User Perception of Public Transport in Kota Kinabalu

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Abstract

This paper identifies components of satisfaction of public bus service in Kota Kinabalu City, Malaysia. Factor analysis is used to analyse a total of 24 parameters satisfactions of public buses. This study succeeded in developing three dimensions of public bus service attributes a satisfaction namely comfort, accessibility and safety and found that there is a slight difference in satisfaction between the minibus and bus transit, but users agreed that overcrowded and felt unsafe during the night were among the most significant attributes that affect their satisfaction. Transportation authorities can use these findings as a guide to enhance the quality of life of public transport users in the future.

Keywords: Public transportation; city bus; factor analysis; customer satisfaction

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1.0 Introduction

The Quality of Life (QOL) has become a world concern. (Felce & Perry, 1995) consider that QOL is a multi-dimensional sense of well being which categorised into five domains: physical, material, social, emotional, and developmental and activity. Transportation is thus an integral contributor to one's QOL as it is the bridge that enables an individual to visit and patronise local amenities. However, Steg & Gifford (2005) have discovered the negative impact of increasing the number of cars on the road. (Bunting, 2004; Shuhana Shamsuddin et al. 2012), noted that if a society prioritises vehicle for personal use only, this will result in an increase in the demand, for cars. The resultant effect will be widespread traffic congestion, air and noise pollution, an unsociable society and expose pedestrians and cyclists to danger (Na'asah et al. 2013; Diyanah & Hafazah 2012; Jalalkamali & Ghraei, 2012).

Therefore, we need a public transport system that focuses on improving air quality and health. Even though Singapore, Tokyo and Hong Kong are known for their excellent public transport systems (Kenworthy,1995), they are not representative of the state of affairs worldwide as other countries are still facing challenges in attracting members of the public to use public transportation.

Somehow the biggest failure of public transport appears to be its inability to attract private car users. Public transport does not meet the current demand and thus forcing residents to opt to use private cars instead (Rakesh & Shweta, 2010). Among the reasons commonly cited for the refusal to switch to public transportation are often late, unattractive stations, surly drivers and inadequate provision for people with disabilities (Bunting 2004).

Kota Kinabalu is the capital state of Sabah, located in the eastern part of Malaysia, which is separated from the mainland by the South China Sea. The Kota Kinabalu Structure Plan indicates that one of the many objectives is to provide efficient and smooth running of public transport. However, previous studies have shown that public transport in the city of Kota Kinabalu is often associated with its ineffectiveness. The study of public transport in the city of Kota Kinabalu was initiated several years ago by the Division of Traffic and Public Transport (2005), Kota Kinabalu Urban Transport Study (2007), and the Master Plan Study of Public Transport in Major Cities / Towns (2010). The reports found that the ineffectiveness can be categorised into five broad aspects, namely: (1) comfort, (2) reliability, (3) accessibility, (4) information and (5) safety.

According to the Sabah Development Corridor Blueprint, 2008-2025 (2007) the city of Kota Kinabalu needs public transport that is both efficient and effective. Therefore, the objective of the study is to determine the effectiveness of public transport from the customers' viewpoint. The research on public transport is limited to the use of the minibus and transit bus.

2.0 Literature Review

2.1 Customers satisfaction determination

The quality of services provided can be evaluated by the perceptions of customers. (Hayes, 2008) determine customers' as 'soft index' which are subjective in nature that can be used

as an indicator of effectiveness which is focused on customers' perceptions because they are the direct users. In other words, it should be customer-oriented and meet the customers' needs and desires. Customers' perspective is measured using the Customer Satisfaction Survey (CSS), which will assist the authorities in improving the quality of services and increase the number of people using public transport. Through the questionnaire, the authorities will be able to identify all elements of public transport that should be addressed.

2.2 Customers perceptions towards the effectiveness of public transportation

Several findings of the effectiveness of public transport have been identified through customers' perception surveys. Iseki et al. (2007) revealed that accessibility and reliability are the top two key factors in evaluating the effectiveness of the services at the bus stop and bus terminal, and they are followed closely by the security factor. (Rasidah S. et al. 2012), measured the customers' satisfaction perception in the context of bus services and found many factors that influence the effectiveness of public transport. The main factors are the physical condition, convenience, comfort and safety of the bus. On the other hand, Abreha (2007) found that accessibility and reliability are key factors that contribute towards the ineffectiveness of public transport. In Malaysia, through the Government Transformation Programme, the Public Transport Roadmap has indicated that reliability and travel time, comfort and convenience, accessibility, interconnections, availability and capacity are the key indicators of an excellent public transport system.

3.0 Methodology

Respondents were randomly chosen by giving them a form in selected vicinities of Kota Kinabalu City especially at bus stops, on buses, at shopping centers, as well as at government and private institutions. Data collection was conducted from Jun 15–20, 2012. The survey was targeted mostly at people who use public transport. The total sample size was 987.

The level of satisfaction about to public transport services was measured with a four-point Likert scale where 1 = strongly disagree, 2 = disagree; 3 = agree and 4 = strongly agree. Respondents were asked to rate the twenty-four items regarding of effectiveness on their experiences in having commuted on a minibus and transit bus. The twenty-four satisfaction items were gleaned from a literature review and also through a pilot study that reflected the respondents' experiences and problems faced when commuting via public transport. Descriptive statistics involving mean and standard deviation and factor analysis were used to analyze a total of 24 parameters that outlined the various statements against which the effectiveness of a public transport system can be graded.

4.0 Results and Discussion

4.1 Satisfaction service attribute quality (minibus and transit bus)

Figure 1 depicts the mean value of user satisfaction of both the minibus and transit bus services. The mean score for 13 statements for the minibus service is slightly higher compared to those of the transit bus service. The level of satisfaction garnered or experienced while commuting on the minibus is best compared to that while taking the transit bus, despite the mean score of the transit bus service for seven statements being higher. Both the minibus and bus transit services share the same mean score for four statements: 'safe during the night', 'not crowded', 'easy access to bus stop' and 'cheap fare'. This shows that at least in these four aspects, users have the same experience for both the minibus and transit bus service.

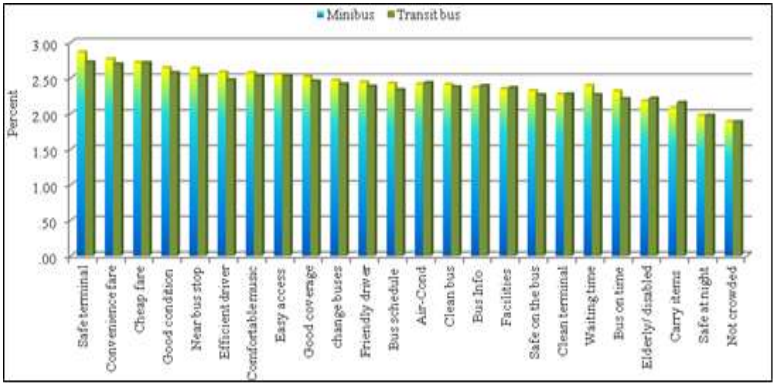

Fig. 1. Satisfaction service attribute quality for minibus and transit bus

4.2 Analysis factors test for effectiveness of public transportation (mini bus and transit bus)

Factor analysis is one of the multivariate methods used to analyse the correlation between the variables so that all the variables can be reduced or sorted into groups or same categories. Popuri et al. (2011) has produced six (6) factors using analysis factor to identify patterns of travel and consumers' behaviour towards the use of public and private transport. Abd Rahim et al. (2011) managed to produce six (6) significantly different from the bus service characteristics. The analysis starts by testing the validity of the data analysis with the help of Kaiser-Meyer Olkin (KMO) and Barlett's Test Of Sphericity. With the KMO value .938 for the minibus and .947 for the transit bus, it shows that the data do not have a multicollinearity problem and the appropriate items are suitable to test its factor analysis. Barlett's Test of Sphericity is used to identify whether the correlation between the items is sufficient in order to factor analysis. The test results are significant, $p <. 05$ for both the data for the minibus and transit show that the correlation between the items is appropriate to do factor analysis. Table 1 and 2 below shows the results of KMO test, Bartlett's Test, items involved, loading a factor, eigenvalues, the percentage of variance and Cronbach's alpha values. The factor analysis is performed using principal component analysis and varimax rotation with the objective to test the underlying factor structure of the data whereby items

with a factor loading lesser than 0.50 were discarded and items that cross-loaded were also uninvolved. Only eigenvalues greater than 1.00 are considered to determine the number of selected components. The reading of Cronbach's alpha values of all variables ranges from 0.837 to 0.919 for a minibus (see Table 1),and from 0.768 to 0.935 (see Table 2) for bus transit, exceeding 0.70 (Nunnaly, 1978). The measurement of this study has shown that it is acceptable in reliability. Within minibus users' perspective, as presented in Table 1, from 24 statements, 19 items were left to be used for further analysis where there was an item each from accessibility factor i.e. 'bus on time' and safety factor i.e. 'friendly driver' while two items from the comfort factor i.e. 'bus schedule available', and 'not crowded in a bus' that were cross-loaded with the small coefficients of absolute value below 0.50 were deleted.

4.3 Factor analysis tests towards minibus services

Based on factor analysis results, minibus users' perspective, comfort is the most dominant factors that contributed 40.529 from 53.150 percent of the total variance with eigenvalues 9.727. This factor consists of eight (9) items of effectiveness. The second factor is accessibility. Eigenvalues are 1.564 with a variance contribution is 6.516 percent. This factor contains nine (6) items of effectiveness. The third factor is the safety with four (4) items that contribute to the effectiveness of the total variance 6.102 percent with eigenvalue 1.465.

Table 1. Exploratory factor item loadings for minibus

Statements	Factor		
	1	2	3
Comfort			
Facilities in good condition	0.817		
Clean bus	0.812		
Air Condition	0.719		
Bus in good condition	0.703		
Easy to carry items	0.632		
Convenience for elderly, disabled	0.620		
Clean terminal	0.619		
Bus Info	0.587		
Bus on time	0.512		
Accessibility			
Easy to get a bus		0.807	
Easy access to bus stop		0.733	
Cheap fare		0.720	
Convenient fare		0.638	
Good coverage		0.594	
Easy to switch buses		0.582	
Safety			
Feel safe on the bus			0.742
Feel safe during night			0.690
Feel safe at the terminal			0.647
Efficient driver			0.504
Cronbach's Alpha	0.919	0.847	0.837
Total Variance Explained	9.727	1.564	1.465
Percentage Variance Explained	40.529	6.516	6.102

Notes: Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.938;
$\chi 2$ = 12132.603; Bartlett's Test of Sphericity Significance = 0.000; df = 276

Factor analysis loadings for minibus shows that all 19 items load heavily on their

respective factors as the factor loadings of the items, as illustrated in table 1, were relatively large and positive, ranges from 0.504 to 0.817, which is above 0.50, a threshold point suggested by Hair, et al. (2010), thus corroborating that the constructs are one-dimensional and factorially idiosyncratic. The first referred to item 'efficient driver' and the latter referred to item 'facilities in good condition' In terms of comfort factor, empirical results noted that statement 'facilities in good condition' had highest loading factor followed by 'clean bus', while statement 'easy to get a bus from home' fall under factor accessibility and statement 'feeling safe on a bus' for the safety factor, both lead the rest of the items to stand as having highest loading value. These are rated by respondents who used minibus as a mode of transportation as detailed in table 1. Factor analysis is also performed for transit bus sample where there were 3 items from comfort factor i.e. 'clean terminal/bus stop, easy to carry items in a bus' and 'not crowded' while an item from safety factor i.e. 'feeling safe at the terminal' were discarded from a total of 24 items as they were cross-loaded with the small coefficients of absolute value below 0.50.

Table 2. Exploratory factor item loadings for transit bus

Statements	Factor 1	2	3
Comfort			
Bus on time	0.790		
Bus info	0.769		
Short waiting time	0.731		
Bus schedule available	0.730		
Easy to switch buses	0.726		
Good coverage	0.722		
Easy to get a bus	0.698		
Bus in good condition	0.668		
Clean bus	0.638		
Air Condition	0.565		
Convenience for elderly/disabled	0.541		
Accessibility			
Convenient fare		0.703	
Cheap fare		0.680	
Easy access to bus stop		0.673	
Bus in good condition		0.653	
Comfortable music		0.637	
Safety			
Feel safe during night			0.672
Friendly driver			0.669
Feel safe on the bus			0.668
Efficient driver			0.647
Cronbach's Alpha	0.935	0.768	0.828
Total Variance Explained	11.054	1.591	1.422
Percentage Variance Explained	46.057	6.628	5.927

Notes: Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.947; χ^2 = 15103.294; Bartlett's Test of Sphericity Significance = 0.000; df = 276

4.4 Factor analysis tests towards bus transit services

From Table 2, transit bus users' perspective, comfort is the most dominant factors that contributed 46.057 from 58.611 percent of the total variance with eigenvalues 11.054. This factor consists of eleven (11) items of effectiveness. The second factor is a comfort. Eigenvalues are 1.591 with a variance contribution is 6.628 percent. This factor contains nine

(5) items of effectiveness. The third factor is the safety with four (4) items that contribute to the effectiveness of the total variance 5.927 percent with eigenvalue 1.422. Out of the total 20 factorised items under factor analysis, highest factor loading appears in the statement ' bus on time' (loading = 0.790), followed by 'bus info' with loading = 0.769, and 'short waiting time' (loading = 0.731) which were factorised under factor called comfort (see Table 2). Further investigation of the study in Table 2 revealed that within an accessibility factor, a statement 'convenient fare' had uppermost loading value among five factorised items followed by 'cheap fare' and 'easy access to bus stop'. Respondents who used bus transit also to do concern on safety factor where statements such 'safe at night' (loading = 0.672), 'friendly driver' (loading = 0.669), and 'feel safe on a bus' (loading = 0.668) are rated high within four-point Likert scale. Respondents rated 'convenience for elderly/disabled' as the last aspects among twenty items with loading = 0.541. Besides, Cronbach's alpha value is checked to for item reliability.

4.5 Perceptions towards city bus services

Factor 1: Comfort

This factor is the main contributor in affecting people's perceptions of the effectiveness of both minibus and transit bus service, and it includes the physical condition, the convenience and comfort that experiences while being on the bus or at the terminal. The Figure 1 used earlier reveal that the respondents are satisfied with safety at the bus terminal, but do not appreciate the congestion or overloaded buses and lack of facilities for the elderly and disabled, carry items and clean terminal. Soltani et al. (2012) in their research in Kuala Lumpur about accessibility for disabled in public transport terminal, found out that there are a lot of improvements needs to be done, and the feeling of unsafe among women travellers is still very high when they are using a public transport (Rohana et al. 2012) . The current system that allows permits to be given out to individual bus operators has resulted in too many permits being issued and has led to bus operators competing with each other. To get more profits, buses that are managed by bus entrepreneurs with more than ten years are taking more passengers than they should. Travel will only take place when the bus is overloaded, and they will also choose a route that will give more profits.

Factor 2: Accessibility

The minibus is better in accessibility aspect as according to the respondents such as waiting time, good coverage and bus on time (see Figure 1). Its small size enables it to pick up and set down passengers relatively easily. According to Abd Rahim (2004), the advantage of using minibus against the larger bus in its ability to maneuver easily reasonable speed due to its size and organisational form. Even though the transit bus has the capacity to accommodate more passengers as compared to the minibus, but the latter that cannot provide optimum frequencies. The average shows that inaccurate itinerary and waiting time are the main problem. As the Final Report, Public Transport Fares In Peninsular Malaysia, the Ministry of Entrepreneur and Cooperative Development (MECD, 2008), stated that the main problem of the transit bus is the failure to ensure the accuracy of the time while taking passengers, too much unhealthy competition, overlapping routes, and higher operating costs.

Factor 3: Safety

It shows that feeling safe while inside the bus and feeling safe at night are the major problems for both bus modes (minibus and transit bus). However, respondents are satisfied with the level of security during the day. This suggests that the efficiency and discipline of the driver are not the main cause of the lack of safety on public transportation services, but rather the problem arises due to the lack of lighting infrastructure and congestion when boarding the bus.

5.0 Conclusion

Although some research has been done regarding the effectiveness of public transportation, there are few studies regarding the dispute between the effectiveness of the use of a minibus versus that of a transit bus. The contribution of this study is to identify the primary components of satisfaction among the users of both a minibus and a transit bus. This study showed that a minibus service is noteworthy regarding the level of comfort and convenience that it affords its users.

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