Jurnal Teknologi

An Investigation Into Qualitative Differences Between Bus Users and Operators for Intercity Travel in Malaysia

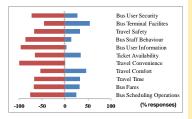Anil Minhans[a*], Shamsuddin Shahid[b], Ishtiaque Ahmed[b]

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Graphical abstract

Abstract

Public transport usage in Malaysia is showing a downward trend. Despite major improvements implemented as well as intended for public transport, the bus user satisfaction is constantly on a decline. This study investigated qualitative differences between bus users and operators based on 11 pre-selected quality attributes for an intercity travel in Malaysia with a predominant public transport mode– the Bus. The perceptions were measured via responses on a likert scale to establish differences. Perceptual, socio-economic and trip data were collected using questionnaire from bus users and operators on a pre-selected route-Johor Bahru to Kuala Lumpur (JB-KL). Analyses used statistical tools particularly correlation analyses, step-wise multiple regression analyses, Mann Whitney test methods and Wilcoxon test. Quadrant analyses established relationship between relative importance and satisfaction from quality attributes. Results indicate significant correlation differences in both groups on attributes viz. 'bus fares' 'travel comfort', 'travel convenience', 'ticket availability' and the 'facilities at the bus terminal'. Study revealed significant gaps in the understanding about the composition of bus service-quality by operators. Alternate hypothesis were rejected as bus users and operators reveal significant perception differences on quality attributes–'bus fares', 'travel comfort' and 'bus staff behaviour'. The satisfaction levels of four extremely important quality attributes viz. 'bus fares', 'travel comfort', 'bus staff behaviour' and 'bus user security' were found low to average. Similarly major deterrents of the bus patronage were appraised. In this endeavour, the research exploited knowledge of perceptions to suggest quality attributes that are necessary to improve public transport ridership and consequently the modal share of public transport in Malaysia.

Keywords: Bus users' satisfaction; perception; bus quality attributes; trip characteristics; bus quality characteristics

1.0 INTRODUCTION

Public transport in Malaysia is going through a rapid transformation to meet the ever increasing mobility needs of people. With a few exceptions of cities like Kuala Lumpur, development of present-day public transport is generally poor [1]. In many cities, the share of public transport for private trips is constantly declining. Data indicate that modal shares have decreased from nearly 35% in the year 1985 to 16% in the year 2011 [2]. Some newer estimates even suggest lower public transport modal shares of 5% during morning peak hours in urban transport [3]. In the Greater Kuala Lumpur area which has the best transit system in the country, the modal share for public transport is only about 20% [4]. Furthermore, in some semi-urban and peri-urban areas, car is the only mode available for satisfying mobility needs of most people. All the above facts demonstrate that car as a preferred travel mode among Malaysians. One of the causes may be partly attributed to the high subsidies that are provided for car travel as compared to any other urban transport mode [5]. Previous studies have revealed reasons such as poor

availability, poor brand image and poor service quality of public transport as major deterrent to its use [6]. Unlike many developed countries, public transport in Malaysia has failed on many accounts to emerge as a priority, a competitive mode or a public welfare mode. In many developed countries that have efficient public transport systems, a surge in modal shares of public transport is seen. Ever increasing patronage is possible while regarding private transport as intermodal transport benefiting public transport. Exclusion of private transport is discarded by many as a future solution to transport problems. Rather, if regarded appropriately is seemed to provide the solution to ever increasing mobility needs. Many European cities such as Frankfurt, Amsterdam, London, Stockholm and Paris have adopted holistic development of multi-modal transport as solution to mobility crises of recent times.

In the UN climate change conference, the Copenhagen Accord was adopted to replace Kyoto Protocol. Within the purview of this accord, Malaysia has committed to 40% reduction of carbon emissions by the year 2020 compared with 2005 levels. Clearly, development of public transport is instrumental towards

achieving such ambitious goals. Many studies reveal that transport sector amounts to 28% Green House Gases (GHG)[7], of which, cars and trucks combined together contribute to 80% GHG from transport sector [8]. Also, total transport sector is believed to consume 70% of total petroleum products [9]. Traffic experts debate that transit modes can secure more than double the mobility demand (trip-km) with the amount of petroleum used in personalised transport [10]. Some even argue that total costs of traveling by car ignore the external costs to ecology, environment and society [11]. All the above considerations including goals of accessibility, mobility, safety and economics justify a great requirement to develop public transport in Malaysia. Notwithstanding the UN commitment to cut GHG and the overall goal to improve environmental quality, car ownership is rising in Malaysia such that it is placed third in the world with 93% car ownership. This phenomenon is attributed to high subsidies on fuel, soft loans, overall low cost of travel by car (parking, vehicle taxes etc.) and significantly due to an underdeveloped public transport. Furthermore, vehicle sales in Malaysia are dominated by local car manufacturers by virtue of government policies (on tariff and non-tariff barriers) that protect the local automotive industry. Equally contributing to the rise of personalised vehicles is unavailability of public transport, poor transport services, and poor image of public transport. These forces prevent the users from using alternative modes such as buses, trains, taxis etc [12]. Process of operational planning in public transport envisages greatly on the travel needs and the public attitude formation towards quality of travel and patronage. This study attempts to investigate the factors affecting quality of inter-state bus travel, and consequently its role in satisfying users. It analyses the perceptions of passengers with operators, and attempts to understand the differences. The study of such differences on quality aspects is extremely necessary to find gaps. Thereby, this study suggests a general advice to counter such differences. In this endeavour, the importance of quality factors and their role in the overall satisfaction of user are further identified.

Different sources of information on customer satisfaction are reviewed in this study. However, there are limited details to allow the comparisons between passenger's and the bus operator's point of view in Malaysian context. These are important to understand whether the operators and users relate to the quality in a similar manner. Few studies have been conducted in the past to gain information regarding the effectiveness of bus services as they involved multiple stakeholders, resources and planning efforts by both the bus operators and the local authorities of Malaysia [13-15]. This study is conducted keeping satisfaction survey approach in consideration to investigate the degree of satisfaction that the bus users' enjoys during their travel. Passenger perceptions can reveal type of quality related improvements necessary to increase patronage. The expectations of the study are towards developing an understanding on aspects of planning, operational design, scheduling, and traffic management of public transport system particularly for a typical interstate route (JB-KL route). This paper also delivers the critical information about the strategies to improve the effectiveness of bus travel from bus users' and operators' perspective through the evaluation of compiled socio-economic data, trip data and travel behaviour data. The following key objectives were underlined for this study:

i.   To study the factors those contributes towards the bus users' satisfaction.
ii.   To assess the perceptions of bus users and operators towards satisfactory intercity bus travel.
iii. To identify the main factors that improve bus user perceptions towards quality of intercity bus travel.

Finally, this research concludes by extending a few suggestions to improve bus user's satisfaction.

2.0 LITERATURE REVIEW

The increasing travel demand and preferences in using private vehicle is causing traffic congestion around the world. Most people are now highly dependent on private vehicles.[16] This problem is attributed to the attractiveness of car which lots of people prefer to drive. Congestion results in longer travel times for many bus passengers as well as car users [17]. In addition to congestion, private vehicle usage is also affecting the safety of the road users [18], a high consumption of non-renewable resources [19], and causing serious threat to the quality of human environments [20]. In order to prevent the problems caused by this increase in private vehicle usage, traffic experts highly recommend the city authorities to provide an attractive public transport service as an alternative. Many advocacy forums suggest public transport as the solution for sustainable transport in the future such as L'Union internationale des transports publics (UITP), Institute of Transportation and Developmental Policy (ITDP), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) etc. However, in order to attract more passengers to use public transport, the key players must provide high service quality offerings and a wide range of mobility options to different customers [21-22]. It is therefore, extremely important to gain the knowledge about needs of public transport users' and critically assess their satisfaction or dissatisfaction to plan, design, develop and operate an attractive public transport system.

Public transport operators as well as city authorities are now realizing the importance of customer satisfaction. Customer satisfactions are used as measurement values to indicate the success of the operation of public transport companies. According to Oliver [23] and Budiono [24], satisfaction is defined as the customer's fulfilment of their needs. It is a judgment that a product or service feature, or the product or service itself, gives a pleasurable level of consumption-related fulfilment, including levels of under or over fulfilment. Needs fulfilment is a comparative processes giving rise to the satisfaction responses. According to Parasuraman *et al.* [25], service quality is defined as a comparison between customer expectation and perception of service. Service quality in general consists of five distinct dimensions which are tangibility (physical facilities, equipment, and appearance of personnel), reliability (ability to perform the promised service dependably and accurately), responsiveness (willingness to help customer and provide prompt service), assurance (knowledge and courtesy of employees to inspire trust and confidence), and empathy (caring and individualized attention the firm provides to its customer). The relationship between quality and satisfaction is complex, due to a high reliance on the performance dimension used in quality judgments than those used in satisfaction judgments. Performance based quality is a result of ideal expectation and preference of individual consumer. Quality is one of the key dimensions which focus on consumer's satisfaction judgments. Quality is the totality of features and characteristics of a product or service that relies on its ability to satisfy stated and implied needs. Thus, service features determine quality which in turn satisfies consumer needs.

Gatersleben and Uzzell [26] investigated the effective experiences of daily commute using surveys involving Surrey University's employees. The results revealed that commuting by car as well as by public transport can be stressful because of delays caused by the traffic volume. Public transport was considered as unpleasant as public transport users' expressed more negative attitudes toward their daily commute than users of other transport modes. The negative attitudes were related to stress as well as boredom caused by unusual delays and longer waiting time. Gatersleben and Uzzell [27] also suggest that public

transport is stressful due to unpredictability and longer travel times.

The UK Department for transport has also conducted several studies regarding customers' need in public transport. Service attributes such as frequency of services; services that are reliable and fares that offer value for money are revealed as most important needs of UK public transport users. Such studies have also revealed that buses need to have a broad range of destinations to fulfil travel demand of customers [28]. Public transport users have also reported the importance of understandable time table information at the bus stops and in local newspapers in order to make them aware of the services (Department of Transport 2013)[29]. Furthermore, simple ticketing is also revealed as an important consideration in order to influence users to use more public transport.

Fujii *et al.* [30] conducted an investigation in Osaka, Japan during a temporary closure of freeway that connected between Osaka and Sakai City. The survey was distributed at three tollgates from 6:00 am to 8:30 am. An important finding was that the closure of the freeway increased public transport use. Secondly, it was also found that the expected commute time by public transport was overestimated by automobile commuters. Finally, people who corrected their commute time continued to use public transport when the freeway was reopened.

Vugt *et al*. [31] conducted an investigation of the motivating factors underlying the decision to commute by car or public transport. A total of 192 employees of a publishing company participated and filled in a questionnaire containing questions relating to social value orientation, the commuting situation and a series of post-experimental questions. The findings provided strong evidence to support conclusion that individuals preferred options yielding shorter travel time as well as frequent public transport.

Fellesson and Friman [32] conducted a transnational comparison of customers' perceived service- satisfaction involving public transport in eight cities (Stockholm, Barcelona, Copenhagen, Geneva, Helsinki, Vienna, Berlin, Manchester and Oslo) in Europe. The result showed supply, reliability, information and bus stop environment as key factors affecting users' opinion. Furthermore, it was concluded that differences in public transport technology and infrastructure may cause differences in individual satisfaction level.

Eboli and Mazzulla [33] investigated the importance of service quality attributes for customer satisfaction with a bus transit service in Cosenza, Italy. Respondents were asked to rate the importance and satisfaction with 16 service quality attributes [bus stop availability, route characteristics, frequency, reliability, bus stop furniture, bus overcrowding, cleanliness, cost, information, promotion, safety on board, personal security, personnel, complaints, environmental protection and bus stop maintenance]. The result shows how important the reliability, frequency, information, promotion, personnel and complaint are to satisfy the passenger needs.

Beirão and Sarsfield Cabral [17] summarises the advantages in using public transport according to Portugal public transport users. The result highlights the importance of a cost effective and less stressful public transport service. Public transport was perceived as less stressful since there was no need to drive, it was possible to relax and one was able to read or rest. Travel time on exclusive bus lanes was found faster than the Car. There were significantly less overall exhaust emissions. Furthermore, there were opportunities of socialising with fellow passengers while travelling. Beirão had also conducted in-depth interviews in Porto to find out dissatisfying factors. Customers reported factors e.g. wasted time during waiting and idling, over-crowded conditions, lack of comfort, uncertainty of time, lack of control, unreliability,

long waiting times, need to transfer, inability to change route to avoid traffic congestion, lack of flexibility, and long walking time emerged as the most dissatisfying factors concerning public transport.

Fellesson and Friman [34] conducted a mailed survey to investigate factors affecting customer satisfaction in Sweden towards public transport. The results showed that overall satisfaction was highly dependent on the attributes that customer feels important. Also, it is highly related to the remembered frequencies of negative critical incidents such as the unexpected bad behaviour of driver or the departure of bus before its planned schedule. Friman examined the effect of quality improvements in public transport on customer satisfaction and frequency of perceived negative critical incidents. The studies were conducted in 13 regions in Sweden probing quality improvements in public transport. Data were collected before and after implementation. Comparison of passenger reaction was considered a way to understand the type of improvement necessary to enhance customer satisfaction. The study concluded that customer satisfaction was influenced by quality improvements only to a limited extent. Furthermore, the effect was directionally opposite in that respondents reported less satisfaction and higher frequencies of negative critical incidents after the quality improvements had been implemented. Thus, quality improvements do not always boost customer satisfaction.

Safety and security issues were found by Smith and Clarke [35] as a constraint for people to choose public transport as preferred choice of travel mode. Pick pocketing, overcharging in conjunction with overcrowding and lack of supervisory control were deemed as important factors dissuading public transport use. UK Department for Transport reported that young people were also involved in vandalism, damage of public property as well as other crimes involving public transport. These factors are found to have significant effect on the public transport usage by patrons. Also, service recovery and information about service improvement do not always seem to increase customer satisfaction. Many studies revealed that environmental concerns such as reducing pollution and congestion could become an effective campaign to attract people using public transport [36-38]. Research shows that public transport is still an alternative and attractive mode of travel choice for lots of people all over the world.

◼ 2.0 RESEARCH METHODS

This assessment involves the inter-city bus travel between cities of Johor Bahru (JB) and Kuala Lumpur (KL), Malaysia. The survey was divided into two main parts: bus users' survey and operators' survey. Both surveys sought information by investigating whether the bus operators and governmental policies are considerate towards bus users' needs as a priority.

The passenger surveys were conducted at both Larkin Terminal (Johor Bahru) and Terminal Bersepadu Selatan (Kuala Lumpur). The survey focusing on ten bus operators were conducted to seek opinions. The research methodology included the pre-orientation of respondent's to prevailing quality-related issues and problems of intercity bus travel from Johor Bahru to Kuala Lumpur. A pilot study was conducted to determine a comprehensive set of attributes that bus users, operators and experts believed to describe the quality of travel in Malaysia. A total of 36 sub-attributes were initially chosen and this effort simplified the selection of 11 service-quality attributes finally for studying the differences between the users' and operators' perceptions. These were related to: (i) bus-scheduling operations, (ii) bus fares, (iii) travel time, (iv) travel comfort, (v) travel

convenience, (vi) ticket availability, (vii) bus-user information, (viii) bus-staff behaviour, (ix) travel safety, (x) bus-terminal facilities and (xi) bus-user security. Equally, sub-attributes were statistically clustered to aid the statistical analyses.

Questionnaires were distributed at both Larkin terminal in Johor Bahru and TBS terminal in Kuala Lumpur, where bus users boarded or alighted. The sampled bus users completed the survey and the collection was done instantaneously. The questionnaire-based surveys were conducted at the end of the trip which covered both an outward and return trip, in order to represent the range of the individual bus users' journeys on each route. Furthermore, careful consideration was made to ensure that bus users' responses were addressed to specific bus operators. By this consideration, the bus users' responses were only referred to the specific bus operator and the comparison between operator and passenger perceptions were made more representative.

Since, the bus operators had no central database containing information about the operating elements such as headway, capacity, cycle time, operating time, operating speed, costs etc. of all the services run by them, sampling plans were derived on the basis of various sources such as regional websites, individual operator websites in addition to publicly available timetables (where possible). This information was deemed important for defining many service quality attributes. All the relevant bus operators were notified by a letter of authority to gain their cooperation. Also attention was given to ensure the reliability of data i.e. respondents who had 2 years patronage or more were chosen.

Survey questions were framed based on extensive literature review on customer needs and satisfaction in the Malaysian context. Hence a frame of reference was developed to ensure the validity of comparisons and further analyses. Also, data collection was restricted to a short span of four days to minimise any changes that might occur in opinion as a result of longer duration of data collection. The questionnaire, for this purpose, was a 4-page self-administered set of questions, handed out to passengers that used the same bus. Below is a summary of the type of data collected from the questionnaire.

— personal data such as age, gender, household size, income status, auto-ownership education etc.
— trip data such as origin-destination, location, travel time, access and travel distance, travel costs etc.
— perception and satisfaction data regarding bus travel elements containing but not limited to- headway, punctuality, comfort, convenience, bus-staff conduct, facilities at station, other important aspects of journey etc. It also included the study of preferences those contribute to satisfaction among different bus users and their relative importance in defining quality of travel.
— Unstructured miscellaneous data which respondents thought it to be appropriate and necessary. An open space was demarcated for receiving comments.

This research took account of both secondary and primary data.

Additionally, information was also obtained through observations, mainly about local site conditions, bus-related quality problems, prevailing passenger demand at certain time periods and passenger behaviour. The samples were collected at the terminals to generate as close as possible the accurate number of responses from each operator as well as bus user. The sample sizes were chosen to have low margins of error to enable comparison across results. A total of 10 operators and 100 passengers were finally analysed. Samples sizes of 100 generate results with a maximum margin of error of around 0%, for both passenger (100) and operator samples (10). The multivariate analysis was done on the data for each respondent [bus user and operator] to find out the most agreed and disputed statements [level-of-agreement]. The specific multivariate technique was conducted for descriptive correlation among attributes of interests using SPSS software.

All qualitative sub-attributes were evaluated using a five-point Likert scale of 1 to 5 in the increasing order of their travel satisfaction or bus quality perceptions. Thereby, the number '1' indicated the worst and '5' indicated the best service respectively. The number '3' was used as the mid-point which meant a neutral state. Information was mostly obtained through self-completed questionnaire. The questionnaire was designed to reflect the profile of bus users in different socio-economic groups. Later, the respondents were briefly interviewed to obtain general and specific information regarding the existing situation of bus services, and the measures that they believe could improve effectiveness of bus travel.

The satisfaction level on different service quality attributes, relations among service quality attribute in both bus users' and operators' opinion and their differences were analysed. Statistical analysis such as estimation of median and standard deviation of responses, Pearson correlation among the service quality related issues, and Mann-Whitney U test between passenger and operator responses were conducted. The Mann-Whitney U test between the bus users and the operator's responses is conducted to understand the difference in opinions among bus users and operators on bus service quality.

Median Scores were calculated to understand the satisfaction level of respondents via different questions related to bus service quality. The median values of bus user and operator responses to different survey quality attributes were examined [Table 7]. A high median value meant high satisfaction and a low median value meant a low level of satisfaction. Similarly comparison on the satisfaction levels of bus users and operators on different service quality issues were also drawn.

Eleven alternate hypotheses were finally formed to analyse the responses of bus users and operators [Table 7]. Disagreements and agreements in responses were based on the mean, median and standard deviation. For example, regarding the bus cleanliness [Hypothesis 4], of the bus user responses is 3, which means bus cleanliness as average. On the other hand, median value of 4 for operator's responses to the same question means that satisfaction level of operators regarding this attribute is higher than bus users, thereby indicating disagreement.

The mean and median scores of the responses by bus users and operators were obtained [refer Table 7] and later tested for the significance of mean. This is conducted to understand the unanimity or dispute of respondents to a certain question addressing a particular quality attribute. If the mean of the responses to a certain question is statistically significant, it can be considered that the most of the responses are near to mean response. In other words it means that most of the respondents agree in their opinion. On the other hand, a non-significant mean of responses indicates that the respondents are very diverse in opinion and therefore, they have not agreed to a particular opinion. In the present study, non-parametric Wilcoxon test is carried out to measure the significance of mean score of the responses.

Data Analysis was conducted in three steps; first correlation analysis was undertaken to measure linear correlation between variables. Also, regression analyses were conducted to examine the attributes constituting overall quality. Then, comparison analysis was performed between bus user and operator to evaluate the overall satisfaction of travel. Third, a relationship analysis using Quadrant analysis between satisfactory and important factors was performed to evaluate the key quality factors.

Quadrant analyses suggested the most important attributes and their corresponding derived-satisfaction levels.

■3.0 DATA ANALYSIS

3.1 Profile of Bus Users and Operators

A total of 127 questionnaires were filled out by passengers of 10 bus companies at the TBS [KL Terminal] and Larkin [JB Terminal] respectively. However, only 100 questionnaires from bus users were used for analyses, of which a total of 55% questionnaires forms were filled in TBS Terminal and 45% in Larkin Terminal.

The bus users consisted of 98 men and 2 women with the following frequency distribution:7% age of 16-20; 82% age of 21-30; 9% age of 30-40 and 2% age of 40-50 respectively. Students constituted 48% passengers followed by 21 % privately employed 30% public-employed, 15% self-employed and 1 % unemployed respondents.

Households with only 2 members constituted 28% of total bus users followed by 2-4 members [30%], 4-6 members [38%] and 6-10 members [17%]. Also, surveys reported 67% married and 33% unmarried bus users. A total of 56% bus users owned automobile and 44 % reported to have no access to automobile.

Income status of the bus users revealed that a majority earned a monthly income between RM 2,000 to 4,000 [46%] followed by RM 5,000 to 7,000 [24%], RM 1000 and less earners [22%] and RM 8,000-13,000 [8%]. Purpose of trips were highly varied with 15.3% respondents reported work trips followed by 16.7% educational trips; 11.3% return-to home trips; 8.7% business trips; 20% leisure trips; 3.3% shopping trips; 14.7 % vacation trips and 10% trips had other purposes. Ethnicity of the surveyed bus users' followed nearly the census population distribution with 57% Malay, 20% Chinese, 10% Indian and 13% with foreigner status.

Number of staff per trip in the bus was mostly 2 people and numbers of seats per bus were between 33 to 40 seats. In most cases, travel time was between 3.5 to 4 hours. Numbers of trips from JB to KL were more than 100 departures per day by a total of 10 operators. Most operators reported that each bus needed maintenance up to 4 times month.

Bus operators' profile indicated that 50% belonged to age group 26-30 years followed by 21-25 years [30%], 41-45 years [10%] and greater than 56 years [10%]. Bus operators were predominantly from Malay ethnicity [80%] followed by each Chinese [10%] and Indian ethnicity [10%]. A total of 60% surveyed operators were males.

3.2 First Estimation: The Correlation Between the Attributes and Their Satisfaction from Attributes

A correlation matrix is used to reveal whether the different questions in the survey addressing quality attributes have relationships to one another. For the purposes of this study, it is assumed that the interrelations amongst attributes indicate that they share common factors and represent latent dimensions of service quality or characteristics. Correlation coefficient among different service quality related issues are calculated from the responses of bus users which are shown in Table 1. The bold numbers in the figure shows significant correlation.

Table 1 Bus user's correlation matrix

Bus User's Correlation	Bus Scheduling Operations	Bus Fares	Travel Time	Travel Comfort	Travel Convenience	Ticket Availability	Bus User Information	Bus Staff Behaviour	Travel Safety	Bus Terminal Facilities	Bus User Security
Bus Scheduling Operations	1.00	**0.84**	**0.95**	0.72	**0.88**	**0.81**	**0.86**	**0.95**	**0.97**	**0.94**	**0.98**
Bus Fares	**0.84**	1.00	0.76	0.63	0.63	**0.84**	**0.88**	**0.82**	**0.81**	**0.92**	**0.85**
Travel Time	**0.95**	0.76	1.00	0.68	0.78	**0.84**	**0.90**	**0.87**	**0.89**	**0.89**	**0.93**
Travel Comfort	0.72	0.63	0.68	1.00	0.67	0.61	0.67	0.72	0.75	0.72	0.72
Travel Convenience	**0.88**	0.63	0.78	0.67	1.00	0.60	0.64	**0.92**	**0.89**	0.76	**0.88**
Ticket Availability	**0.81**	**0.84**	**0.84**	0.61	0.60	1.00	**0.93**	0.80	0.74	**0.90**	**0.85**
Bus User Information	**0.86**	**0.88**	**0.90**	0.67	0.64	**0.93**	1.00	**0.81**	**0.81**	**0.93**	**0.89**
Bus Staff Behaviour	**0.95**	**0.82**	**0.87**	0.72	**0.92**	0.80	0.81	1.00	**0.96**	**0.91**	**0.95**
Travel Safety	**0.97**	**0.81**	**0.89**	0.75	**0.89**	0.74	0.81	**0.96**	1.00	**0.91**	**0.95**
Bus Terminal Facilities	**0.94**	**0.92**	**0.89**	0.72	0.76	**0.90**	**0.93**	**0.91**	**0.91**	1.00	**0.96**
Bus User Security	**0.98**	**0.85**	**0.93**	0.72	**0.88**	**0.85**	**0.89**	**0.95**	**0.95**	**0.96**	1.00

Table 1 gives an overall idea about correlations among different quality factors from bus user's point of view. Many of the correlations in the figure may not provide meaningful information as they correlate seemingly unrelated factors and therefore must be discarded. However, in many cases it gives useful information such as differences in the reporting between bus users and operators.

One importance of correlation in this study is to help reveal whether the bus users and operators have common thinking about quality of bus travel and the attribute accounting to the quality. 'Bus scheduling operations' can be considered to have correlation with bus fares as their proportionality with distance will ensure timely arrival and departure by bus operators to ensure minimum cycles per day. Bus scheduling operations depends mainly on consistent operating and cycle time. Quick and convenient boarding and alighting also assist in the adherence to the schedules. Study revealed that pre-payment of bus fares allow quick boarding and alighting, thereby affecting dwell times, and bus operations as per schedule. Also, provision of en-route and pre-trip information to passengers facilitated quick transfers among other modes and reaching destinations. It revealed that good staff conduct with minimum disputes with bus users ensures minimum delays. Significant correlations were observed between safety of travel with minimum disturbances due to accidents and incidents and keeping planned bus schedules. Also, availability of facilities at the bus terminals ensured minimum detours, and hence adherence on bus schedules. Security of bus users is paramount to the operators, if the security is met, operations are reliable. Similar deductions were obtained from the correlation analyses. Furthermore, the correlation values among different

service quality issues from operator's point-of-view are shown in Table 2 and can be interpreted in the similar way.

Table 2 Bus operator's correlation matrix

Operator's Correlation

	Bus Scheduling Operations	Bus Fares	Travel Time	Travel Comfort	Travel Convenience	Ticket Availability	Bus User Information	Bus Staff Behaviour	Travel Safety	Bus Terminal Facilities	Bus User Security
Bus Scheduling Operations	1.00	0.96	0.88	0.77	0.86	0.90	0.93	0.92	0.97	0.97	0.94
Bus Fares	0.96	1.00	0.92	0.79	0.86	0.88	0.88	0.88	0.91	0.92	0.90
Travel Time	0.88	0.92	1.00	0.87	0.60	0.89	0.89	0.81	0.81	0.76	0.89
Travel Comfort	0.77	0.79	0.87	1.00	0.51	0.90	0.80	0.60	0.79	0.64	0.78
Travel Convenience	0.86	0.86	0.60	0.51	1.00	0.69	0.69	0.79	0.84	0.94	0.75
Ticket Availability	0.90	0.88	0.89	0.90	0.69	1.00	0.91	0.79	0.87	0.82	0.96
Bus User Information	0.93	0.88	0.89	0.80	0.69	0.91	1.00	0.86	0.93	0.86	0.94
Bus Staff Behaviour	0.92	0.88	0.81	0.60	0.79	0.79	0.86	1.00	0.86	0.93	0.91
Travel Safety	0.97	0.91	0.81	0.79	0.84	0.87	0.93	0.86	1.00	0.93	0.89
Bus Terminal Facilities	0.97	0.92	0.76	0.64	0.94	0.82	0.86	0.93	0.93	1.00	0.90
Bus User Security	0.94	0.90	0.89	0.78	0.75	0.96	0.94	0.91	0.89	0.90	1.00

To draw comparison between the opinions of bus users and operators, correlation is compared of one qualifying attribute with the other defining attributes. Percentage differences in the correlation coefficients are obtained [Table 4]. The bus user's views are fixed and operator's views are compared to form a range of -0.05 to +0.05 [signifying ± 5% differences of views], which are treated as similar views. Likewise, a range of +0.05 to +0.10 is assigned for very dissimilar views of users with operators in increasing importance of the given attribute. Similarly, a range of +0.10 to 1.0 is assigned to reflect extremely dissimilar views, while users depicting their utmost importance. The negative sign of the difference of correlation coefficient means that operators define more importance of an attribute than the bus users. The scheme of ranges followed in this study is explained in Table 3. Extremely high correlation differences are found in the qualifying attribute 'travel time' with defining attributes 'travel convenience' and 'bus terminal facilities' stated by the users. Likewise, 'travel comfort' is seen to correlate extremely well with 'travel convenience' and 'bus staff behaviour'. The qualifying attribute 'travel convenience' is well correlated with defining attributes 'bus staff behaviour' and 'bus user security'.

Extremely dissimilar views were observed on attributes such as 'travel time', 'travel comfort' and 'travel convenience'. For example, high correlation of travel time with travel convenience and bus terminal facilities is observed in the bus user's data. It can be construed that travel time is more when boarding and alighting times are more. Also, travel time is affected by the bus terminal facilities, which may be true for people coming late during bus halt midway of journey.

Travel comfort correlated highly with travel convenience and bus staff behaviour by the users. It correlated differently with ticket availability and bus user information by the bus operators. Based on bus users, travel convenience is affected highly by bus staff behaviour and bus user security. It is differently correlated with bus terminal facilities by the bus operators.

Table 3 Semantics of ranges for differences of views

Difference of correlation coefficient [expressed in %]	Description
-100 to -10	Extremely dissimilar views with users and operators depict extreme importance of one attribute over another
-10 to -5	Very dissimilar views with users and operators depict moderate importance of one attribute over another
-5 to 5	Somewhat similar views of operators and users
5 to 10	Very dissimilar views with operators and users depict moderate importance of one attribute over another
10 to 100	Extremely dissimilar views with operators and users depict extreme importance of one attribute over another

According to operators, bus fares correlated extremely well with bus scheduling operations, travel time, travel comfort and travel convenience. Likewise, bus user security is extremely well correlated with travel comfort, ticket availability and bus user information as per operators.

Similarly moderately different correlations of users were also formed. Bus users perceive longer travel time as an effect of ineffective bus scheduling operations. However, operators perceive operations to be more correlated with travel comfort, travel convenience and bus user information. Travel comfort for bus operators is a featured correlation with bus user security. While bus users' data were able to correlate travel safety with bus user security, the operators' data were not found to establish any correlation. Users depict a correlation of bus user security [security of users through installing CCTV, security staff, lighting systems and storage lockers] with bus terminal facilities. The responses of bus operators failed to depict any correlation in this respect. While the correlations that are conducted provide meaningful inferences, some can be deemed purely coincidental and random. There are also many similar views between user and operators given in the Table 4.

Table 4 Differences between users and operators views on attributes correlation

Differences in the Correlation

	Bus Scheduling Operations	Bus Fares	Travel Time	Travel Comfort	Travel Convenience	Ticket Availability	Bus User Information	Bus Staff Behaviour	Travel Safety	Bus Terminal Facilities	Bus User Security
Bus Scheduling	++				++			++	++	++	++
Operations	+	++	++	++	+	++	++	+	+	+	+
		++	++				++	++			++
Bus Fares	++	+	+	+	+	+	+	+	++	+	+
			++				++				++
Travel Time	++	+	+	+	+	++	+	++	++	+	+
				++					++	++	
Travel Comfort	++	+	+	+	+	+	+	+	+	+	++
Travel	++				++		++		++		
Convenience	+	+	+	+	+	++	+	+	+	++	+
Ticket		++				++	++	++			
Availability	++	+	++	+	++	+	+	+	+	++	+
Bus User		++	++		++	++	++				++
Information	++	+	+	+	+	+	+	++	+	++	+
Bus Staff	++				++		++			++	++
Behaviour	+	++	++	+	+	+	++	+	++	+	+
	++			++	++					++	++
Travel Safety	+	+	++	+	+	+	+	++	+	+	++
Bus Terminal	++	++		++				++	++	++	
Facilities	+	+	+	+	++	++	++	+	+	+	++
Bus User	++	++	++				++	++			++
Security	+	+	+	++	+	+	+	+	++	++	+

Note: +++ [similar views], ++ [very dissimilar views], + [extremely dissimilar views]

Step-wise multiple regression based on bus users' responses indicate a total of 7 attributes in constitution of quality, with bus scheduling operation being the most important attribute [Table 5].

Table 5 Relevant quality attributes in composition of quality based on bus user responses

Quality Attributes	Coefficient	Significance
Travel Convenience	.068	.000
Ticket Availability	.079	.000
Travel Comfort	.107	.000
Bus User Security	.132	.000
Bus User Information	.141	.000
Bus Staff Behaviour	.161	.000
Bus Scheduling Operations	.187	.000
[Constant]	.482	.000

Similar analyses when performed on bus operator's data, it is found that only few attributes constitute quality [Table 6]. It is found that the inclusion or exclusion of other attributes did not contribute significantly to composition of quality. This can be inferred that operators don't believe the role played by other attributes in defining quality. However, both groups revealed the significance of efficient bus scheduling operations and bus user security. Bus users also have higher number of quality attributes and corresponding higher expectations of quality from them.

Table 6 Relevant quality attributes in composition of quality based on bus operator responses

Quality Attributes	Coefficient	Significance
Bus User Security	0.196	.000
Bus Scheduling Operations	0.459	.000
[Constant]	1.213	.000

3.2 Second Estimation: The Level of Agreement and Disputes in Responses

Standard Deviations of scores are used to understand the level of agreement among respondents. Table 7 shows the standard deviations of bus users and operators responses to different survey questions. A low standard deviation means respondents generally have a higher level of agreement or disagreement for a statement. On the other hand, the higher standard deviations mean less agreement among respondents. A threshold of one standard deviation is considered in the present study to understand the agreement among respondents. It means that if the standard deviation in responses for a particular question is more than 1, the respondents have less agreement to that issue. As shown in Table 7, bus users are in well agreement that travel time are mostly constant and operating conditions don't result in the longer travel time [Alternate Hypothesis 3], but they are not in agreement related to the question on cleanliness and comfort [Alternate Hypothesis 4].

Analysis of the standard deviation values of the responses on different survey questions reveals that bus users as a group are in well agreement in most of the questions compared to operators. These agreements are revealed from their agreements in answering 30 questions out of 36 questions. On the other hand, operators are in agreements only in answering 23 questions out of 36 questions. Analysis of median and standard deviation together reveals that both bus users and operators agreed on same level of satisfaction in answering only 11 questions out of total 36 questions.

The ninth column of the Table 7 shows the significance of Mann-Whitney statistics in testing the hypotheses given in the second column of the table. As 95% level of confidence are used to test the difference in opinion, a significance value in the table more than or equal to 0.05 means that the null hypothesis cannot be rejected. It means that both the bus users and the operators agree on a particular issue. On the other hand, a significance value less than 0.05 means the null hypothesis can be rejected which means that the bus users and the operators do not agree on a particular issue. Analysis of significance values reveals that both bus users and operators have agreed in 22 specific issues and disagreed in 14 specific issues.

Later, the 36 survey questions were composed into 11 main categories of responses [akin to quality attributes] to understand the responses of bus users and operators at a broader level such as their views on overall bus scheduling, bus fares, travel time, etc. Median of the user's and operator's responses to those broader issues are also given in the Table 7. In order to distinguish the opinion [agreements or disagreement] within the group, bars are used. Longer bars from central axis indicate consistency in opinion and vice versa. For example, it is obvious that quality attributes such as 'travel convenience' and 'bus user information' are highly agreed by bus users. Figure 1 shows that the bus users

are highly opinionated in reporting their satisfaction from most quality attributes in all cases except 'bus terminal facilities' and 'travel comfort'. Bus users were moderately divided in opinions for attributes such as 'ticket availability', 'travel safety' 'bus user security' and 'bus fares'.
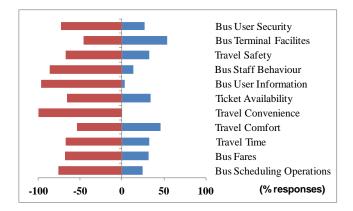

Figure 1 Levels of agreement among bus users

On the other hand, Figure 2 shows that bus operators' responses are not opinionated in many cases such as 'travel safety', 'ticket availability' and 'travel time' among many others. Bus operators reveal no common opinion in many attributes viz., 'bus terminal facilities', 'bus user information', 'bus fares' etc.
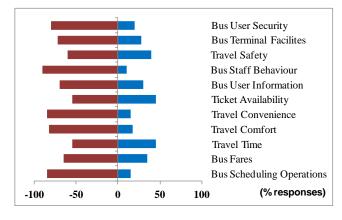

Figure 2 Levels of agreement among bus operators

In order to compare the difference in the opinions of two respondent groups, Figure 1 and 2 are compared. It is evident from the figures that the operators are more satisfied compared to bus users on quality attributes such as travel comfort, staff behaviour and terminal facilities. On quality attributes such as bus fare, ticket availability, bus user information and travel safety, the satisfaction levels of both the bus users and the operators are same. Furthermore, it is concluded that the bus users are more satisfied when compared with operators regarding bus scheduling, travel time and bus security.

Test of the significance of the mean is conducted in the study. Non-parametric Wilcoxon test provided the significant mean which are shown by bold in Table 7. The results show that mean score of bus user's responses for most of the categories have significance at 0.05 levels. Buses users are found to be unanimous in their opinion in answering questions related to all categories except on 'bus terminal facilities' and 'travel comfort'. On the other hand, the bus operator's responses do not have significant

mean. Bus operators do not have common opinion on 'bus terminal facilities', 'travel safety', 'bus user information', 'ticket availability', 'travel time', and 'bus fares'. The results indicate that the bus users are more unanimous in their opinion. On the other hand, the bus operators are not unanimous in their opinion in most of the cases. Statistical results also conform to the previously obtained results from Figure 1 and 2.

Though there exist some disputes in opinion within the bus users and bus operators in many cases, the overall differences in opinions between bus users and operators on different classes of service quality are also examined. Significance tests using Mann Whitney test methods indicated low significance values for formulated alternative hypothesis , H2, H4 and H8 [Table 7]. Of a total 11 alternative hypotheses, it is found that bus users and operators agreed upon 8 hypotheses. Alternate hypotheses are positive statements reflecting the quality attributes of bus scheduling operations, bus fares, travel time, travel comfort travel convenience, etc.

It is found that current bus fares are not found to be affordable and proportionate to the travelled distances. Significant differences are observed between the bus users and operators on terms of bus fares and proportionality of services provided. Secondly, bus users are hopeful to receive a clean bus and comfortable journey which bus operators are presently not able to cater it. Finally, considerable differences are found in the expectation of bus users towards conduct of bus staff. These expectations are simply not met by the presently employed staff and differences remain concerning staff behaviour towards users.

3.3 Third Estimation: The Relationship Between The Importance and Derived Satisfaction from Attributes

Gap analysis shows the difference between how important attributes are to your respondents and how satisfied they are with those attributes. This section focuses on the analysis of the importance and satisfaction of quality attributes. The analyses are done to compare and relate the passenger perception regarding the importance and satisfaction level for every quality attribute for a bus travel on JB to KL route. The level of importance are obtained via perceptions of quality attributes before the trip, however, the satisfaction level is the perception after having performed the trip with the bus. The gap is the mean score for the satisfaction rating subtracted from the mean score for the importance rating. By this relationship qualifying attribtues that are important can be related to current levels of satisfaction. The analyses are conducted using the mean value for both satisfaction and importance levels. A 5-point scale has been used on the questionnaire for both importance and satisfaction ratings from 1 to 5. (1= totally dissatisfied to 5= totally satisfied) and (1= not at all important to 5 = extremely important). If the gap is below zero, negative, this indicates over achievement; respondents' rate this attribute relatively unimportant, but are very satisfied with the service. In this instance no action/improvement is required. The closer the gap is to zero the better balance there is between importance and satisfaction.

It is important to know whether the expectations of bus users are met by the provision of services. Quadrant analyses focused mainly on attributes with high importance [as given by bus users'] but less satisfaction derived from them. Regardless of high importance given to attributes such as bus fares [4.51], travel comfort [4.39], bus staff behaviour [4.4], and bus user security the satisfaction are rated averagely as 3.75, 2.98, 3.35 and 2.64 on a 5- point likert scale respectively. Results clearly indicate lack of satisfaction by bus users on above attributes. By performing this analysis, attributes are distinguished that demand immediate

intervention to improve the effectiveness of travel by improving   bus user satisfaction.

Table 7 Agreements and disagreements between bus users and bus operators based on hypotheses tests

No.	Alternate Hypotheses	Bus User				Bus Operator				Significance of Mann-Whitney U Test	Decision
		N	Mean	Median	Standard Deviation	N	Mean	Median	Standard Deviation		
H 1	Buses always operate on schedule with minimum delays	100	**3.53**	3.00	1.04	10	**3.38**	4.00	1.23	0.741	Accepted
H 2	Bus fares are affordable and proportionate to the distance travelled	100	**4.14**	4.00	0.31	10	3.70	4.00	0.48	0.002	Rejected
H 3	Travel Time are mostly constant and operating conditions don't cause longer travel time	100	**3.27**	4.00	0.74	10	3.10	3.00	0.70	0.507	Accepted
H 4	Buses are kept clean and the comfortable to passengers	100	2.98	3.00	0.43	10	**3.30**	4.00	0.59	0.033	Rejected
H 5	Buses are disable-friendly and it is easy to board and alight	100	**3.10**	2.00	1.39	10	**3.55**	4.00	1.38	0.129	Accepted
H 6	Tickets are available at multiple sources and can be purchases at any time	100	**2.10**	2.00	0.78	10	2.40	3.00	0.91	0.125	Accepted
H 7	Updated bus pre-trip and en-route information is provided at multiple spots	100	**3.04**	2.00	0.86	10	3.25	3.00	0.98	0.506	Accepted
H 8	Bus staff are well-behaved, polite and cooperative	100	**3.34**	3.00	0.69	10	**3.80**	4.00	0.82	0.039	Rejected
H 9	Travel safety issues, if any, are extrinsic to drivers' or operators' condition	100	**3.30**	3.00	0.68	10	**3.20**	3.00	0.61	0.644	Accepted
H 10	Bus Terminal Facilites are provided and adequate (parking, food outlets, phone, toilets etc.)	100	3.20	3.00	0.53	10	3.50	3.00	0.55	0.089	Accepted
H 11	Bus user security provisions are adequate at critical areas	100	**2.64**	3.00	1.00	10	2.40	2.00	1.26	0.531	Accepted
	Average values		3.15	3.00	0.77		3.23	3.00	0.87		

■4.0 SUMMARY

The differences in the correlation values of bus users and operators were studied to find similarities and dissimilarities of opinions. These views were necessarily focused on direct and indirect relationship between the pre-selected attributes. Significant correlation differences [negative and positive] were found between attributes- bus fares with travel comfort, travel convenience, ticket availability and the facilities at the bus terminal.

— Bus users believe that travel time is affected by travel inconvenience as a result of poor boarding and alighting, longer waiting times and due to average terminal facilities.
— Bus users believe travel comfort is affected by travel inconvenience and poor staff conduct.
— Travel convenience of bus users is affected by poor staff conduct as well as security gaps in user security.
— Bus operators believe that bus fares are responsible for poor bus scheduling operations, longer travel time, poor travel comfort and travel inconvenience. Such differences clearly indicate that bus users did not share the same views with operators on the proportionality of fares with the provided services.
— Although bus user security entails many aspects including additional security staff and luggage storage facilities, bus operators believed it to be the extrinsic of their responsibilities of administration. Bus operators relate bus user security differently from bus users. Their perceptions on bus user security are limited to providing adequate security at bus terminals and ascertaining travel comfort.
— While bus users believed that driving behaviour and other safety issues will be highly monitored through security devices such as CCTV, additional security staff, and use of better lighting systems. Bus operators did not establish any such relationships.
— While users believe longer travel time as a result of ineffective scheduling by operators, operators believe

ineffective scheduling a result of higher travel comfort, travel convenience and other quality checks.
— Travel safety and bus user safety showed high correlation among users which operators failed to establish. Moreover travel comfort is observed as a bus user safety feature by bus operators.
— Bus users believed that an increment in their personal security is achieved by installing CCTV, adding more security staff, improving lightening systems and providing adequate storage facilities in buses as well as at bus terminals. Bus operators did not establish such correlation.
— A total of 7 quality attributes namely 'bus scheduling operations', 'bus staff behaviour' ' bus user information' ' bus user security' , travel comfort', ' ticket availability' and 'travel convenience' contributed in the composition of overall quality by bus users. However, only 2 quality attributes namely 'bus scheduling operations' and 'bus user security' were found adequate in the composition of overall quality by bus operators. These facts signify gaps in the understanding of quality of bus service by operators.
— When users were consistent in reporting their responses on quality, bus operators were highly inconsistent and divided in reporting facts. This can be easily observed through higher standard deviation among operators.
— Travel convenience, bus user information and bus staff behaviour were mostly agreed quality attributes by bus users.
— Attributes such as bus scheduling operations, travel convenience and bus staff behaviour were mostly agreed in opinions by bus operators.
— Bus users were more unanimous than operators in their opinions in most cases.
— Overall, the results indicate more variance is opinions among the bus operators compared to bus users. Both

groups shared similar views on most bus service quality issues.

— The disagreements in opinions between users and operators were found only in three quality attributes namely, bus fares, bus comfort and bus staff behaviour. Both groups were divided on opinion about equity of bus fares and equitable transport services. Bus users failed to agree that the buses were kept clean and made comfortable for their use. Also, bus users were highly dissatisfied by the poor staff conduct.

— Equity of bus fares, travel comfort, bus staff behaviour and bus user security are rated very important and lowly satisfied quality attributes by bus users. At a time when poor provision and satisfaction in public transport is regarded as one of the main deterrents of public transport use in Malaysia, it certainly requires immediate intervention.

— Operators revealed contentment from the majority of the quality related issues except bus user security provisions at critical areas

Significant improvements will be necessary in the realm of cleanliness, travel comfort and convenience, information, staff behaviour and user safety to substantiate the current fare levels.

The users disagree with operators on cleanliness and comfortability during travel. Therefore, bus physical condition, seat comfort, air conditioning, bus entry and exit must be improved to increase user satisfaction.

Issues of poor bus staff behaviour have contributed to poor quality of bus travel. Therefore, bus staff must be constantly monitored and trained to ensure professional staff conduct at all times.

To focus upon the perception of bus users is an effective way to identify their needs and discover means to satisfy them. This research was able to establish factors that make intercity travel attractive and marketable to its users. According to the results of this study, most passengers were not completely satisfied with public bus transport servicing the JB-KL route. Further studies will be required to investigate the role of user satisfaction in the mode choice for different purposes of travel.

It is more important to improve public transport in the light of ever increasing private car usage in Malaysia which is causing many problems of traffic congestion, a high level of pollution, a high consumption of non-renewable energy resource, a high number of traffic accidents and it poses a severe threat to the overall quality of life. Public bus transport should become the solution for sustainable transport in the future for Malaysia. On the contrary, modal shares of public transport modes are constantly dwindling due to fewer quality provisions by operators and expectations by users, an apparent reason for user dissatisfaction. This study identified numerous quality attributes that have a strong influence on user satisfaction. In order to keep bus passengers satisfied as well as to attract new users, public transport needs to improve the quality of its services conducive to passenger needs and expectations.

Acknowledgement

References

[1] A. S. I. Almselati, R. Rahmat, O. Jaafar. 2011. An Overview of Urban Transport in Malaysia. *Social Sci.* 6: 24–33.

[2] A. Nurdden, R. A. O. Rahmat, A. Ismail. 2007. Effect of Transportation Policies on Modal Shift from Private Car to Public Transport in Malaysia. *Journal of Applied Sciences.* 7(7).

[3] H. Hussein, N. M. Yaacob 2012. Development of Accessible Design in Malaysia. *Procedia-Social and Behavioral Sciences.* 68: 121–133.

[4] S. Tamrin. 2013. Only 5% Using Public Transport During Morning Peak Period. *The Star.* December 3, 2013.

[5] A. Minhans, A. Moghaddasi. 2013. Transport Cost Analysis of City Bus and Private Car Usage in Johor Bahru, Malaysia. *Jurnal Teknologi.* 65(3).

[6] Z. Zakaria, Z. H. Hussin, M. F. A Batau, Z. Zakaria. 2010. Service Quality of Malaysian Public Transports: A Case Study in Malaysia. *Cross-Cultural Communication.* 6(2).

[7] D. A. Lashof, D. R. Ahuja. 1990. Relative Contributions of Greenhouse Gas Emissions tTo Global Warming. *Nature Weekly Journal of Science.* Nature Publishing Group.

[8] D. L. Greene, S. Plotkin. 2011. *Reducing Greenhouse Gas Emission From US Transportation. Arlington: Pew Center on Global Climate Change.* Environmental Protection Agency. United States. http://www.epa.gov.

[9] W. Ross Morrow, K. S. Gallagher, G. Collantes, H. Lee. 2010. Analysis of Policies to Reduce Oil Consumption and Greenhouse-gas Emissions From The US Transportation Sector. *Energy Policy.* 38(3): 1305–1320.

[10] S. N. Salahudin, M. M. Abdullah, N. A. Newaz. 2013. Emissions: Sources, Policies and Development in Malaysia. *International Journal of Education and Research.* 1(7).

[11] V. R. Vuchic. 2007. *Urban Transit Systems and Technology.* ISBN: 978-0-471-75823-5.Wiley Publishing.

[12] A. Minhans, N. H. Zaki, R. Belwal. 2013. Traffic Impact Assessment: A Case of Proposed Hypermarket in Skudai Town of Malaysia. *Jurnal Teknologi.* 65(3).

[13] A. R. M. Nor .2004. *Transport for the Under-served in Malaysia: The Roles of Minibuses in Malaysian Towns and Cities.* Penerbit Universiti Kebangsaan Malaysia.

[14] M. A.Rahim, A. C. Er., R. Katiman, M. Aishah, S. Zaini, M. N. Hasan, A. C. R. Rosniza. Assessing Public Transport Service Attributes Using Factor Analysis. *World Applied Sciences Journal.* 2011;13(13 Special Issue):07–12.

[15] O. C. Chuen, M. R. Karim, S. Yusoff. 2014. Mode Choice Between Private and Public Transport In Klang Valley, Malaysia. *The Scientific World Journal.*

[16] A. Ellaway, S. Macintyre, R. Hiscock, A. Kearns.2003. In the Driving Seat: Psychosocial Benefits from Private Motor Vehicle Transport Compared to Public Transport. Transportation Research Part F. *Traffic Psychology and Behaviour.* 6(3): 217–231.

[17] G. Beirão, J. Sarsfield Cabral. 2007. Understanding Attitudes Towards Public Transport and Private Car: A Qualitative Study. *Transport Policy.* 14(6): 478–489.

[18] C. Dhingra, S. Kodukula. 2010. Public Bicycle Schemes: Applying the Concept in Developing Cities. *GTZ Sustainbale Urban Project.* New Delhi. 32.

[19] D. Aßmann, N. Sieber. 2005. Transport in Developing Countries: Renewable Energy Versus Energy Reduction*? Transport Reviews.* 25(6): 719–738.

[20] D. L. Greene, M. Wegener. 1997. Sustainable Transport. *Journal of Transport Geography.* 5(3): 177–190.

[21] J. Anable. 2005. 'Complacent Car Addicts' or 'Aspiring Environmentalists'? Identifying Travel Behaviour Segments Using Attitude Theory. *Transport Policy.* 12(1): 65–78.

[22] R. Belwal, A. Minhans, A. M. Al-Balushi. 2013. Perception of Taxi Services in Oman–A Cross Examination of Citizens' and Taxi Drivers' Perception. *Jurnal Teknologi.* 65(3).

[23] R. L. Oliver. 2010. *Satisfaction: A Behavioral Perspective on the Consumer.* 2nd Edition. ME Sharpe. Armonk, NewYork.

[24] O. A. Budiono. 2009. *Customer Satisfaction in Public Bus Transport. Master of Service Science Program.* Karlstad University, Sweden.

[25] A. Parasuraman, V. A. Zeithaml, L. L. Berry. 1994. Alternative Scales for Measuring Service Quality: A comparative assessment based on psychometric and diagnostic criteria. *Journal of Retailing.* 70(3): 201–230.

[26] B. Gatersleben, D. Uzzell. 2003. Local Transport Problems and Possible Solutions: Comparing Perceptions of Residents, Elected Members, Officers and Organisations. *Local Environment.* 8(4): 387–405.

[27] B. Gatersleben, D. Uzzell. 2007. Affective Appraisals of the Daily Commute Comparing Perceptions of Drivers, Cyclists, Walkers, and Users of Public Transport. *Environment and Behavior.* 39(3): 416–431.

[28] P. Goodwin, G. Lyons. 2010. Public Attitudes to Transport: Interpreting the Evidence. *Transportation Planning and Technology.* 33(1):3–17.

[29] P. Goodwin, G. Lyons. 2009. Public Attitudes to Transport: Scrutinising the Evidence. *Proceedings of the 41st Universities Transport Study Group Conference.* London, UK, 5-7 January 2009.

[30] S. Fujii, T. Gärling, R. Kitamura. 2001. Changes in Drivers' Perceptions and Use of Public Transport during a Freeway Closure Effects of Temporary Structural Change on Cooperation in a Real-Life Social Dilemma. *Environment and Behavior.* 33(6): 796–808.

[31] M. Vugt, R. M. Meertens, P. A. Lange. 1995. Car Versus Public Transportation? The Role of Social Value Orientations in a Real-Life Social Dilemma1. *Journal of Applied Social Psychology.* 25(3): 258–278.

[32] M. Fellesson, M. Friman. 2012. Perceived Satisfaction with Public Transport Service In Nine European Cities. *In: Journal of the Transportation Research Forum.* 3.

[33] L. Eboli, G. Mazzulla. 2007. Service Quality Attributes Affecting Customer Satisfaction for Bus Transit. *Journal of Public Transportation.* 2007. Citeseer.

[34] M. Friman. 2004. Implementing Quality Improvements in Public Transport. *Journal of Public Transportation.* 7(4).

[35] M. J. Smith, R. V. Clarke. 2000. *Crime and Public Transport. Crime And Justice.* 169–233.

[36] L. Chapman. 2007. Transport and Climate Change: A Review. *Journal of Transport Geography.* 15(5): 354–367.

[37] Research Results Digest. 2009. *Public Transportation's Role in Addressing Global Climate Change.* Transit Cooperative Research Program.

[38] Research Results Digest. 2010. *Performance Measurement and Outcomes.* Transit Cooperative Research Program.