

THE INFLUENCE OF SERVICE QUALITY AND PASSENGER SATISFACTION TOWARDS ELECTRIC TRAIN SERVICES (ETS): A PLS-SEM APPROACH

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Abstract: This research is about service quality (responsiveness, reliability, tangible, safety and security) dimensions becoming major determinants of passenger satisfaction towards Electric Train Services (ETS). The significance of this study is intended to assist Keretapi Tanah Melayu Berhad (KTMB) to establish the service offered and to identify the important aspects of service quality that affect passenger satisfaction. A total of 280 questionnaires were distributed to ETS passengers, who were using the service from Kuala Lumpur Sentral Station to Padang Besar Station. The main objective of this study was to investigate the relationship between service quality dimensions and passenger satisfaction towards ETS. Data gathered were analyzed using partial least square (PLS) method. The study concluded that service quality dimensions are the factors affecting the passenger satisfaction towards ETS. In addition, service quality can also define the significant relationship between passenger satisfaction towards ETS. Other than that, several useful recommendations were made regarding the findings of this study.

Keywords: passenger satisfaction, service quality, electric train services (ETS).

JEL: L90, L91, L92, M10, N75.

1 Introduction¹

Malaysia is a developing country where industry, commercial product, population and transport are being developed. Public transport is important for people's movement and mobility. The progress of the city of Kuala Lumpur depends on the development and effectiveness of public transport services. Public transport service is part of the basic infrastructure and essential in the development of a country. As the capital city of Malaysia, Kuala Lumpur has one of the most modern transportation systems in the region (Das, et al., 2013). In Malaysia,

ETS was established in July 2015 and is being managed by Keretapi Tanah Melayu Berhad (KTMB).

Public transport plays an important role in the Malaysian growth and development, especially in an urban area. One of the important aspects of public transport is that it helps to reduce the traffic congestion in Malaysia, especially during peak hours or any festive seasons. It reduces stop-start driving and fuel consumption as well as saves passengers' time and energy. Public transport is not only used by locals but it is also being used by the tourists who came to the country.

The service quality of public transport becomes an important issue in order to have better and comfortable environment. The service quality of the public transport seems to be unsatisfied and at an average level, which are physical facilities, in term

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of cleanliness, comfort, punctuality, frequencies and responsiveness of the staff. Thus, this study will also investigate the responsiveness of the staff.

For example, in 2010, there was problem of delay in the arrival time of the Light Rapid Transit (LRT) and Keretapi Tanah Melayu Berhad (KTMB), when Malaysia's former Prime Minister, Tun Abdullah Ahmad Badawi himself experienced by using that service. He was not satisfied with the service quality provided by these two companies (Utusan, 2008). This issue clearly showed that even though the public transport system in Malaysia was modernized in the urban area, the service quality was still lacking and not well implemented. This would lead to negative perception or dissatisfied passengers (Thompson and Schofield, 2002).

In addition, it is very important to highlight that although some research has been done regarding the effectiveness of public transport, there are a few studies conducted regarding the service quality dimensions and passenger satisfaction toward ETS. Most of the previous studies conducted covered the service quality and riders satisfaction on LRT and commuter. This is because ETS is a relatively new public transport in Malaysia; it was established in 2015. For example, Zaherawati Zakaria, et al. (2010) conducted a study on the service quality of the Malaysian public transports including buses and taxis; Ojo, et al. (2014), for instance, focused on the service quality in the public bus transport services in Ghana.

2 Literature review

One of the problems that is commonly related to public transport is reliability. Reliability is measuring the ability of the service provider to perform the promised service dependably and accurately (Parasuraman, et al., 1988; Ojo, et al., 2014). Most of the passengers were not satisfied with the service

quality provided in term of punctuality of train arrival and departure (Utusan Malaysia, 2008). In addition, responsiveness is another dimension of quality in measuring service quality (Parasuraman, et al., 1988). Responsiveness means the willingness to help customers and provide prompt service to the customers. Employees' behavior reported to have similari-

ties with responsiveness, whereby it may be related to assurance but with regard to access to information rather than employee knowledge and courtesy scale (Thompson and Schofield, 2002). It is clearly mentioned that responsiveness is related to the attitude of the staff involved in the operation of public transport services.

On the other hands, public transportation in Malaysia are also lacking in term of physical facilities. Physical facilities are one of the service quality dimensions that is tangible. Based on the previous study, public buses, for example, were not providing convenience facilities to disabled passengers who use wheelchair to board. Ramps are mostly not provided by the public buses in order to give a disabled person more convenience to use public transport. This is different in another country like Japan, in which their public transport system and the built environment are fully accessible (Malay Mail, 2009). They have portable ramps at the train station where there is a difference in height between the platform and train. In addition, station masters are always ready to assist wheelchair users when requested.

Security is also one of the important aspects in public transport. Previous studies indicate that the users of public transport being involve in crime, especially women, has increased. According to Rohana Sham, et al. (2013), the women who live in the urban area and depend on the public bus or train to commute to work into center were believed to have a routine journey on every weekend. Thus, they are potentially exposed to be the victims of crime. In addition, crime offenders have since long targeted women more as compared to men, and this heightens women's feeling of being unsafe. The background infrastructure especially walkaway to and from the bus stop, poor design and maintenance of the station, poor security measure throughout the entire journey, have further put women's lives into the risk of crime victimization.

3 Methodology

To determine the relationship between service quality and passenger satisfaction, a survey was conducted, where questionnaires were distributed to a valid sample of 280 respondents representing ETS passen-

gers who used ETS from KL Sentral to Padang Besar Station. Following the recommendations by Hair, et al. (2006), a sample size of 100-200 respondents was considered as appropriate for very large or unknown population. The convenience sampling technique is chosen because it is easy to be employed and is cost-effective, where the questionnaire will be easy to distribute to the passengers and it is also a very convenient way to generate the required sample.

4 Findings and discussion

4.1 Demographic Analysis

280 respondents participated in the survey. There were 156 of female respondents (55.7%) and 124 of male respondents (44.3%). Most of the participants were Malay with a total of 186 (66.4%), followed by Chinese with a total of 67 (23.9%) and Indians with a total of 27 (9.6%). In addition, the result found that most of the respondents were aged between 45 years and above with a total of 87 (31.1%), followed by the young aged between 20-24 years old with a total of 58 (20.7%), aged between 25-30 years old with a total of 43 (15.4%) and less than 20 years old with a total of 25 (8.9%). Furthermore, there were a total of 30 respondents (10.7%) aged between 31 to 34 years old, 25 of the respondents (8.9%) were aged less than 20 years old, 19 respondents were aged between 35–40 years old, and finally, 18 of them (6.4%) were aged between 41

to 44 years old. This concluded that there were various aged people - teenagers, adults and senior citizen - who used the ETS services.

4.2 Common Method Bias

The response bias analysis or the nonresponse bias check was carried out to determine the representativeness of the responses from the participants. It is possible that the sample might have common method variance (CMV) because the dependent and independent variables were measured from the same participants (Podsakoff, MacKenzie, Lee and Podsakoff, 2003) or also known as single source bias. The Harman's single factor test was used to assess the common method bias (Podsakoff, et al., 2003).

An unrotated factor analysis was used for the Harman's single-factor test for all the first-order constructs using SPSS, and all the indicators were loaded as a single factor. The cutoff values of the total variance explained should be less than 50% in order to have no common method bias, as explained by Hair, Hult, Ringle, Sarstedt and Thiele (2017). From the 5 constructs, 32 items were analyzed and it was found that the total variance was explained by one factor was 36.83%, which is less than 50 percent, and this confirmed there was no common method bias in the study.

Table 1. Factor Loading for Multiple Items
(Source: Authors' own research)

Indicators	Items	Factor Loading
Reliability 6	The timetable is available at the ETS station	0.707
Reliability 7	ETS staffs are friendly with their customers	0.808
Reliability 8	Passengers can book tickets easily	0.762
Reliability 9	ETS staff satisfy the passengers' request right the first time	0.843
Reliability 10	ETS never breakdown when it is on the railway	0.646
Responsiveness 1	Service provider always inform me about the availability of service and changes of price in advance	0.606
Responsiveness 2	The public transport always on time	0.660
Responsiveness 3	Communication with ETS staff is clear and helpful	0.829
Responsiveness 4	ETS staffs are always willing to help passengers	0.824
Responsiveness 5	ETS staffs provides individualized attention to help customers	0.831

Table 1. Factor Loading for Multiple Items (cont.)
(Source: Authors' own research)

Indicators	Items	Factor Loading
Safety 17	I have no experience involving any accident when using ETS.	0.765
Safety 18	I never heard that other people experienced any accident when using ETS.	0.738
Safety 19	I never involved in any criminal incidents when using ETS.	0.778
Safety 20	ETS always brief to their passenger about safety before start the journey and will keep announce from time to time.	0.692
Safety 21	Using ETS is very safe.	0.786
Safety 22	It is safe to wait at the station during the day and night.	0.710
Satisfaction 1	It is easy to take the ETS to go anywhere I want	0.737
Satisfaction 2	The services provided by transporters need my satisfaction	0.766
Satisfaction 4	I am satisfied with the fares	0.686
Satisfaction 5	I am satisfied with the ETS services	0.807
Satisfaction 6	The public transport network has improve from time to time	0.713
Satisfaction 9	Cleanliness of toilet and prayer room	0.653
Satisfaction 10	Service of steward and stewardess towards passengers	0.694
Tangible 11	Public transport provide up to date equipment	0.723
Tangible 12	ETS provide good hospitality to their passenger	0.812
Tangible 13	Public transport are well maintained and neat	0.788
Tangible 14	Public transport are spacious seats for passengers on board	0.731
Tangible 15	Cafe in ETS provides fast food for their passengers with affordable price	0.599
Tangible 16	The dress of staff is neat	0.732

4.3 Convergent Validity Analysis

For the first level, this study has to determine the factor loading of reliability, responsiveness, safety, satisfaction and tangible. According to Hair, et al. (2014), the loading must be higher than 0.7 to be considered as high factor loading. If the loading is lower than the threshold value, the item should be deleted from the constructs. If the finding found that the values of 32 items tested were greater than 0.7, then three items of item 3, item 7 and items 8 were deleted due to lower factor loading.

4.4 Convergent Validity

In addition to convergent validity, the loading must be higher than 0.7 to be considered as having high internal consistency reliability. If the loading is lower than the threshold value, the item should be deleted from the construct to obtain the average vari-

ance extracted with the minimum value of 0.50 and higher than 0.7. In the study, it was found that the values of composite reliability (CR) and average variance extracted (AVE) for reliability (CR = 0.869, AVE = 0.572), responsiveness (CR = 0.868, AVE = 0.572), safety (CR = 0.882, AVE = 0.556), satisfaction (CR = 0.885, AVE = 0.524) and tangible (CR = 0.874, AVE = 0.539) were greater than the threshold values and confirmed that all the items remained tested valid for the analysis. According to Lawson-Body and Limayen, 2004, if the composite reliability value is 0.6 or higher, the scale will have reasonable internal consistency. In addition, based on the results depicted in Table 2, all indicators found good composite reliability. Consequently, the results confirm that the variables in this study are extremely reliable as they are very consistent in explaining the variance constituted in them.

Table 2. Composite Reliability and Average (CR) Variance Extracted (AVE)
(Source: Authors' own research)

Constructs	Composite Reliability	Average Variance Extracted (AVE)
Reliability	0.869	0.572
Responsiveness	0.868	0.572
Safety	0.882	0.556
Satisfaction	0.885	0.524
Tangible	0.874	0.539

4.5 Discriminant validity

The discriminant validity was applied in order to measure the degree to which items differentiate

among constructs by examining the correlations between construct as in the model (Fig. 1).

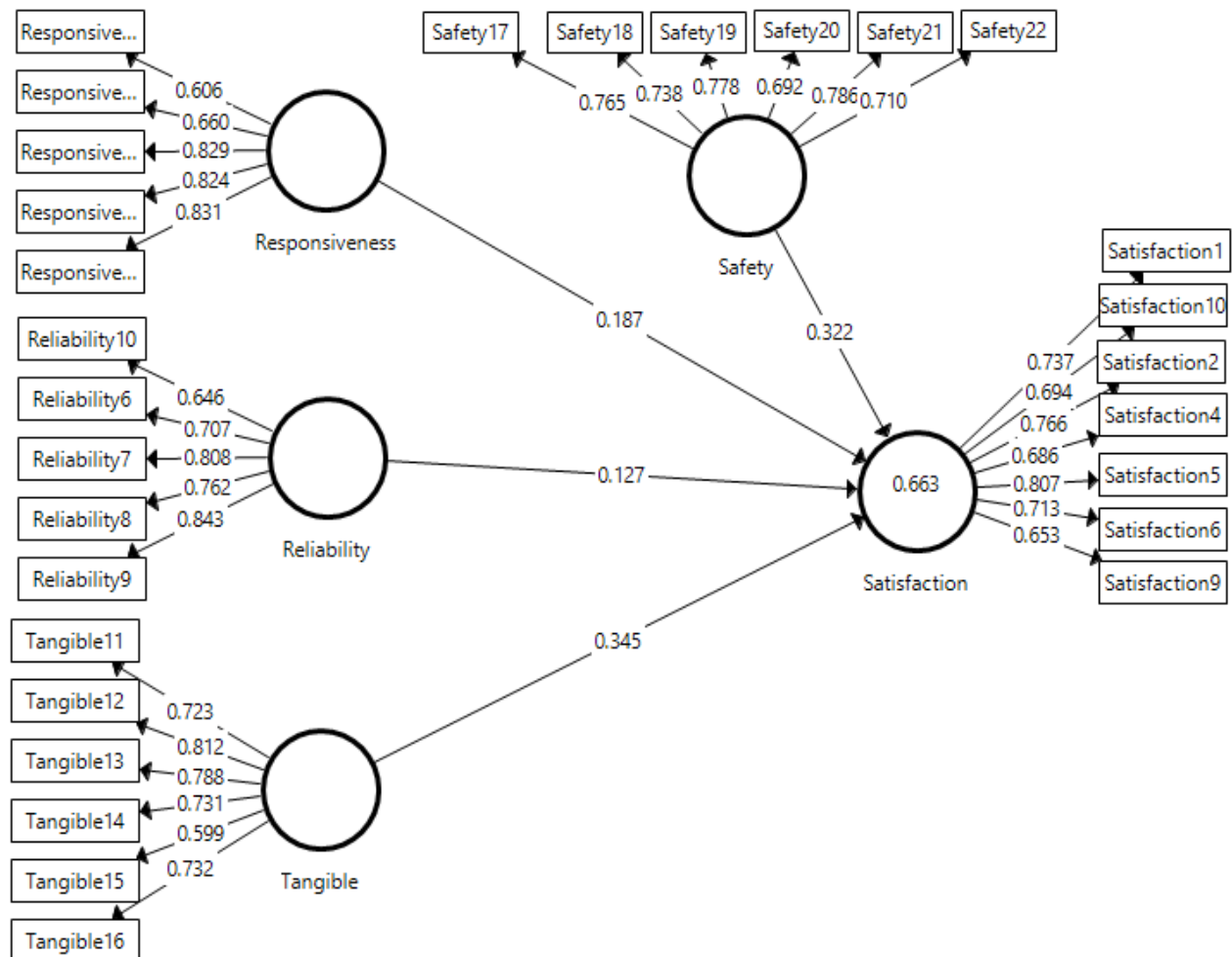


Figure 1. Measurement Model
(Source: SmartPLS)

To confirm that there is no issue on discriminant validity, the items should load more strongly on their own construct and the AVE share between each construct and its measure should be greater than variance shared between the construct and another construct (Barclay, Higgins and Thompson 1995). To test the discriminant validity, a Fornell and Lack-

er (1981) criterion has been conducted to compare the correlation between the construct and the AVE values. From Table 3, as presented in bolded values on diagonal were greater than the corresponding row and column values, indicating that the measures were discriminant.

Table 3. Discriminant Validity
(Source: Authors' own research)

Constructs	1	2	3	4	5
1. Reliability	0.757				
2. Responsiveness	0.681	0.756			
3. Safety	0.556	0.44	0.746		
4. Satisfaction	0.642	0.614	0.679	0.724	
5. Tangible	0.606	0.577	0.592	0.72	0.734

4.6 Structural Model

In a structural model, the calculated values of R square (R^2), path loading (β -Values) and the corresponding (t-Values) by conducting a bootstrapping procedure with 500 samples. In further analysis, the prediction relevance and effect size of the relationship required assessing in structural model (Hair, et al., 2014). From Table 4, the R square (R^2) of 0.658 that explains 65.8% of the variance in perceived satisfaction was explained by responsiveness, reliability, tangible and satisfaction.

In further analysis, to assess the significance of the relationship, the data require bootstrapping with a total of 500 samples for each data set. In order to confirm the significance of the relationship, the significant values should be less than 0.05 ($p < 0.05$) and the t-value should exceed 1.96 to accept the hypotheses of the relationship. The findings established that there was a positive and statistically significant relationship between reliability and satisfaction ($\beta = 0.127$, t-values = 1.974, $p < 0.05$). Additionally, there was small effect size ($f^2 = 0.021$) as recommended by Cohen (1988). The result further confirmed that the values of confidence interval that corrected the bias of lower limit (LL = 0.017) and upper limit (UL = 0.23) were not straddled on zero values. Therefore, the hypothesis H1 was supported for this study. On the other hand, there was a positive and statistically significant relationship

between responsiveness and satisfaction ($\beta = 0.187$, t-values = 3.763, $p < 0.05$). Additionally, there was a small effect size ($f^2 = 0.051$) as recommended by Cohen (1988). The result further confirmed that the values of confidence interval that corrected the bias of lower limit (LL = 0.092) and upper limit (UL = 0.273) were not straddled on zero values. Therefore, the hypothesis H2 was supported for this study.

In addition, the finding found that there was a positive and statistically significant relationship between safety and satisfaction ($\beta = 0.322$, t-values = 5.493, $p < 0.05$). Additionally, there was small effect size ($f^2 = 0.181$) as recommended by Cohen (1988). The result further confirmed that the values of confidence interval that corrected the bias of lower limit (LL = 0.196) and upper limit (UL = 0.416) were not straddled on zero values. Therefore, the hypothesis H3 was supported for this study. In the final analysis, the finding revealed that there was positive and statistically significant relationship between tangible and satisfaction ($\beta = 0.345$, t-values = 5.976, $p < 0.05$). Additionally, there was a small effect size ($f^2 = 0.177$). The result further confirmed that the values of confidence interval that corrected the bias of lower limit (LL = 0.221) and upper limit (UL = 0.454) was not straddled on zero values. Therefore, the hypothesis H4 was supported for this study.

Table 4. Structural Model
(Source: Authors' own research)

Constructs	Beta	SE	T-Values	Sig Values	F ²	Confidence Interval	
						LL	UL
Reliability-> Satisfaction	0.127	0.064	1.974	0.049	0.021	0.017	0.23
Responsiveness -> Satisfaction	0.187	0.05	3.763	0	0.051	0.092	0.273
Safety -> Satisfaction	0.322	0.059	5.493	0	0.181	0.196	0.416
Tangible -> Satisfaction	0.345	0.058	5.976	0	0.177	0.221	0.454

4.7 Hypothesis Result

From the analysis, the result concluded that all the hypotheses tested, as depicted in Table 5, were supported for this study. The findings of this study

are aligned with the previous study conducted by Murambi and Bwisa (2014); Kurshid, et al. (2012) found that service quality dimensions are significantly related to the passenger satisfaction.

Table 5. Hypothesis Testing
(Source: Authors' own research)

Path Coefficient	Hypothesis Statement	Result
Reliability \Rightarrow Satisfaction	H1: There is a significant relationship between reliability and passenger satisfaction	Supported
Responsiveness \Rightarrow Satisfaction	H2: There is a significant relationship between responsiveness and passenger satisfaction	Supported
Safety \Rightarrow Satisfaction	H3: There is a significant relationship between safety and passenger satisfaction	Supported
Tangibility \Rightarrow Satisfaction	H4: There is a significant relationship between tangible and passenger satisfaction	Supported

5 Conclusions and recommendations

To conclude, ETS should be evaluated and assessed within a wider context, not only focusing on the service quality dimensions that were used in the current study. This study has deliberated that service quality dimensions namely reliability, responsiveness, safety and tangibility were significantly related to passengers' satisfaction. In addition, these dimensions explain 65.8% of the variance in the perceived passenger satisfaction toward ETS.

It means that 34.2% is explained by the other determinants. If Kuala Lumpur or Malaysia is to achieve to be a developed nation by 2020, the key improvement areas are being more reliable, safest, responsiveness, capable of attracting more patronage, thus

ensuring a more sustainable economic and social growth propagated by the Sustainable Development concept. Therefore, more research is needed in areas such as identification of the mode of transport used by the passenger to go to the nearest train station, as this also will influence the passenger's choice of using ETS.

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