

**Research Article**

**Passengers Preference and Satisfaction of Public Transport in Malaysia, Part II: A Comparative Analysis of Komuter and LRT Network**

<sup>1</sup>Rozmi Ismail, <sup>2</sup>Mohammad Hesam Hafezi and <sup>1</sup>Rahim Mohd Nor

<sup>1</sup>School of Psychology and Human Development, Faculty of Social Science and Humanities Universiti Kebangsaan Malaysia, Selangor, Malaysia

<sup>2</sup>Sustainable Urban Transport Research Centre (SUTRA), Department of Civil and Structural Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor Darul Ehsan, Malaysia

**Abstract:** This study presents a comparative analysis of passengers preference and satisfaction of two kinds of public transportation in Malaysia, namely, train commuter (KTM) and Light Rail Transit (LRT). One of the important issues regarding public transport is the passenger satisfaction. The main objective of this research is to describe traveler’s satisfaction and preference towards public transport with service quality attributes. Parameters in passenger preference and satisfaction on public transportation network are facilities, comfortness and quality of services. A survey was conducted public transportation network in Kuala Lumpur, Malaysia through a self questionnaire. They were 312 respondents voluntarily participated in this study. Result showed that passenger’s preference and satisfaction in the LRT services are better than Komuter. The application of this study suggested Komuter service need to improve their quality of service to attract more passengers.

**Keywords:** Commuter train, public transportation, satisfaction, preference, lrt, passenger

**INTRODUCTION**

In Major cities throughout the world, public transport network plays an important role. Workers,, students and tourist are expecting public transport could give them the best services. A relatively good public transportation network needs to provide easy access and cheaper cost to the users. However, in Malaysia the public transportation network and services are different as compared to other metropolitan cities. The use of Public transport in Malaysia is become the second priority because majority are-prefer to use their own vehicle for some reasons. Literatures have found that operating cost and fixed cost are an important and noticeable issue for Transit companies. Also, travelling with high level of facilities, convenience and quality are significant for passengers. Study on behavior of passengers towards the use of public transportation also is very important, not only for the customer but also for the companies involved.

In recent years, the number of vehicle owners in Malaysia is growing rapidly. At present, total number of registered motor vehicles in Malaysia is approximately 18 million. Table 1 shows the number of vehicles registered in Malaysia according to state in the year 2011 (Road Transport Department, Highway Planning Unit 2011). As shown in Table 1 majority of

Table 1: Motor vehicle registration in 2011

	State	Total
1	Perlis	70,802
2	Kedah	901,988
3	Pulau Pinang	1,914,865
4	Perak	1,667,663
5	Selangor	2,092,989
6	Federal Territory	4,012,840
7	Negeri Sembilan	722,220
8	Melaka	610,370
9	Johor	2,494,722
10	Pahang	715,334
11	Terengganu	396,548
12	Kelantan	567,644
13	Sabah	719,937
14	Sarawak	1,112,077
	Total	18,000,000

car owner are-in Selangor, Federal Territory and Johor states. Thus this lead to massive traffic jams in the city center and surrounding area (Hafezi and Ismail, 2011a).

To illustrate the rapid growth of the number of vehicle owners in Malaysia, the total numbers of motor vehicle registrations were compared from year 1990 to 2011. These comparisons are shown in Fig. 1. The graph shows that in 20 years the number of vehicle owners in Malaysia is increased around four times from 1990. On the other hand, road length and highway have limited growth and therefore it is not enough to accommodate massive growing in transportation. As

**Corresponding Author:** Rozmi Ismail, School of Psychology and Human Development, Faculty of Social Science and Humanities Universiti Kebangsaan Malaysia, Selangor, Malaysia

This work is licensed under a Creative Commons Attribution 4.0 International License (URL: <http://creativecommons.org/licenses/by/4.0/>).

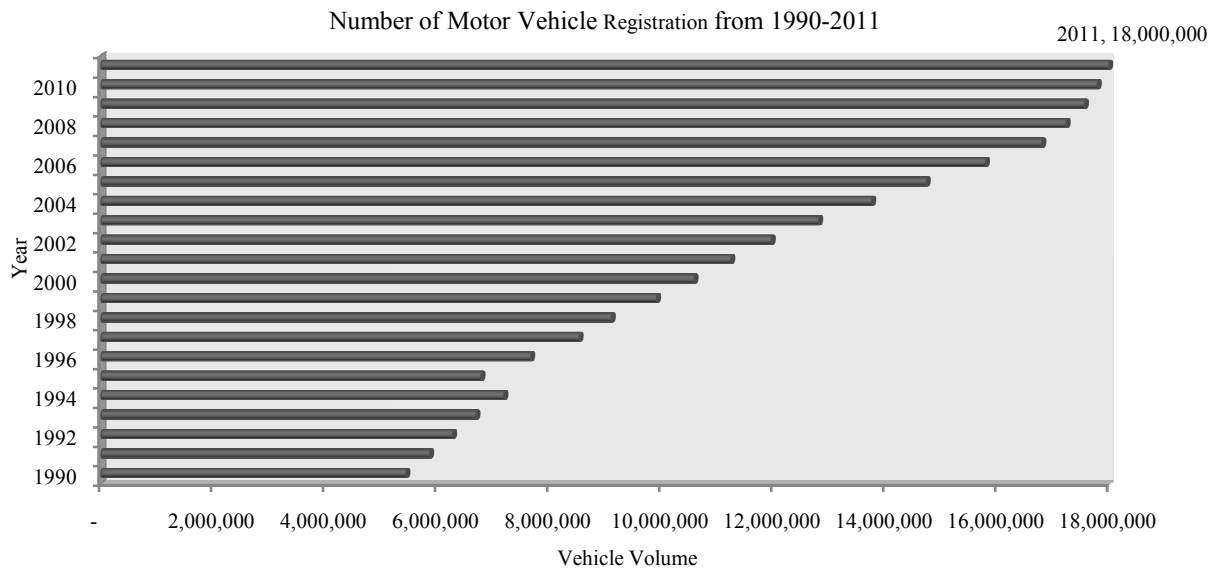


Fig. 1: Motor vehicle registration from 1990-2011

the number of registered vehicles increased rapidly, it led to cause other problems on the road which are road congestion, massive traffic jam as well as the increased of road accident.

In this situation, government policy encourages people to use public transportation instead of private car for reduction of traffic congestion, environmental concerns (Anable, 2005; Ambak *et al.*, 2009; Hafezi *et al.*, 2012), as well as air pollution (Hwe *et al.*, 2006; Borhan *et al.*, 2011). If the government did not take proper action to deal with this problem, it is predicted that in the next 10 years Malaysia will suffer with high level of congestion and other negative causes such as environmental pollution and operating cost. In Malaysia even though there are growing use of public transport such as commuter train, busses, minibus, Mass Rapid Transit (MRT), Light Rail Transit (LRT) and taxi, but these are become the last choice, because people more prefer private vehicle.

So it is important to understand why they do not like using public transport. The understanding of these issues can be summarize into two general parts which are satisfaction and punctuality. According to Oliver (1997), satisfaction is defined as the customer's fulfillment. It is a judgment about the product or service feature. It is also related to pleasurable level of consumption-related fulfillment, including levels of under- or over-fulfillment (Borhan *et al.*, 2011).

In line with this research problem, previous researcher such as Van Vugt *et al.* (1996) conducted an investigation of the motivational factors underlying the decision to commute by car or public transportation through filed out a questionnaire. The findings provided strong evidence for the conclusion that individuals prefer options yielding shorter travel time as well as an

alternative with high frequency of public transport. Beirão and Sarsfield Cabral (2007) found that portugese people are particularly looking at the importance of a cost friendly and less stressful public transport service. Passanger tend to choose rail transport because it is less stressful since there is no need to drive, possible to relax and one may be able to rest or read. Friman *et al.* (2001) conducted a mail survey to investigate factors affecting customer satisfaction in public transport service in Sweden. The results showed that overall cumulative satisfaction related to attribute specific cumulative satisfaction and remembered frequencies of negative critical incidents for instance the driver behaves unexpectedly bad or the bus is leaving before scheduled departure time. Smith and Clark (2000) and Ambak *et al.* (2009) found that safety issue as a constraint for people to choose public transport as travel mode of choice. Pick pocketing, overcharging facilitates overcrowding and lacks of supervision are the most related safety issue (Smith and Clark, 2000; Hafezi and Ismail, 2011b).

In this article we survey on traveler's satisfaction and preference towards public transport with service quality attributes through a comparative analysis between influences parameters in two kinds of public transportation (Komuter (KTM) and Light Rail Transit (LRT). in Kuala Lumpur and Selangor Target respondent is a Malaysian living in Selangor and Kuala Lumpur and has the experience of using public transportation.

## RESEARCH METHOD

In many research projects especially in social sciences, survey method is the most popular to method

of gathering such information and views. In this study the survey was conducted using face to face interview and distributing questionnaire to the target respondent. The questionnaire was designed according to research objectives proposed.

**Instrument/questionnaire:** The questionnaire was divided into three parts: First, demographics, the items consist of correspondent to city they live, age, sex, driving license, access to private transport mode and recommendation to use public transportation, second, travel pattern behavior, the related item concern about routine commute pattern, commute purpose, distance of travel, travel time, numbers of commute day in a week, majority daily transport of choice, and public transportation use pattern, third, items measuring satisfaction with parameters mentioned in research design. The questionnaire was developed based on Benchmarking in Asian Service of Public Transport survey's tool and previous research that conducted in Malaysia (Liden *et al.*, 2008). Respondents were asked to rate (1 to 7) their satisfaction to the item of overall satisfaction where 1 has low rate and 7 has high rate) and 14 items in specific quality attribute for public transport. Likert-type scale rate ranged from strongly disagree, disagree, neither agree nor disagree, agree and strongly agree.

This study employed a set of questionnaire asking about respondent preference and satisfaction toward public transport in Malaysia, which has two main sections. The first section is asking about the demographic profile of the respondents (such as gender, age, educational background, monthly income and occupation). This section can help to understand about variety of the people who use the public transportation. The second part is the information on KTM and LRT operation and facilities they offered. These information can help to analyze the travel pattern behavior, routine commute pattern, commute purposes, distance of travel, travel time, numbers of days commuting in a week, choice of daily transport, public transport use pattern and items measuring preferences and satisfactions with parameters mentioned in research design. The question was developed based on the identification of 15 different scopes of public transport services and facilities. It is believed that these parameters could be influences passenger's perception especially for the KTM and LRT operation. Table 2 summarized 15 different characteristics of public transportation in this present study.

The independent variables used in this study are respondents' preference and overall satisfaction toward public transport services in Malaysian. Dependent variables is specific service quality attributes which consist of public transport departure frequency, waiting time, fare, drivers behavior, punctuality, seat availability and comfortable, facilities inside the transportation means included music, baggage storing and air-condition, cleanliness, design and color of vehicle, travel information, facility for OKU (disable

Table 2: Characteristics of public transportation

Code	Characteristic
1	Waiting time
2	Cheap fare
3	Drivers/conductor behavior/service
4	Punctuality
5	Seat availability
6	Music
7	Baggage storing
8	Seat comfortness
9	Air-condition
10	Driver behavior
11	Cleanliness
12	Design and color of vehicle
13	Travel information
14	Facility for disabled person (OKU)
15	Facility for waiting
16	Coach for female only

person) and facility for waiting at stations. Data analysis using statistical tool carried out in two ways, to investigate both global and local satisfaction on public transportation.

**Respondents:** Target respondent is a Malaysian house hold that is in the range of age between 15 and 60, living in Selangor state and Kuala Lumpur and has the experience of using public transportation. The ages range 15 to 60 years old chosen because people in these age have a routine commute travel behavior and probably has taken public transportation as their mode of choice. From the age of 15, the children usually have to go to school that is not in their own neighborhood. After age of 60, people usually may not have routine commuter behavior because they already pension. Actually a total of 330 respondents were voluntarily agreed to participated and completed questionnaire. However, only 312 questionnaires were analyzed due to incomplete responses.

**Procedure:** Self-rating and handing out questionnaires were used as a data collection method in this study. Reasons of using three sections questionnaire to collect data are (1) The respondent has break time when fill out the questionnaire in order to understand the aim of each section questionnaire; and (2) questionnaire offers confidentiality. The respondents were asked to fill out the questionnaire at the station or at their convenient time. The data represents public preferences and satisfaction toward the conventional public transportation, which is very useful data the implementation of public transport in Malaysia.

### RESULTS OF A COMPARATIVE ANALYSIS BETWEEN COMMUTER (KTM) AND RAIL TRANSIT (LRT)

The main objective of this research is to describe the traveler's satisfaction and preference towards public transport with service quality attributes. Data Analysis was conducted in four steps; first descriptive analysis to

Table 3: Descriptive analysis of the demographic profile of the respondents

	N	Mean		S.D	Variance
		Statistic	S.E.		
Age	312	34.89	0.560	9.893	97.862
Sex	312	1.59	0.028	0.492	0.242
Total income	312	2859.40	106.677	1884.289	3550546.90
No. of vehicles owner	312	1.51	0.046	0.806	0.649
No. of motorcycle	312	0.89	0.048	0.855	0.732

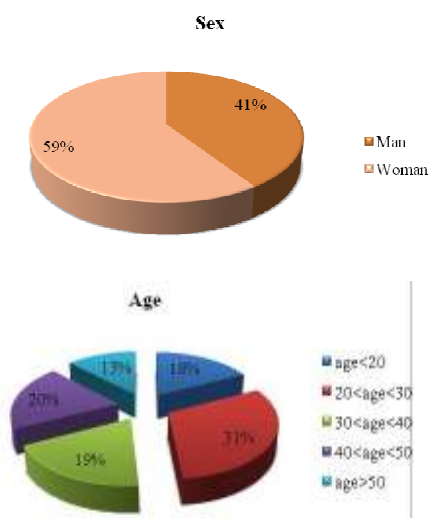


Fig. 2: Age and sex range of the respondents

Table 4: Frequency table

		Frequency	Percent	Cumulative Percent
KTM	No	186	59.6%	59.6%
	Yes	126	40.4%	100.0%
	Total	312	100.0%	
LRT	No	235	75.3%	75.3%
	Yes	77	24.7%	100.0%
	Total	312	100.0	

Table 5: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.804
Bartlett's Test of Sphericity	Approx. Chi-Square	1792.469
	df	105
	Sig.	0.000

highlight respondent characteristics. Second, correlation analysis was undertaken to measure linear correlation between variables. Then factor analysis was performed to identify group or cluster of variables. Fourth, a regression analysis was performed to evaluate the contribution of each factor on overall satisfaction.

Table 3 shows the descriptive analysis of the demographic profile of the respondents. As shown in Table 3 and Fig. 2 respondent age are between 18 and 69 (mean = 35 years), about (59%) of respondents are females and (41%) are male. Majority have owned at least one vehicle and motorcycle. Majority of respondents are working with the average monthly income is RM 2800 per-month.

Regarding frequency of using public transport, the study found that LRT is more popular than KTM.

Table 6: Analysis of Principal Component Analysis (PCA) for each item

Item	Components Rotated Component Matrix <sup>a</sup>			
	1	2	3	4
14	0.775			
13	0.747			
15	0.724			
10	0.607			
11	0.521			
2		0.766		
4		0.683		
3		0.595		
8			0.732	
5			0.699	
7			0.595	
9			0.590	
6				0.794
12				0.777
Eigen values	3.374	2.044	2.617	1.571
% Variance	12.789	25.790	16.462	7.761
				$\Sigma = 62.80\%$

<sup>a</sup>. varimax rotation method with normalization rulers

Table 4 shows the frequency table included two questions from respondents for using the KTM and LRT network.

According to Table 4 most of respondents (59.6%) don't used the KTM network. On the other hand, around 24.7 % of them only used LRT. Table 5 shows the KMO and Bartlett's test analysis for the constructs in the proposed model. The analysis found that the measurement of sample adequacy (MSA) KMO is 0.804 more than 0.5 (minimum value) and that the data suitable for analysis of Principal Component Analysis (PCA). Similarly, Bartlett Sphericity test values were significant ( $p < 0.001$ ), suggesting that the variables are closely related to each other and suitable for further analysis. Analysis of the suitability of the measurement matrix revealed that all the items in the MSA meet the compatibility matrix ( $p > 0.05$ ) and so are all the commonality in the range 0.4 to 0.7.

The Principal Component Analysis (PCA), the values of the scale (loading), eigenvalues and percentage changes shown in Table 6. Varimax rotation methods were performed to produce the maximum value of the scale factor. The results shows that four factors were produced and the value of each item exceeds the value 0.4. These four factors are facilities, services, comfortness and vehicle design, respectively. While the eigenvalues of these four factors are 3.374, 2.044, 2.617 and 1.571, respectively, with 62.80% of

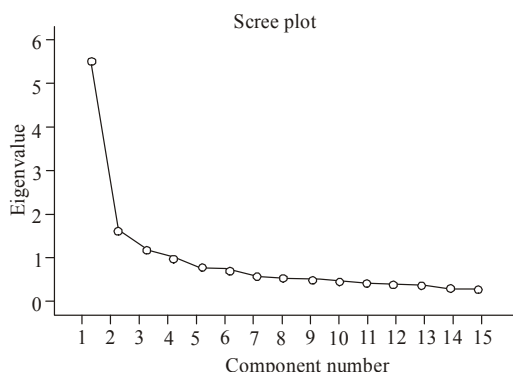


Fig. 3: Plot of the components in the model skri

the total variability that can be explained. Meanwhile, the scree plot in Fig. 3 also shows that there are four components that have eigenvalues  $\geq 1.0$ .

In this study multiple regression analysis was performed to asses the contribution variable for the preference model for the KTM and LRT network. Table 7 shows the ANOVA summary table or analysis of variance of the dependent variable and independent

variable of preference model. The analysis found that the F-test show that there is a significant relationship ( $p = 0.000$ ) between the dependent variable (preference) with the independent variables (convenience, comfortness and quality of services) in both kinds of public transportation, namely, KTM and LRT network.

Table 8 shows the regression coefficients for preference model. The analysis of all variables included facilities, services, comfortness and vehicle design has a significant relationship ( $p < 0.05$ ), with variable preference. Facilities can be summed variables have a positive influence for the KTM and LRT network ( $\beta_1 = 0.546, 0.578$ , respectively) on the preference of the respondents use public transport more than the services of variable for the KTM and LRT network ( $\beta_2 = 0.478, 0.478$ , respectively), comfortness for the KTM and LRT network ( $\beta_3 = 0.368, 0.386$ , respectively) and vehicle design for the KTM and LRT network ( $\beta_4 = 0.394, 0.509$ , respectively). Provisional value of  $R^2$  can explain the influences of independent variables on the dependent variable. According to Fig. 4 this explains shows that 86.8 and 95.4, respectively percent of

Table 7: Summary of ANOVA table HBM model

ANOVA <sup>b</sup>						
Model	Total power of two	d.k	Mean square	F	Sig.	Model
1 (KTM)	Regression	85686.096	4	29785.872	1205.397	0.000 <sup>a</sup>
	Error	15942.982	310	23.406		
	Total	104598.862	312			
2 (LRT)	Regression	88570.9432	4	29457.937	1238.844	0.000 <sup>a</sup>
	Error	16417.381	310	27.686		
	Total	124693.653	312			

<sup>a</sup>: Predictors (constant): facility, services, comfortness and vehicle design; <sup>b</sup>: Dependent variables: Preference

Table 8: Preference coefficient regression model

Coefficients <sup>a</sup>							
	Model	Non-standardized coefficients		Standardized coefficients		Sig.	R <sup>2</sup>
		B	Standard Error	$\beta$	t		
KTM	(Constant)	-4.644	1.458		-2.753	0.012	0.868
	Facility	1.765	0.069	0.546	19.854	0.000	
	Services	0.875	0.065	0.478	14.785	0.000	
	Comfortness	0.897	0.061	0.368	14.694	0.000	
	Vehicle design	0.901	0.0469	0.394	16.045	0.01	
LRT	(Constant)	-3.328	1.385		-1.976	0.009	0.954
	Facility	1.485	0.032	0.578	18.654	0.000	
	Services	0.345	0.049	0.487	16.943	0.000	
	Comfortness	0.844	0.029	0.386	14.876	0.000	
	Vehicle design	0.753	0.069	0.509	15.684	0.00	

<sup>a</sup>: Dependent variables: Preference

Table 9: Summary of ANOVA tables satisfaction model

ANOVA <sup>b</sup>						
Model	Total power of two	d.k	Mean Square	F	Sig.	Model
1 (KTM)	Regression	8864.985	4	109834.578	3356.654	0.000 <sup>a</sup>
	Error	16872.345	310	34.873		
	Total	157984.345	312			
2 (LRT)	Regression	8632.8754	4	103587.433	3023.323	0.000 <sup>a</sup>
	Error	15492.234	310	38.312		
	Total	127839.539	312			

<sup>a</sup>: Predictors: (constant): facility, services, comfortness and vehicle design; <sup>b</sup>: Dependent variable: satisfaction

Table 10: Satisfaction coefficient regression model

Coefficients <sup>a</sup>		Non-standardized coefficients		Standardized coefficients	t	Sig.	R <sup>2</sup>
Model		B	Standard Error	$\beta$			
KTM	(Constant)	2.786	0.597		4.568	0.000	0.843
	Facility	2.476	0.076	0.901	53.765	0.000	
	Services	1.874	0.067	0.571	36.432	0.000	
	Comfortness	1.397	0.049	0.393	32.568	0.000	
	Vehicle design	1.457	0.068	0.491	33.753	0.001	
LRT	(Constant)	2.4365	0.432		5.153	0.009	0.981
	Facility	2.9684	0.043	0.956	50.424	0.000	
	Services	1.9563	0.049	0.684	33.543	0.000	
	Comfortness	1.4874	0.019	0.595	29.324	0.000	
	Vehicle design	1.521	0.043	0.753	34.354	0.000	

<sup>a</sup>: Dependent variable: satisfaction

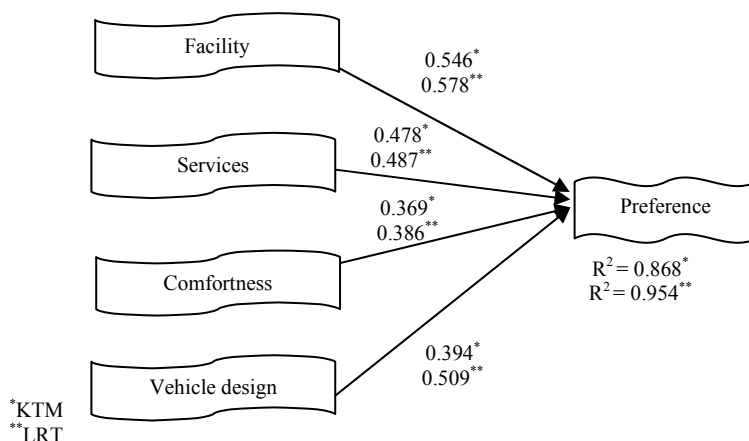


Fig. 4: Regression model preference for public transport

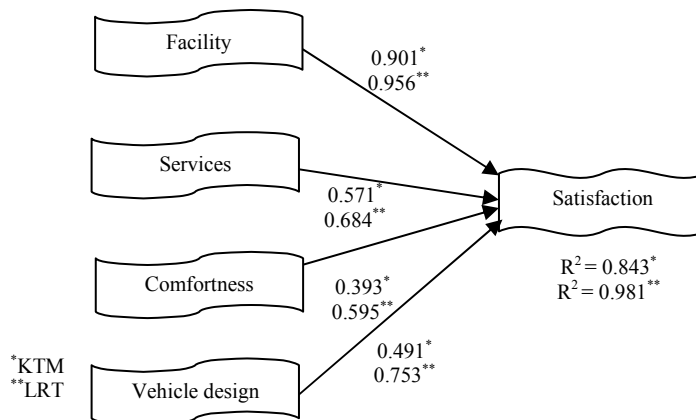


Fig. 5: Satisfaction regression model for public transport

variation in preference the KTM and LRT network can be explained by the variables of facilities, services, comfortness and vehicle design.

Table 9 shows the ANOVA summary table or analysis of variance of the dependent variable and independent variables of model satisfaction for the KTM and LRT network. The analysis show that there is a significant relationship ( $p = 0.000$ ) between the dependent variable (satisfaction) with the independent

variables (convenience, comfortness and quality of services).

Table 10 shows the regression coefficients for satisfaction model for KTM and LRT network. The analysis of the variables included facilities, services, comfortness and vehicle design has a significant relationship ( $p < 0.05$ ), with variable satisfaction. The model of satisfaction presented in Fig. 5 showed that facility can be summed variables have a positive

influence ( $\beta_1 = 0.901$  and  $0.956$ ) on the preference of the respondents used KTM and LRT network, respectively, more than the services of variable for KTM and LRT network ( $\beta_2 = 0.571$  and  $0.684$ ), comfortness for KTM and LRT network ( $\beta_3 = 0.393$  and  $0.595$ ) and vehicle design for KTM and LRT network are ( $\beta_4 = 0.491, 0.657$ , respectively). Provisional value of  $R^2$  can explain many variations by the independent variables on the dependent variable. This explains show that 83.5 and 98.1% of variation in satisfaction KTM and LRT network, respectively, can be explained by the variables of facilities, services, comfortness and vehicle design.

### DISCUSSION AND CONCLUSION

The main objective this study is to compare the customers' preference and satisfaction toward Malaysian public transportation network especially LRT and KTM network. It is understand that Malaysian public transport services is far left behind in terms service quality compared to other developing countries. Results have revealed that passengers' preference and satisfaction in LRT network is higher (better) than KTM network. In addition, this study found that respondents have shown to rate their satisfaction level as lower than preference levels. This indicates that the quality of Malaysian public transportation network (LRT and KTM network) is under the travelers' expectation of the service. The study also found four factors that contribute to preference and satisfaction of public transport which are facilities, services, comfortness and vehicle design. Correlation analysis suggested that these four attributes have significantly correlated with cheap fare, music, seat comfortness and travel time. People are prefer for good service quality but at the same time their satisfaction after use public transport below than expected. Overall it was found that majority of respondents have rated as unsatisfied with the Malaysia public transport. In this regards public transport operator must improve their service performance.

High increasing motorization in Malaysia causes many problems in traffic congestion, a high level of pollution, a high consumption non-renewable energy resource, a threat to quality of life and a high number of traffic accidents. Public transportation network should become the solution for sustainable transport in the future, which is the reason to increase customer satisfaction. High quality public transportation not only keep customer to continue using public transport to fulfill their travel demand but also attract potential customer. The functional factor has a strong influence on customer satisfaction and need a higher attention to improve customer satisfaction. Frequency, price, punctuality and travel time are the crucial factor that is responsible in bringing higher level of satisfaction.

### ACKNOWLEDGMENT

The authors would like to acknowledge Universiti Kebangsaan Malaysia (UKM) and the Malaysian of Higher Education (MOHE) for research sponsorship under project UKM-AP-CMNB-20-2009/5.

### REFERENCES

- Ambak, K., R. Atiq and R. Ismail, 2009. Intelligent transport system for motorcycle safety and issues. *Eur. J. Sci. Res.*, 28(4): 601-612.
- Anable, J., 2005. Complacent car addicts or aspiring environmentalist? Identifying travel behaviour segments using attitude theory. *Transp. Policy*, 12(1): 65-78.
- Beirão, G. and J.A. Sarsfield Cabral, 2007. Understanding attitudes towards public transport and private car: A qualitative study. *Transp. Policy*, 14(6): 478-489.
- Borhan, M.N., R.A.A.O.K. Rahmat, A. Ismail and R. Ismail, 2011. Prediction of traveling behavior in putrajaya, Malaysia. *Res. J. Appl. Sci. Eng. Tech.*, 3(5): 434-439.
- Friman, M., B. Edvardsson and T. Gärling, 2001. Frequency of negative critical incidents and satisfaction with public transport services. *I. J. Retailing Consum. Serv.*, 8(2): 95-104.
- Hafezi, M.H. and A. Ismail, 2011a. Interaction between bus stops location and traffic on bus operation. *Appl. Mech. Mat.*, 97-98: 1185-1188.
- Hafezi, M.H. and A. Ismail, 2011b. Study behaviour of passengers on transit operation. *Appl. Mech. Mat.*, 97-98: 1154-1157.
- Hafezi, M.H., A. Ismail and A.A. Shariff, 2012. A comparative analysis of fare collection system on bus operations. *J. Appl. Sci.*, 12(4): 393-397.
- Hwe, S.K., R.K. Cheung and Y.W. Wan, 2006. Merging bus routes in Hong Kong's central business district: Analysis and models. *Transport. Res. A Pol.*, 40(10): 918-935.
- Liden, S.B., M. Felleson, L. Haglund and H. Sutomo, 2008. Bringing the Customer into Public Transport Development-a Pilot Study of Service Quality in Public Transportation in Indonesia. Paper for Hong Kong Seminar Edn., Hong Kong.
- Oliver, R.L., 1997. *Satisfaction: A Behavioral Perspective on the Consumer*. McGraw-Hill, New York.
- Road Transport Department, Highway Planning Unit 2011
- Smith, M.J. and R.V. Clarke, 2000. Crime and public transport. *Crime Justice*, 27: 169-233.
- Van Vugt, M., P.A.M. van Lange and R.M. Meertens, 1996. Commuting by car or public transportation? A social dilemma analysis of travel mode judgements. *Eur. J. Soc. Psychol.*, 26(3): 373-395.