-hailing	103	51.76
Sharing rental car/van	65	32.66
Taxi	46	23.12
Frequency of Using PT (per year)		
less than 5 times	43	21.61
5 to 10 times	97	48.74
more than 10 times	59	29.65
The Best Service		
E-hailing	127	63.80
Taxis	14	7.00
Sharing rental car/van	15	7.50
Bus	43	21.60
The Main PT Choice		
E-hailing	122	61.30
Taxis	13	6.50
Sharing rental car/van	16	8.00
Bus	48	24.10

Table 5. Trip characteristic and PT preferences

Type of PB	Interdistrict Movement	Within District Movement	When Personal Vehicle Breakdown
E-hailing	15 (7.54%)	102 (51.26%)	134 (67.34%)
Taxi	18 (9.05%)	21 (10.55%)	22 (11.06%)
Sharing rental car/van	17 (8.54%)	23 (11.56%)	19 (9.55%)
Bus	149 (74.87%)	53 (26.63%)	24 (12.06%)

4.3 Passenger preferences towards service quality of PT

Table 6 presents the service quality attributes that PT passengers preferred. Seventeen service quality attributes have been categorized into five construct variables: customer service, safety, price, accessibility, and passenger preferences. Based on the mean value, all attributes achieved a value of 4.00 except 'reduce the speed during the service,' which is less than the 4.00 mean value of 3.90. The result described that the majority of respondents 'agree' (mean > 4.00) with the service quality attributes of PT that they preferred. However, respondents may have different opinions about PT's 'driving speed'. The travel duration will affect their journey time, schedule, and appointments, and it may be delayed due to the reduction in driving speed.

4.4 Measurement model assessment

Three criteria in measurement model assessment are internal consistency reliability, convergent reliability, and discriminant validity. The results of measurement model assessment are shown in Table 7. In PLS-SEM, internal consistency reliability is valued by composite reliability (CR)

values when the CR threshold value within 0.7 to 0.9 is satisfied, achieves construct reliability, and is accepted in research [39, 41]. The CR value is from 0.862 to 0.933, which means construct reliability is achieved in this research.

Next, for convergent validity, the outer loading values are more than 0.708 for all indicators, which means that the indicators for each construct show high variance with each other because the square power value of outer loading will generate indicator reliability that will produce a variance of at least 0.50 [42]. In this research, the outer loading power for all attributes is more than 0.708, and the square power value of outer loading is more than 0.5. Besides, the AVE should be higher than 0.5 when the average value of variances is obtained from the square power value of the outer loading indicator.

Table 6. Central tendencies measurement of constructs

Variable	Observed Attributes		Mean
Customer Service	I prefer the staff to show a good attitude to the passengers.	CS1	4.6
	I prefer a staff that is always ready to serve passengers.	CS2	4.54
	I prefer the staff that show high responsibility during service delivery.	CS3	4.51
	I prefer the staff to provide prompt response to passenger complaints.	CS4	4.52
Safety	I prefer the PT that has a high-safety element.	ST1	4.42
	I prefer PT which could reduce the speed during the service.	ST2	3.9
	I prefer drivers with good driving attitudes.	ST3	4.55
	I prefer PT as it has high security.	ST4	4.57
Price	Fare is one of the main factors in choosing PT.	PR1	4.52
	The fare should be reasonable with the destination.	PR2	4.61
	The fare should be reasonable with the service.	PR3	4.58
	Fare should affordable.	PR4	4.52
Accessibility	I prefer PT it offer less waiting time.	AC1	4.48
	I prefer PT which has easy access.	AC2	4.44
	I prefer PT with a flexible schedule.	AC3	4.34
	I prefer PT that could provide punctual service.	AC4	4.58
Passenger Preference	I prefer the PT to meet my need.	PRF1	4.51
	I prefer the PT to provide good service.	PRF2	4.59
	I will recommend the type of PT that I prefer to friends and family.	PRF3	4.6

Then, the discriminant validity is based on Heterotrait-Monotrait (HTMT) Criterion (refer to Table 8). HTMT refers to the ratio between the correlation within a construct and between constructs. When the HTMT value is less than 0.9, discriminant validity for the measurement model is achieved [43]. Besides, HTMT is also achieved when the confidence interval value is not obtained at 1.0 for each construct [44]. Based on the given criteria, all the construct variables are valid

in this research.

Table 7. Assessment of measurement model

Indicator / Attribute	Convergent Validity			Internal Consistency Reliability
	Outer Loadings (>0.708)	AVE (>0.5)	Indicator Reliability (>0.5)	Composite Reliability (CR) (>0.708)
CS1	0.873		0.763	
CS2	0.944	0.795	0.892	0.939
CS3	0.920		0.847	
CS4	0.824		0.679	
ST1	0.791		0.626	
ST2	0.873	0.693	0.763	0.900
ST3	0.827		0.684	
ST4	0.838		0.702	
PR1	0.834		0.695	
PR2	0.870	0.761	0.757	0.927
PR3	0.896		0.802	
PR4	0.889		0.790	
AC1	0.835		0.702	
AC2	0.890	0.705	0.787	0.905
AC3	0.823		0.659	
AC4	0.807		0.638	
PRF1	0.940		0.884	
PRF2	0.872	0.795	0.760	0.921
PRF3	0.861		0.741	

Table 8. Discriminant validity based on heterotrait-monotrait (HTMT)

Construct Variable	AC	CS	PR	PRF	ST
AC					
CS	0.826				
PR	0.803	0.722			
PRF	0.836	0.899	0.772		
ST	0.820	0.870	0.873	0.868	

4.5 Structural model

The structural model measures the relationship between construct variables and tests the hypotheses of this research. However, a collinearity test should be conducted first to check collinearity issues in the model. The variance inflation factor (VIF) value should be more than 0.2 but less than 5.0 to ensure collinearity issues do not exist [45]. The VIF for all the construct variables are higher than 0.2 and less than 5.0, showing no collinearity issues in this model (refer to Table 9).

The results of the structural model are shown in Table 10. As Hair Jr et al. [45] suggested, the model is run with the bootstrapping with 5000 subsamples in PLS-SEM to measure the relationship and test the hypothesis. It shows the significant relationship between customer service (β =0.443, p<0.001), safety (β=0.199, p<0.001), and accessibility (β=0.175, p<0.001) with passenger preferences towards PT services in Sarawak. Three (H1, H2, H4) out of four hypotheses proposed are supported. Figure 3 together reported the path coefficient, p-value, and t-value for the structural model.

Then, two criteria were used to assess the model fitness coefficient determination R^2 and predictive relevance Q^2. The R^2 is 0.713, which means independent variables explain 71% of passenger preferences. The studies [42, 45] recommended that the explanatory power in R^2 above 0.70 is acceptable for the research. Next, the value of Q^2 greater than zero indicates

that the path model can predict the observed initial value. The Q^2 value is 0.556, which means customer service, safety, accessibility, and price have significant predictive relevance to passenger preferences.

Table 9. Collinearity assessment

Construct Variable	Passenger Preferences (0.2<VIF<5.0)
Accessibility (AC)	2.732
Customer Service (CS)	3.054
Price Factor (PR)	2.848
Safety (ST)	3.656

Table 10. Assessment of structural model

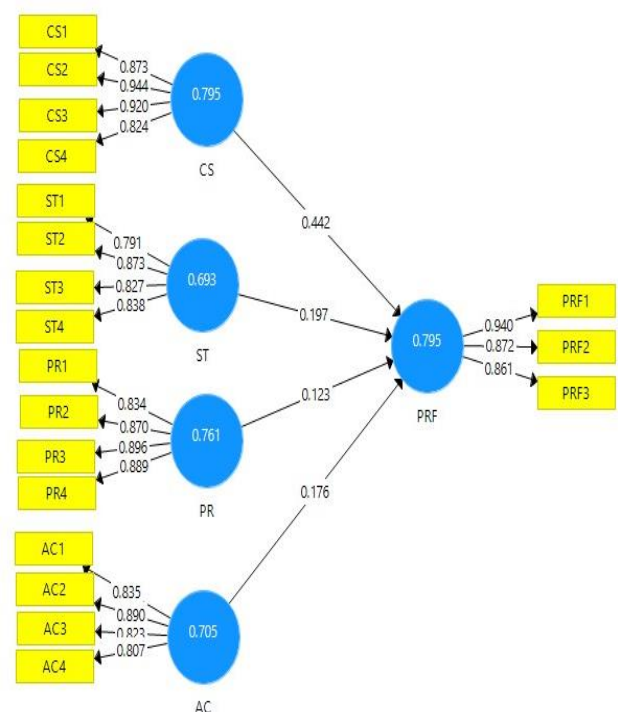| Hypothesis	β	P	t	Decision	R^2	Q^2 (> 0)
H1	0.175	0.030	1.196	Supported		
H2	0.443	0.000	5.059	Supported	0.713	0.556
H3	0.124	0.165	3.901	Rejected		
H4	0.199	0.049	0.601	Supported		

Figure 3. Structural model

5. DISCUSSION OF THE FINDINGS

Customer service, safety, and accessibility significantly influence passenger preference for PT services in Sarawak. Price does not play a significant role in this research. Even though the customer service dimension is not widely used as a service quality dimension to measure passenger preferences in previous studies (refer to Figure 1), the customer service dimension has the most vital relationship with passenger preferences compared to safety and accessibility (refer to section 4.5) in this research. PT staff, such as drivers and bus conductors, must show good attitudes and be responsible and responsive to any problems and complaints during service delivery. The ability to handle customer questions, concerns, and frustrations, as well as the attention and promptness in dealing with customer requests, are essential in customer service in the PT sector. When users perceive poor customer

service, they will likely become unsatisfied and not use it [9].

Next is the safety dimension. In this research, security (mean 4.57) and driving attitudes (mean 4.55) attributes have achieved high mean values (refer to Table 6). As passengers, security is a primary concern when using PT. For instance, an e-hailing mobile application has an emergency button to enhance user security. Besides, passengers are also concerned about PT's driving attitude. Rude drivers and exceeding the speed limit affect passenger safety and PT preference. However, for the PT services, the speed limit and driving attitudes are under control compared to private vehicles because PT transport drivers know they are carrying passengers and avoid misbehaviour on the road for safety purposes. That is why safety is a significant factor influencing passenger preference for PT.

The third dimension is accessibility. As passengers and customers, we hope the services will always be there whenever we need them. Among the accessibility dimensions, the punctuality attribute has achieved the highest mean score, 4.58 (refer to Table 6). Traffic conditions and the interconnectedness of routes influence punctuality. With fewer traffic jams, the PT can arrive on time. Accessibility improves performance and activities in particular locations and is a spatial and social phenomenon that affects mobility [46].

Regarding easy access, flexibility, and less waiting time, e-hailings and taxis have advantages over bus and car/van services. For e-hailings and taxi services, passengers can order e-haling through mobile apps and call for a taxi, and the driver will pick them up at a given location. Even though the public bus has an operational schedule, the passengers easily manage their time. Sharing a car is flexible, but waiting depends on the time and distance to fetch other passengers before their turn.

6. CONCLUSION: THEORETICAL AND MANAGERIAL IMPLICATIONS

This research proved that safety, accessibility, and customer service dimensions significantly influence passenger preferences. Safety and accessibility dimensions have been used widely in measuring service quality and also were factors of passenger preference in PT studies in other areas such as Kelantan (Malaysia) [1], Filipina [6], Ghana [10, 11] and United Kingdom [11].

Meanwhile, customer service was rarely used as part of service quality dimensions in the previous research. Then, this research applied the customer service dimension as one of the determinants of passenger preference, and the result showed that the customer service dimension also significantly influenced passenger preference towards PT. It is shown that the safety, accessibility, and customer service dimensions are essential in measuring the service quality of PT, and these variables must be considered in service quality management for customer preferences in business and marketing research as well.

Government PT providers and relevant agencies need to enforce guidelines for PT services in Sarawak to ensure improved quality, high customer satisfaction, and increased attraction to PT services. The findings of this research could provide guidelines for the MOTS to strengthen PT services in Sarawak. PT providers in Sarawak should meet specific criteria for their operation, especially the safety elements. Government and PT providers should emphasize safety

elements, such as setting safety standards by setting a limit to the age of PT vehicles, which should be at most ten years and additional licences or permits for PT drivers.

Customer service is an essential factor that PT providers must consider and improve to attract people to use PT. Therefore, government and PT providers could provide customer management training among PT staff, such as drivers and bus conductors, to train them on customer management. Next, PT providers should improve their accessibility for passengers' welfare by increasing the availability of PT services and, for instance, providing more frequent bus service operations. Besides, the drivers of taxis, e-hailing, and sharing vans need to be experts in alternative routes to avoid traffic congestion and ensure their customers have less waiting time and can arrive on time at their destination.

Besides, the conceptual framework of this research is a new model to measure the relationship between service quality and passenger preference in the PT industry. However, it is based on Sarawak state settings. It is a general model and could also be applied in other PT studies at other locations. Modifying attributes or selecting service quality dimensions is subject to the study location settings. For instance, the type of PT services may vary in other locations compared to PT services in Sarawak. Peninsular Malaysia has other types of PT, such as commuter trains, MRT, and LRT. The variables and attributes of this research should be applied in other locations to test the significant relationship between the variables. The findings of the research may be different from those of Sarawak state.

7. LIMITATION AND RECOMMENDATION FOR FUTURE RESEARCH

This research was only conducted in the main cities in Sarawak (Kuching, Sibu, Bintulu, Miri) due to the high population density and need for PT services compared to other areas in Sarawak. The findings could reflect the service quality and passenger preferences in big cities, and they may not be appropriate for measuring service quality and passenger preferences in small-town areas. Thus, the findings may need to be more generalised as a whole Sarawak state, and extensive research needs to be conducted for all divisions to portray PT services in Sarawak.

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