Environmental Concerns Motivate Intention to Utilize Free Bus Services : An Empirical Study in Malaysia

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Abstract

The free bus concept is one of the strategies used in many countries to reduce the traffic congestion problems. In Australia, free buses have been introduced in selected places to protect the nature of the city, but not for office commuters. Malaysia is unique in the sense that the free bus service is funded by the government as an alternative for commuting to ease the traffic woes. The purpose of this study was to identify the factors influencing the utilization of the free bus service since the free bus service is underutilized by 55% even after 2 years of its implementation in Malaysia. This study examined the relationship between five independent variables (predictors) namely, perceived ease of use (PE), perceived usefulness (PU), moral obligations (MO), subjective norm (SN), and financial incentives (FIN) on the intention to utilize the free bus service. From the current empirical study of 142 respondents, 60.6% were utilizing the free bus service, and 39.4% were non-users. The results showed that PE, PU, MO, and SN significantly influenced the intention to use the free bus service. It is worthwhile to mention that FIN did not statistically influence the intention to use the free bus service. It clearly indicates that people will not take it for granted anything that is given free of cost. The findings strengthen the application of the decomposed theory of planned behavior (DTPB) in predicting Malaysian commuters' behavior. The research findings also indicate that people have started taking note of the environmental problems and the ultimate benefits of using public transport for primary travel to resolve traffic congestion issues.

Keywords: intention to use free bus, moral obligation, perceived usefulness, subjective norm

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The rapid increase of private vehicles ownership in Malaysia is mainly due to rising standards of living and the poor public transportation system. Vehicle ownership in major cities, for example, Klang Valley and Penang increased significantly since the past decades. There are more vehicles than people in Penang with an average of 1.06 vehicles per person for the 1.5 million population and is growing at an average of 9.5 % p.a. (Madhoun, Ramli, Yahaya, Yusuf, Ghazali & Sansuddin, 2008). The usage of public transportation in Klang Valley dropped sharply from 35% in 1985 to 11% in 2008. According to Penang Transport Master Plan Strategy Report (2013), the situation is worse in Penang, the public transportation usage is only about 3.0% compared to 80% in

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Hong Kong, 60% in Seoul, 56% in Singapore, 54% in Manila, and 49% in Tokyo (Mat, Othman, & Hussain, 2008). The increasing number of private vehicles and low public transport utilization has generated various environmental, social-economic, and traffic congestion problems. The largest proportion of CO_2 emissions contributing to global warming is from transportation. On the social level, car use threatens the urban quality of life because it is noisy, causes odor annoyance, local air pollution, and causes traffic accidents (Steg, 2003). Problems associated with traffic congestion include workforce stress as time is wasted by being stuck in the traffic. Traffic congestion also causes loss of productivity and impacts the competitiveness of a city in a global market. Continuing to build more roads has proven to be not effective in resolving the traffic congestion problems and might cause further financial and social economic costs.

There is need to have a strategy to promote the use of public transportation in Malaysia. Increasing ridership of public transport service is one of the seven National Key Results Areas (NKRAs) under the Malaysia National Transformation Program (NTP) with the aim to propel the country into a developed, high income nation by 2020 (Kang, Jayaraman, & Soh, 2013). In Penang, the traffic woes within the Bayan Lepas Free Industrial Zone (FIZ) corridors and the Penang Bridge are no secret. The Penang Bridge Corporation estimated the number of vehicles travelling from the mainland to the island is 70,000 vehicles a day. Two-thirds of the vehicles entering the Bayan Lepas FIZ come from the mainland (Quah, 2011). The impacts due to the traffic congestion are significant in terms of time, resources, and air pollution. Soon (2010) remarked that the Penang Bridge congestion alone caused 328 million hours of travel delay and 10 million liters of wasted petrol. The "Bridge Express Shuttle Transit" is a pilot project that was launched in March 2011 to reduce traffic congestion. The Bridge Express Shuttle Transit (BEST) program is the state government's latest effort with RM2 million annual costs to ease the problem and provides an alternative transport solution for commuters (Quah, 2011).

Employees park their vehicles at the designated car parks in Sunway Carnival, Bandar Perda, and Juru Auto City in the morning, hop on to a bus, which takes them across the Bridge through the FIZ. In the evening, employees get back on the bus and head back to the mainland. Considering the cost, social-economy, and environmental benefits, the BEST Park and Ride transit seems to be a good alternative transport solution for the commuters. However, the system is underutilized by approximately 55% after 2 years of implementation. This phenomenon highlights a fundamental problem regarding the acceptance of the free bus service among the FIZ employees, which is worth investigating. Apart from the basic factors, Herzberg (1966) would call them the "hygiene factors" like bus schedule, cost, availability, and comfort of the bus service, and hence, it seems appropriate to look into the psychological factors of the use of such a system. This appears necessary if we intend to increase the usage of such a bus system because we must be aware of the fact that we are talking about a few hundred passengers only and ,therefore, the model discussed here can be a pilot project only. If carefully and successfully carried out, it might, however, have a multiplier effect.

Literature Review

Prior research about the relationship between psychological factors of behavior intention and the use of public transportation has been widely conducted. At this stage, we are not using Herzberg's two factor theory of hygiene factors and motivators (this could be applied in a later stage), but the theory of planned behavior (TPB), which is regarded as one of the psychological models that have been applied widely in predicting travel behavior. For example, Warner and Aberg (2006) applied the TPB to study drivers' decision to speed ; Heath and Gifford (2002) extended the TPB to predict the use of public transportation in Canada university after the U-pass implemented ; Long, Choocharukul, and Nakatsuji (2011) used the extended TPB to investigate the significant influence on the psychological factors on commuters' behavior intention toward the sky train usage in Phnom Penh, Cambodia. This research used an expanded version of the decomposed theory of planned behavior (DTPB) to predict and explain the factors influencing the utilization of the free bus service.

The theory of planned behavior (Ajzen, 1991) is an extension of the theory of reasoned action by adding perceived behavioral control as the third factor to account for situations where an individual lacks substantial control over target behavior. Ajzen (1991) claimed that TPB is a general theory of social behavior to explain all kinds of intentional social behaviors. In TPB, there are three determining factors of intention :

(1) Attitude Towards the Behavior: How favorable or unfavorable a person feels towards the behavior in doubt,

(2) Subjective Norm : It is the perceived social pressure from the people who are important to the respondents either to execute the behavior or not.

(3) Perceived Behavioral Control : How easy or difficult a person perceives his or her ability to perform the desired behavior.

TPB has been widely used in transportation research to predict travel behavior. Heath and Gifford (2002) expanded the TPB to successfully explain public transportation use among university students. In Cambodia, Long, Choocharukul and Nakatsuji (2011) extended the TPB to investigate the commuter's behavior intention toward future sky train usage in Phnom Penh. Based on Abrahamse, Steg, Gifford, and Vlek (2009), TPB and moral considerations were able to explain self-reported car use for commuting and intentions to reduce it in a sample of Canadian office workers. A study by Heath and Gifford (2002) also showed that attitudes, subjective norms, and perceived behavioral control significantly influenced the university students' intention to use a bus.

DTPB is an alternative version of the TPB model with decomposed belief structures (Taylor & Todd, 1995). The decomposition provides a stable set of beliefs, which can apply across a variety of settings. Finally, by focusing on specific beliefs, the model becomes more managerially relevant, pointing to specific factors that may influence adoption and usage. DTPB decomposes attitudes further by incorporating perceived usefulness and ease of use as variables to have better predicative power compared to the traditional theory of planned behavior model and technology acceptance model. The perceived ease of use and perceived usefulness were found to have significant positive effects on an individual's attitude toward public transit in Kaohsuing City, Taiwan (Chen & Chao, 2011).

Ndubisi (2004) found that attitude has an important direct influence on intention to adopt e-learning, and attitude is anchored to perceived usefulness, ease of use, and system security. Huang and Chuang (2004) revealed that employees behavior of information system use could be predicted by attitude and perceived ease of use. Hsu, Wang, and Wen (2009) examined consumer behavior intention towards mobile text message coupons and discovered that perceived usefulness and perceived ease of use influenced the intention to use mobile coupons.

Park and Ride have been identified by transport planners and policymakers as one of the many policies that can help to alleviate the traffic congestion problem. The Park and Ride concept involves commuters driving to the public transport terminals, park their vehicles, and continue their journeys to their destinations by public transport (Adnan, Alyia, Hamsa, & Azeez, 2011). Thus, traffic is shifted from the critically congested urban areas to the P&R sites that are distributed on the periphery of the urban areas (Sivakumar, 2007). Many factors that influence the acceptance of the P&R system have been studied in various research studies. In Sweden, according to Olsson (2003), security at parking lots, availability of spaces at the parking lots, costs at the parking lots, and walking distances between the parking space and the station are important factors influencing the acceptance of the P&R system. Shirgaokar and Deakin (2005) found that many P&R lots in the San Francisco Bay Area of California were fast approaching the capacity and there was a need to create new ways to increase parking supply. Users have concerns on lot security, the lack of lighting, and the quality of transit services offered.

Increasing the ridership of public transport service is one of the seven National Key Results Areas (NKRAs) under the Malaysia National Transformation Program (NTP). The motivation of this research is to understand why the commuters were using or not using the free bus service, and what are the actions that could be taken by the

government to improve the service and utilization of the system? We also propose to expand the TPB and DTPB by adding moral obligation and the incentives constructs to have a better prediction of the intention toward the usage of transport service systems. Based on the literature review and the theoretical framework, the following research hypotheses are, therefore, proposed for the study :

✤ **H1-H5 :** The (independent) variables - Perceived Ease of Use (PE), Perceived Usefulness (PU), Moral Obligation (MO), Subjective Norm (SU), and Financial Incentives (FIN) are positively related to the intention to use the free bus service.

✤ **H6 :** Travel habits moderate the relationship between the independent variables and the intention to use the free bus service.

✤ **H7 :** When verifying or falsifying hypotheses 1-5, users and non-users of the system show different characteristics.

✤ **Intention to Use the Free Bus Service :** Based on the theory of planned behavior, intentions are the closest antecedents of behavior.

> Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance. (Ajzen 1991, p. 181)

Intention refers to motivation, whereas the second part (see above), behavioral control, refers to the real or the perceived ability to perform a behavior (Ibid., see also Bamberg & Schmidt, 2003).

The Independent Variables :

(1) Perceived Ease of Use (PE) : Davis (1989) defined perceived ease of use as the degree to which an individual believes that using a particular system would be free of physical and mental effort. According to Rogers (1983), perceived ease of use is the degree to which consumers perceive a new product or service as better than its substitutes. Research provides evidence of the significant effect of perceived ease of use on usage intention, either directly or indirectly (Jahangir & Begum, 2008). Maditinos, Tsairidis, and Grigoriadis (2009) empirically found that perceived ease of use significantly affected customer internet banking acceptance intentions in Greece and Bulgaria. The degree to which travelers needed to spend affective and cognitive efforts using public transportation determined the ease of use of the system. There are three types of efforts to measure ease of use. First is the physical effort, which is the physical activity on a journey. Second is the cognitive effort, which is the effort expended on a journey by means of information gathering and having to process the information for route planning, navigation, and reorientation. Finally, the emotional energy expended on a journey in dealing with uncertainties regarding safety and delays is known as the affective effort (as cited in Kinsella & Caufield, 2011).

(2) Perceived Usefulness (PU) : Perceived usefulness is defined as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). Davis (1993) conducted a study and confirmed that perceived usefulness significantly influenced the new system acceptance usage. Studies have validated the relationship between perceived usefulness and user acceptance of systems. Lee, Park, and Ahn (2001) found that PU directly affects the consumers' purchasing behavior and adoption of e-commerce. In terms of

transportation research, Chen and Chao (2011) in Taiwan found that perceived usefulness had significant positive effects on an individual's attitude and switching intentions towards public transit. Travel time and travel cost are the two important variables that commuters determine whether the public transport system is perceived to be useful. In Sweden, Eriksson, Friman, and Gärling (2008) found that shorter travel time and lower public transport fares were the main reasons for the car users to increase public transport use. Majumdar and Lentz's (2012) study conducted in a rural district in United States showed that cost saving, time saving, frequency of service, job accessibility, the acceptance of a variety of payment options, and the flexibility to perform some other activities during travel influenced individuals' decision to use public transportation.
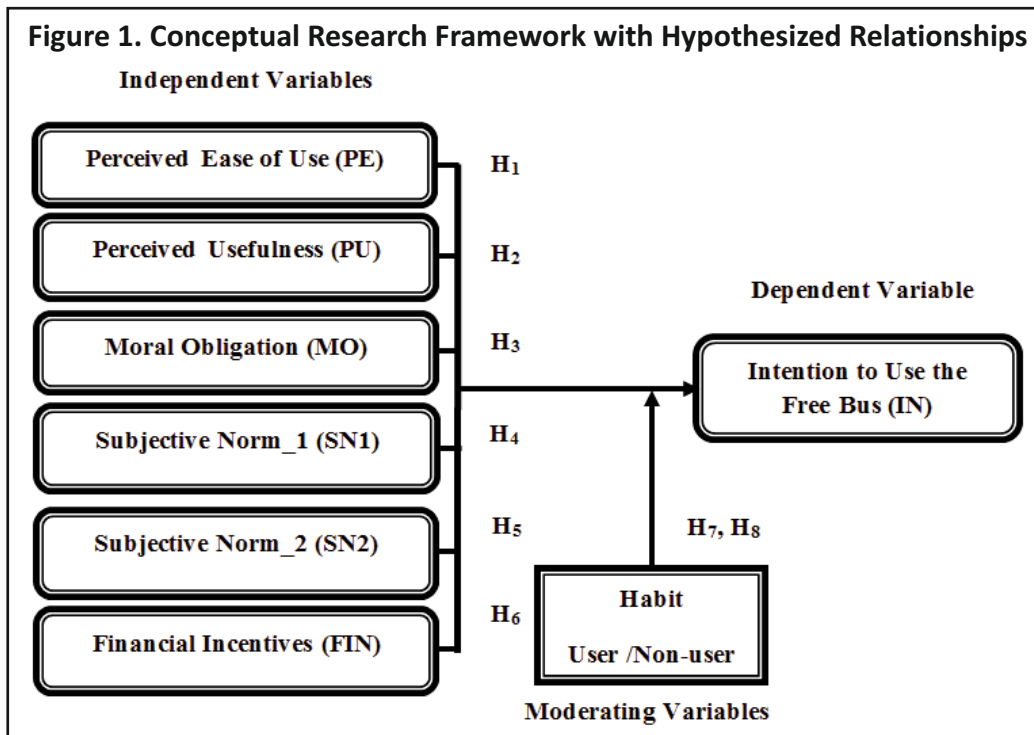
(3) Moral Obligation (MO) : Schwartz (1977) claimed that the feelings of moral obligation regarding each specific action was generated by weighing the action's impact on the norms and values to which it was related. The more important the relevant norms and values are to one's self-evaluation, the stronger are the feelings of obligation which are experienced. There are four variables to activate the norm-activation process :

(i)   The problem awareness and understanding of the problem created by the behavior to the environment,
(ii)   The individual need to feel responsible on the consequences of the behavior,
(iii)   The outcome efficacy (defined as the identification of actions to relieve the needs of others),
(iv) One's own perception of the ability to provide relief.

     Clark, Kotchen, and Moore (2003) analyzed the data from a mail survey of participants and non-participants in United States in a premium-priced green electricity program, and the results revealed that normal activation model (NAM) variables were significant in influencing the users' decision to participate in the program. Schwartz (1977) proposed the NAM to explain pro-social behaviors in which pro-social behaviors were expected to follow from personal norms reflecting feelings of moral obligation to perform or refrain from specific actions. Fujii and Van (2009) concluded that moral obligation significantly influenced the users' intention to use a bus in Ho Chi Minh city. Long, Choocharukul, and Nakatsuji's (2011) study showed that the awareness of consequences were also found to be significant determinants for the behavior intention to use sky train in Phnom Penh, Cambodia.

(4) Subjective Norm (SN) : Subjective norm is a social factor which refers to the perceived social pressure to perform or not to perform the behavior (Ajzen, 1991). The more favorable the subjective norm with respect to a behavior, the stronger should be an individual's intention to perform the behavior under consideration. Health behavior intentions are predicted well by attitudes and subjective norms (Finlay, Trafimow, and Jones, 1997). Transportation researchers (Chen & Chao, 2011 ; Hsiao & Yang, 2008; Long et al., 2011) found that subjective norms significantly influenced the behavioral intention of using or switching towards public transit use. The variable is usually separated into interpersonal and external influences (Lin, 2008). Maditinos et al. (2009) claimed that the beliefs enacted on an individual from friends, family, and his or her close social circle is known as interpersonal influences, whereas mass media, government, and others exert the external influences. The results of the survey showed that the split in the variable was meaningful, and therefore, the variable was separated into SN1 (personal influence) and SN 2 (external influence).

(5) Financial Incentives (FIN) : One of the most common trip reduction strategies is the use of financial incentives to change commuter behavior (Kearney & Young, 1996). We need to look at the problem from the social, psychological, and economic perspective. Bachman and Katzev (1982) found that the use of public transport could be encouraged and maintained by free rides. Sriroongvikrai, Choocharukul, and Fuji (2008) found that transit price incentives strategy effectively influenced the Bangkok University students' behavior towards public transport use. Thogersen (2009) found that the free month travel card led to a doubling of the use of public transport in

Figure 1. Conceptual Research Framework with Hypothesized Relationships

Independent Variables

Perceived Ease of Use (PE)	H_1
Perceived Usefulness (PU)	H_2
Moral Obligation (MO)	H_3
Subjective Norm_1 (SN1)	H_4
Subjective Norm_2 (SN2)	H_5
Financial Incentives (FIN)	H_6

Dependent Variable

Intention to Use the Free Bus (IN)

H_7, H_8

Habit
User /Non-user

Moderating Variables

Copenhagen. Parking cash-out refers to a commuter benefit that offers employees the option to accept taxable cash income per month instead of a free or subsidized parking space at work. A tax incentives program was able to encourage the use of public transportation in United States and Ireland (Zimmerman, Turner, & Dwinell, 2011). The government could implement high-occupancy vehicle (HOV) or dedicated bus lanes to encourage the use of public transport. The presence of freeway HOV lanes significantly reduced solo driving by between 11% - 18% in Los Angeles (Brownstone & Golob, 1992). Sometimes, financial disincentives (e.g. parking fees) are used (Kearney & Young, 1996).

(6) Moderating Factor - Habit : According to Ouellette and Wood (1998), habit is defined as behavioral tendency. People tend to repeat the same behavior under stable conditions. Habits means people tend to perform the behavior in a same routine way; the strength of a habit influences the frequency a behavior that is practiced. Based on Verplanken, Aarts, and Knippenberg (1997), people who have a strong habit in choosing a particular travel mode choice need lesser information when trying to select their travel mode.

(7) Moderating Factor - User /Non - User : Being a user or a non-user of a public transport system might also be influenced by habits, but is probably more. We assume ,therefore, the fact that somebody does not use the bus system will influence his or her perception of the system and thus the attitude towards public transport. Whether the non-use is a cause of attitude or vice versa need not not be discussed here, but the differences of users and non-users might lead to important conclusions when trying to enforce the usage of such systems. After all, it is mainly the non-users who need to be convinced if ever such a system should contribute measurably towards traffic reduction. The users and non-users moderator is a quasi-moderator since it interacts with the predictor variables (Moral Obligation and Subjective Norm_1) and is directly related to the dependent variable. If a moderator variable only interacts with the predictor variable, it is a pure moderator (Sharma, Durand & Gur-Arie, 1981). An overview on the conceptual research framework is shown in the Figure 1.

Table 1. Factor Loadings of Model Variables Using Principal Component Analysis

			Factors			
Moral Obligation	1	2	3	4	5	6
MO5	**.897**	.050	.091	.064	-.096	-.024
MO4	**.890**	.088	.103	.146	-.078	-.035
MO2	**.866**	.103	.143	.069	-.047	.040
MO3	**.834**	.081	.186	.129	.057	.057
IN6	**.599**	.321	.050	-.237	-.240	.084
Financial Incentives						
FIN3	.075	**.829**	-.005	-.028	-.010	.096
FIN1	.088	**.802**	.158	.065	.173	.047
FIN2	.089	**.782**	.043	.114	.189	.217
FIN4	.013	**.647**	.248	.080	-.230	-.065
FIN5	.300	**.604**	-.122	.048	-.227	.059
Subjective Norm_1						
SN1	.290	.138	**.812**	.142	-.142	.118
SN2	.204	.174	**.808**	.202	-.123	.163
SN3	.106	.004	**.799**	.277	-.032	.227
Perceived Usefulness						
PU2	.005	.170	.121	**.843**	-.072	-.086
PU3	.043	-.010	.013	**.831**	.183	.059
PU4	.084	.011	.337	**.751**	-.188	.025
PU5	.301	.089	.319	**.625**	-.327	.000
Perceived Ease of Use						
PE1	-.094	.016	-.214	-.061	**.789**	-.078
PE3	-.144	-.010	.338	-.150	**.707**	-.151
PE2	-.019	-.005	-.274	.036	**.702**	.152
Subjective Norm_2						
SN4	-.093	.034	.202	.028	.020	**.874**
SN5	.166	.295	.171	-.053	-.078	**.721**
KMO			0.778			
Eigen Value	6.02	2.718	2.5	1.8	1.67	1.062
Total Variance (71.69%)	27.36	12.36	11.37	8.19	7.6	4.83

Note: MO1, PU1, PE4, and PE5 were dropped due to high cross loadings of more than 0.35

Research Methodology

This is a cross sectional study and the data was collected over a period of one month from September - October 2014. A self-administered questionnaire was utilized in this research. Prior to the main study of the research, a pilot run was conducted to examine the structure and content of the questionnaire. According to Presser et al. (2005), pre-testing is the only way to evaluate in advance whether a questionnaire causes problems for respondents, and it usually takes not more than 12-25 cases to reveal the major difficulties and weaknesses in a pretest questionnaire. A total of 20 surveys were conducted for pre-testing, and the feedback was incorporated to enrich the survey

Table 2. Descriptive Statistics

Variables	Overall Samples		Users		Non-Users	
	Mean	Std Deviation	Mean	Std Deviation	Mean	Std Deviation
Intention to use bus	3.7606	1.0551	4.2512	0.7975	3.0071	0.9541
Moral Obligation	4.3817	0.7393	4.4977	0.6681	4.2036	0.8063
Financial Incentives	3.6761	1.1487	3.8233	1.1593	3.4500	1.0963
Subjective Norm_1	3.4061	1.0591	3.7868	0.9486	2.8214	0.9498
Perceived Usefulness	2.9965	1.1653	3.2907	1.1742	2.5446	0.9968
Perceived Ease of Use	2.8192	1.1408	2.6628	1.1360	3.0595	1.1090
Subjective Norm_2	2.9507	1.2402	3.1163	1.2743	2.6964	1.1456

Table 3. Reliability Analysis

Factors	No. of items	No. of items deleted	Cronbach's Alpha
Moral Obligation	5	1	0.894
Financial Incentives	5	1	0.807
Subjective Norms_1	3	2	0.902
Perceived Usefulness	4	1	0.828
Perceived Ease of Use	3	2	0.655
Subjective Norms_2	2	0	0.659
Intention to use free bus	5	0	0.961

questionnaire. The final questionnaire was distributed to the targeted respondents through hard copy in the bus directly for users, and convenience sampling method was adopted for non-users based on the first-come first serve basis. About 142 responses were received for the final survey. Out of the 142 respondents, 60.6% were the current free bus users, and 39.4% were the non-users of the free bus facility. The respondents (142) were represented by 48.6% of women and 51.4% of the respondents were men. The maximum respondents (47.2%) were from the age group between 30-39 years. Majority of the respondents possessed a bachelor degree qualification. Majority of the respondents were working in the semiconductor industry.

The Table 1 shows the results of factor analysis and six factors were extracted. The question items MO5, MO4, MO2, MO3, and IN6 (refer to the Appendix 1A) were grouped into Factor 1. The question items IN3, IN1, IN2, IN4, and IN5 were grouped into Factor 2. Subjective norm was separated into two groups. The question items SN1, SN2, and SN3 formed into Factor 3 and was renamed as Subjective Norm_1. The question items SN4 and SN5 formed into Factor 6 and was renamed as Subjective Norm_2. The results match with literature review whereby subjective norm was usually separated into interpersonal and external influences (Lin, 2008). Subjective Norm_1 means the interpersonal influences which consist of social pressure from the people who are important to the respondents, for example, friends, colleagues, relatives, and family members. The Subjective Norm_2 group relates to the external influences which include the social pressure from public opinion and government policy. The total variance explained by the principal component analysis is 71.69%, and it exceeds the minimum recommended value of 60% (Hair, Black, Babin, & Anderson, 2009).

The Table 2 shows the descriptive statistics for independent and dependent variables for users and non-users. All variables are measured on a 5 - point Likert scale. The scale ranges from 1 being *"strongly disagree"* to 5 being *"strongly agree"*.

The Table 3 reveals that all the seven independent (predictors) and dependent variable have Cronbach's alpha value more than 0.70 for the factors - Moral Obligation, Financial Incentives, Subjective Norm_1, Perceived Usefulness, and the Intention to Use Free Bus. Perceived Ease of Use and Subjective Norm_2 have Cronbach's alpha values above 0.6.

Analysis and Results

Multiple regression analysis is used to investigate the relationship between the study variables. There are two types of hypotheses in this study, the independent variables influence the dependent variable and the moderating effect on the relationship between independent and dependent variables. A moderator is a variable that specifies conditions under which a given predictor is related to an outcome. Moderation implies an interaction effect, where introducing a moderating variable changes the direction or magnitude of the relationship between variables. Hierarchical multiple regression is used to assess the effects of a moderating variable. The coefficient of determination, R- square indicates how well the data points fit a line or curve. The adjusted R-square is used to estimate the expected shrinkage in R-square that would not generalize to the population. If the adjusted R-square value is much lower than R-square values, which is not the case in the present study, it indicates that the regression equation has limited generalizability. Finally, the multicollinearity problem will be checked by referring to the Variance Inflation Factor (VIF) and the general guideline is the value should be less than 10 to confirm that there is no multicollinearity problem in the model.

The Table 4 shows the multiple regression analysis results. The Durbin Watson value is 1.782, which is within the acceptable range for the error term to become independent, and all the predictors have VIF values below 4 to confirm that there is no multicollinearity problem in this model. The factors - Moral Obligation, Subjective Norm_1, Perceived Usefulness, and Perceived Ease of Use were found to be significant on the Intention to Use Free Bus. The factors - Financial Incentives and Subjective Norm_2 were found to have no significant effect on Intention to Use the Free Bus. Perceived Ease of Use is negatively significant with the dependent variable. The response to the factor - Perceived Ease of Use is negatively related to the factor - Intention to Use Free Bus because *"strongly agree"* here means that the respondents agreed to a negatively oriented question like "it takes a lot of mental effort to plan my trip with the BEST park and ride transit". The factors - Moral Obligation (MO), Subjective Norm_1 (SN_1), and Perceived Usefulness (PU) are positively significant on the Intention to Use Free Bus. Travel time is perceived to be an important factor influencing the utilization of the free bus service (PU). It can be ascertained that the high level of education of the respondents goes in line with an increased level of sensitivity for environmental problems (MO). Social pressure from peers is found to have a positive significant relationship on the Intention to Use Free Bus (SN_1). Surprisingly, the travel cost and financial aspects do not influence the intention to use the free bus service. This might be due to the fact that most of the employees were professionals under management category and ,therefore, gave less importance to travel cost.

In addition, most of the MNCs in the Bayan Lepas FIZ corridors provide travel cost subsidy to the employees, and by taking a bus to commute to work, the employees lose the monthly subsidy provided. The financial disincentives like the imposition of parking fees at the workplace do not influence intention to utilize the free bus service. The results are aligned with the face to face personal interviews with the commuters and non-commuters of the free bus service in which travel time is the most important factor influencing the acceptance of the system instead of cost saving. The instrument of having dedicated bus lane to improve travel time is found to be significant. In this study, the driving habits do not significantly influence the intention to use free bus and also do not significantly moderate the relationship between the independent variables to the intention to use the free bus. Contrary to Ouellette and Wood (1998), it appears that when behavior is repeatedly performed and becomes habitual, it may be less guided by habits than expected.

The research hypothesis is that the intention to use the free bus is a function of multiple influencing factors and specifically, whether habit of driving and category of users and non-users of the system moderate the relationship between these factors and the intention to use the free bus. Based on the moderator regression analysis, the users and non-users have a significant relationship with the dependent variable and moderate the effects of Moral Obligation and Subjective Norm_1 towards the intention to use free bus. Thus, the scores of Subjective Norm_1 increase (the influence of family members, friends, and relatives increase) the intention to use the free bus may be

Table 4. Multiple Regression Analysis with Moderators and Interaction Effects

Hypothesis		Standardized Beta	t-value	p-value	Decision	VIF
H1	Perceived Ease of Use	-0.147	-2.506	0.013	Accepted	1.086
H2	Perceived Usefulness	0.248	3.885	0.000	Accepted	1.297
H3	Moral Obligation	0.179	2.845	0.005	Accepted	1.254
H4	Subjective Norm_1	0.417	5.925	0.000	Accepted	1.572
H5	Subjective Norm_2	0.052	0.849	0.398	Rejected	1.21
H6	Financial Incentives	0.082	1.323	0.188	Rejected	1.214

R^2 = 0.575, Adjusted R^2 = 0.556, F = 30.467, p = 0.000 (ANOVA Table)

Hypothesis		Standardized Beta	t-value	p-value	Decision	VIF
H1	Perceived Ease of Use	-0.116	-2.138	0.034	Accepted	1.101
H2	Perceived Usefulness	0.192	3.140	0.002	Accepted	1.391
H3	Moral Obligation	0.170	2.922	0.004	Accepted	1.258
H4	Subjective Norm_1	0.332	4.720	0.000	Accepted	1.848
H5	Subjective Norm_2	0.039	0.676	0.500	Rejected	1.213
H6	Financial Incentives	0.062	1.083	0.281	Rejected	1.219
H7	User	0.377	4.176	0.000	Accepted	3.049
H8	Habit	0.102	1.083	0.281	Rejected	3.322

R^2 = 0.644, Adjusted R^2 = 0.622, F = 30.040, p = 0.000 (ANOVA Table)

Hypothesis		Standardized Beta	t-value	p-value	Decision	VIF
H1	Perceived Ease of Use	-0.121	-1.535	0.108	Rejected	1.140
H2	Perceived Usefulness	0.313	3.288	0.002	Accepted	1.399
H3	Moral Obligation	0.106	1.400	0.000	Rejected	1.509
H4	Subjective Norm_1	0.466	4.654	0.000	Accepted	2.015
H5	Subjective Norm_2	0.033	0.595	0.553	Rejected	1.229
H6	Financial Incentives	0.045	0.793	0.429	Rejected	1.264
H7	User	0.253	0.532	0.004	Rejected	3.518
H8	Habit	-0.007	-0.070	0.944	Rejected	3.699
H7a	MO*Use	0.875	2.128	0.035	Accepted	1.254
H7b	SN1*Use	-0.663	-2.371	0.019	Accepted	1.440
H7c	PU*Use	-0.411	-1.753	0.082	Rejected	1.190
H7d	PE*Use	0.098	0.540	0.590	Rejected	1.094

R^2 = 0.677, Adjusted R^2 = 0.647, F = 22.565, p = 0.000 (ANOVA Table); Durbin Watson= 1.782

increased for non-users. Also, as the Moral Obligation score increases (particularly with reference to environmental concern), the intention to use free bus increases much more for current users as compared to non-users.

Conclusion

The research objective of this study was to identify the factors influencing the intention to use the free bus service, particularly in the Malaysian context. Based on the literature review and expert comments & suggestions, the variables : Perceived Usefulness, Moral Obligation, Subjective Norm, and Financial Incentives were

conceptualized in the research framework. The results from the multiple regression analysis show that apart from Financial Incentives, all other variables influence the intention to use free bus. Habits as a moderator variable did not have any significant influence, whereas users and non-users show a very distinctive profile ; the users have a much more positive attitude towards the benefits of the free bus facilities. The results of this study confirm the management theory that travel behavior is "reasoned action based". The question is how the results of the study can contribute to help the city administration and the government to improve the use of this system and to possibly create more and better systems like the free bus system. Based on the survey results, one can conclude that:

(I) Advertising : The moral obligation and subjective norm influence on the users can be used in the advertising campaigns to increase the utilization of the bus operations, creating a positive ("caring for the environment") and a "pioneer" image in free bus utilization. If many people use bus travel then automatically there will be a reduction in cars on road which will create a pollution free environment.

(ii) Cognitive Effort and Perceived Ease of Use : Bus users should be supported, wherever possible, to reduce the physical and mental difficulties. Employees should be helped to plan the trip by providing an estimated travel and arrival time, providing ready to use and reliable information on the bus schedule, continuous track improvement, positioning of bus stops, and potential car park places.

(iii) Perceived Usefulness : Travel time appears to be an outstanding factor and may be given utmost attention by improving time schedules and exclusive bus lanes.

(iv) Miscellaneous arguments were raised during the interviews which should be given attention to by planning authorities: Shelters to bus stations, the introduction of bus services during lunch time to enable the commuters to go for lunch outside, improvement of particular routes, and introduction of services to other areas of Penang or an emergency system off schedule (or a shuttle service to the public bus from the factory) to enable the users to visit doctors or attend to some important meetings in other companies.

Managerial Implications

From a theoretical perspective, the results of this study reinforce the decomposed theory of planned behavior in predicting travel behavior. Commuting behavior is based on reasoned actions. This study confirms that traditional predictors of perceived ease of use, perceived usefulness, and subjective norm have a significant effect on intention to use the free bus. The additional moral obligation constructs added to the DTPB model are also found to have a significant influence on travel behavior. The model expansion was found to be useful and valid in predicting commuter behavior in the Malaysian context. This study contributes to the Malaysian government by providing useful information on intention to take public transportation and its determinant factors.

The research results will help the government to improve the free bus transit service, resolve traffic congestion problems, and its consequences of social and environmental impacts. The recommendation to the government is that the efforts should be spent to enhance detailed bus schedule information delivery to the targeted users of the system which helps to reduce the cognitive effort from the users to plan for the trip with free bus, increase the number of buses to provide more frequent services, and reduce the waiting time. The interventions program could be designed to influence the commuters to use the free bus service. Once the right strategies are in place to improve the system and increase utilization of the free bus, the number of cars on the roads during peak hours will be reduced.

Limitations of the Study and Scope for Further Research

The respondents may have some other important factors (other than those considered in the conceptualized research framework) provided in Figure 1 for having not intended to use free bus which is not accounted for in this study. For instance, a respondent can undertake multiple tasks if he/she travels by car instead of bus, like dropping children to school, taking a lunch break outside office, and dropping spouse to the office. Also, Malaysians have become habituated to use car as their mode of transportation for all commuting purposes. Thus, the culture in the form of habit plays a vital role , although it does not moderate in our study. The inbuilt difference between users and non-users in terms of time, scope, and location makes a lot of difference for the preference to use a free bus.

The concepts of offering free services have predominantly appeared in Asian countries. However, financial incentives do not seem to play an important role for a country like Malaysia. Unfortunately, this means that the core concept of the system ("free bus") could not be confirmed, since the financial incentive does not seem to be decisive. This result should be taken with care in view of the respondents' opinion in this survey, but on the other hand, it seems to confirm that the often heard arguments - convenience, travel time, and ease of use appeared to be more important than the bus fare. If this turns out to be true, one could think of introducing fares or monthly flat-rates to provide better services instead of expanding the free bus service.

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Appendix 1A. Question Items in the Survey Questionnaire

Item	Questions	Source
Perceived Ease of Use (PE)	It takes a lot of mental effort to plan my trip with the BEST Park and Ride Transit. (PE1)	Kinsella & Caulfield (2011)
	The lack of information deters me from using BEST Park and Ride Transit. (PE2)	
	While on the BEST Park and Ride bus, I have to continuously re-orient myself and be ready to get off. (PE3)	
	The BEST Park and Ride Transit use is strenuous and puts me in a bad mood. (PE4)	
	If another person has to make this trip, I would recommend them to use the BEST Park and Ride Transit. (PE5)	
Perceived Usefulness (PU)	Taking BEST Park and Ride Transit to commute to work would cost me less. (PU1)	Chen & Chao (2011)
	Taking BEST Park and Ride Transit to commute to work would make my time more efficient. (PU2)	
	Taking BEST Park and Ride Transit to commute to work would reduce my commuting time. (PU3)	
	Taking BEST Park and Ride Transit to commute to work would make my trip more convenient. (PU4)	
	Overall, taking BEST Park and Ride Transit is useful for me when commuting to work. (PU5)	
Moral Obligation (MO)	I should use BEST Park and Ride Transit because it is the right thing to do. (MO1)	Long, Choocharukul, & Nakatsuji (2011)
	I should use the BEST Park and Ride Transit because it is good for the environment. (MO2)	
	I should use the BEST Park and Ride Transit because it is good for society and the city. (MO3)	
	I should use BEST Park and Ride Transit because it will reduce traffic congestion. (MO4)	
	I should use BEST Park and Ride Transit because it will reduce air pollution. (MO5)	
Subjective Norms (SN)	Most people who are important to me would support that I take the BEST Park and Ride Transit. (SN1)	Hsiao & Yang (2008) and Chen & Chao (2011)
	Most people who are important to me think I should take the BEST Park and Ride Transit. (SN2)	
	Most people who are important to me will take the BEST Park and Ride Transit. (SN3)	
	Public opinion will affect my choice of taking the BEST Park and Ride Transit. (SN4)	
	Government policy will influence my choice of taking BEST Park and Ride Transit. (SN5)	
Incentives (FIN)	Monthly subsidies provided by company would encourage me to take the BEST Park and Ride Transit. (FIN1)	Commuter Choice Primer (2013)
	Indirect financial incentives such as additional time off or "points" redeemable for merchandise at retailers provided by company would encourage me to take the BEST Park and Ride Transit. (FIN2)	
	Parking cash-out program provided by the company would encourage me to take the BEST Park and Ride Transit. (Commuter benefit offers employees the option to accept cash income instead of free parking space at work. This give employees the choice of how to use the money, for parking or free transit system.) (FIN3)	
	Imposition of parking fee at workplace or removal of bridge toll subsidy provided by the company would encourage me to take the BEST Park and Ride Transit. (FIN4)	
	Additional income tax deduction for taking BEST Park and Ride Transit would encourage me to take the transit system. (FIN5)	
	Dedicated bus lane along the FIZ corridors and Penang bridge during peak hours would encourage me to take the BEST Park and Ride Transit. (FIN6)	
Intention to use free bus (IN)	I intent to take the BEST Park and Ride Transit. (IN1)	Chen & Chao (2011)
	My intention to take the BEST Park and Ride Transit instead of my existing travel mode is strong. (IN2)	
	I plan to use the BEST Park and Ride Transit instead of my existing travel mode. (IN3)	
	I will make an effort to take the BEST Park and Ride Transit when commuting to work. (IN4)	
	I will make an effort to take the BEST Park and Ride Transit when commuting to work. (IN5)	
Driving Habit (Moderator)	How many days per week you are driving or using motorcycle to commute to work.	Chen & Chao (2011)