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Abstract

Hanoi is a populous capital with consistently growing transportation demands. This study applies an integrative model based on the Theory of Planned Behavior (TPB), service satisfaction, and environmental concern, in order to examine behavioral intention to use public transportation systems. Using 873 completed questionnaires collected from residents in Hanoi who have used public transport before. The study demonstrates that attitude, perceived behavioral control, personal norms, and descriptive norms influence behavioral intention. The impact of subjective norms lessens when descriptive norms and personal norms are included in this integrative model. Environmental concern indirectly affected behavioral intention through attitude, perceived behavioral control, and personal norms, thus strengthening the TPB model. This shows the appropriateness of this TPB-based integrative model, while service satisfaction is not an important motivation for changing from private vehicles to public bus systems. Theoretical and policy implications are discussed, along with suggestions for future research.

Keywords: theory of planned behavior, descriptive norm, environmental concern, public transport

Introduction

Transportation is a critical challenge in growing and developing countries such as Vietnam. With a population of about 95 million (World Bank, 2018), Vietnamese experience day-to-day struggles on the road, especially in the capital city Hanoi with its 7.3 million inhabitants and an estimated average population density 2239 people/km2 (General Statistics Office of Vietnam, 2018). Although this is actually one of the lowest densities for a South-East Asian capital city, Hanoi has

the worst air pollution in the region. Most people use motorbikes, which are the most affordable and convenient way to travel from point to point, resulting in high carbon emissions and serious air pollution. The city consistently has unhealthy air quality readings with PM2.5 levels ranging from 100 to 200 micrograms per cubic meter (hourly reading) while WHO guidelines indicate that PM2.5 level should be at 25 micrograms per cubic meter to be considered safe from pollutant risk.

To overcome these problems, a successful public transportation system could bring a lower fuel consumption, lower CO_2 emissions, and less air pollution (Donald et al., 2014). The public transport system in Hanoi is operated and managed by Transerco, a state-owned company managing more than 112 bus lines in Hanoi. It operates daily from 4:30 a.m. to 11:15 p.m., covering all the 30 administrative units (inner and outer districts, and towns) of Hanoi, with more than 1000 vehicles, and serves around 450 million passenger trips per year for a variety of bus routes and types (including tourist/City Tour buses). The ticket price is affordable starting around US$0.30 for routes below 25km up to US$0.40 for routes longer than 35km. Monthly subscription ticket is approximately US$4.30 to be used on a single route or US$ 8.60 for connecting route. Transerco has recently put in place a cashless payment method using VNQRPay for monthly subscribers. Two years ago, it launched the first bus rapid transit (BRT) route hoping to take some of the five million motorbikes and scooters off the roads in order to reduce congestion and pollution in the city. However, the BRT has a low take-up rate and most passengers are students or retirees. Hanoi currently has 1.6 million daily bus users and that figure is declining, whereas it has close to 5.5 million individual vehicles, including more than 5 million motorbikes (Bao moi, 2017; Ministry of Transportation, 2018). These figures show that buses are clearly not the first transport choice of many city dwellers.

The "motor biking" culture, which allows Hanoians to enjoy greater flexibility and personal control, could be one of the obstacles to the usage of public transport systems such as the

BRT (Ng & Phung, 2015). Hanoi is experiencing rapid economic growth yet is highly polluted, thus an understanding of what influences its residents to choose or ignore the public bus system would be of critical value. A number of studies have adopted the Theory of Planned Behavior (TPB), a popular theory to predict consumer intention to use particular products and services (Ajzen, 1985) and to understand the choice of travel mode (De Bruijn et al., 2009). The implementation of BRT in Hanoi also needs to be evaluated from the perspective of customer satisfaction in particular; it being often assumed that greater customer satisfaction leads to positive behavioral intentions (Grujičić et al., 2014; Guirao, García-Pastor & López-Lambas, 2016). Rapid increase in the ownership of private vehicles, due to high rates of urbanization, significantly threatens future environmental sustainability. Hanoi's BRT aims to reduce the usage of private vehicles, and motorbikes in particular, which contribute significantly to urban pollution. In achieving this, it would be useful to establish the extent to which environmental considerations affect Hanoians' travel choices.

The purpose of this study is to examine the intention to use public transport in Hanoi, specifically in using public transportation like the BRT. A better understanding of how transport choices are made could help policy makers and the BRT operators improve their current offerings. In addition, key stakeholders would be able to design better policies to encourage public transportation usage. Such a modal shift could lead to improved environmental conditions and the better health and well-being of the people (Haghshenas & Vaziri, 2012). A significant reduction in private vehicles would be a good countermeasure to Hanoi's rising urban air and noise pollution.

From a theoretical perspective, this study extended the TPB model by using two additional constructs relevant to the research context: service satisfaction and environmental concern. This study proposed to determine the impacts of attitude, perceived behavioral control, subjective norms, personal norms, and descriptive norms (which are commonly used constructs in TPB

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models), service satisfaction, and environmental concerns on the behavioral intention to use BRT. As TPB is an established theory that has been applied in many research contexts, the study has selected one of the fastest-growing economies in Asia to investigate the proposed theoretical model in an extended version and offer a different perspective in transport research.

Drawing on previous theory and research, the next section develops the framework of each of the key variables along with the hypotheses within our model. The research design and major findings are then presented after the research framework. The paper concludes with discussion of the findings, limitations of the study, and the potential for future research.

Literature review and hypotheses development

The Theory of Planned Behavior (TPB) assumes that people behave rationally and take into consideration the implications of their actions (Ajzen, 1991). According to the theory, individual human behavior is guided by three considerations: positive and negative consequences of performing a specific behavior (attitude); awareness of social expectation to act on certain behavior (subjective norms); and personal belief in his/her ability to perform the behavior (perceived behavioral control). These three considerations form the basis of TPB theory. Table 1 shows that many researchers have extended the TPB model by adding new factors to capture more of the intention and subsequently the behavior, especially in the norming effects. Based on these prior studies, psychological factors are found better in determining travel mode choice than sociodemographic and infrastructure factors (Hunecke et al., 2010). Some research highlights the fact that subjective norms, as measured in the original TPB model, cannot fully capture the measurement of social influence; therefore, two new variables called personal norms and descriptive norms were added (Bamberg et al., 2007; Donald & Cooper, 2001; Donald et al., 2014; Harland et al., 1999). Environmental concern is another new variable that has been added to

extend TPB models examined recently. Ajzen and Fishbein (1980) comment that environmental concern does not affect individual behavior directly but has an indirect influence.

Besides the TPB theory, another popular approach to the study of public transport usage is through service satisfaction. Prior studies confirmed the role of public transportation's service satisfaction on behavioral intention (Lai & Chen, 2011; Pérez et al., 2007; Widianti et al., 2015). Fu and Juan (2017) incorporated service satisfaction into the TPB model and found it had a mediating effect. Our study includes this relationship, with the extended TPB model, in order to provide a holistic understanding of behavioral intention in the public transport context. The recent implementation of the BRT system in Hanoi could also be evaluated to provide some new insights for the relevant stakeholders.

Table 1 Selected studies on public transportation using TPB/extended TPB theory

Authors	Country	Approach/main theory	Factors used	Significant results
Eriksson & Forward, 2011	Sweden	The expanded version of TPB, separate norm included.	1. Attitude 2. Subjective norm 3. Perceived behavioral control (PBC) 4. Descriptive norm added	Attitude, subjective norms, PBC, and descriptive norms are significant regarding intention to use buses.
Zailani et al., 2016	Malaysia	The expanded version of TPB, contains overall image and past behavior.	1. Attitude 2. Subjective norm 3. PBC 4. Overall image and past behavior included	Attitude, PBC, & overall image are significant predictors, but attitude & PBC alone explain between 34.6% and 49.8% of the intention variance.
Donald et al., 2014	UK	Extended theory of TPB model	1. Attitude 2. Subjective norm 3. PBC 4. Moral norm 5. Descriptive norm 6. Environmental concerns	Public transport use was influenced by attitude, subjective norms, and PBC.

Fu & Juan, 2017	China	TPB	1. Attitude 2. Subjective norm 3. Satisfaction 4. Habit	Attitude, subjective norm, satisfaction, and habit influenced target choice behavior.
Chen & Chao, 2011	Taiwan	Integrated model combining TPB	1. PBC 2. Subjective norm 3. Attitude 4. Habit.	The habitual behavior of private vehicle use hinders an individual's intention to switch to public transport.
Bamberg et al., 2007	Germany	Extended TPB	1. Personal norm 2. Social norm 3. Attitude 4. Subjective norm 5. PBC	Personal norms are a significant predictor of public transport use.
Lo, van Breukelen, Peters, & Kok, 2016	Netherlands	Extended TPB	1. Attitude 2. PBC 3. Descriptive norm 4. Personal norm 5. Habit 6. Subjective norm	Attitude, descriptive norm, and PBC are associated with travel mode intention regardless of travel distance
Zhang et al., 2016	China	TPB	1. Personal Norm 2. Descriptive Norm 3. Subjective Norm	Personal norms and subjective norms are significant for public transport usage.

Attitude, Perceived Behavioral Control, and Subjective Norms

Attitude is defined as the individual's belief about the positive and negative consequences of a behavior and the values ascribed to those consequences. Furthermore, attitude toward the particular behavior leads to the formation of behavioral intentions, especially in the choice of travel mode (Bamberg et al., 2003; Burbidge & Goulias, 2009; Shi et al., 2017). Carrus et al. (2008) showed that personal desire positively encourages pro-environmental behavior such as the use of public transportation. Perceived behavioral control is a non-volitional factor that predicts individuals' perception of the ease or difficulty of undertaking a specific action (Ajzen & Fishbein, 1980). If individuals believe it is easier to take the public bus, they will do it. Donald et al. (2014) found that the most significant variable in predicting intentions was perceived behavioral control. Subjective norms are the expectation of the individual that those people important to him or her

think a particular option should be chosen (Cialdini et al., 1990). This factor has been proven to determine behavioral intention in prior literature (Bamberg et al., 2007; Heath & Gifford 2002; Laudenslager et al., 2004). In public transportation research, Heath and Gifford (2002) confirmed that subjective norm influenced a group of university students in their intentions to use buses. Hence, this study proposes:

H1: Attitude is positively related to behavioral intention;

H2: Subjective norms are positively related to behavioral intention;

H3: Perceived behavioral control is positively related to behavioral intention.

Personal Norms and Descriptive Norms

Personal norms have been defined as a self-concept or internal principles of conduct concerning a behavior (Doran & Larsen, 2016). Unlike personal norms, which refer to internal principles of conduct concerning a behavior, descriptive norms reflect externally imposed rules arising from "*what significant others themselves do"* in a particular social context (Cialdini et al., 1990; Rivis & Sheeran, 2003). The views and behaviour of significant others such as friends and family members provide suggestions that one may refer to in deciding what to do. Comparing to subjective norms which only relate to the beliefs of other people who are important; descriptive norms are generally accompanied by the expectation that people will behave according to the belief. In a study conducted by Bamberg et al. (2007), they emphasized the importance of social context and personal norms in public transport usage. Their study confirmed that personal norms are a major determinant of the intention to use public transport, which was also supported in other studies (Lind et al., 2015; Abrahamse et al., 2009). A recent work by Zhang et al. (2016) found that personal norms could be influenced by awareness of social problems, which in turn would motivate public transport intention and usage. In a meta-analysis study conducted by Rivis and

Shereen (2003), when descriptive norms were included in the original TPB model, it led to an increase of 5% in the level of variance in intention to use public transport. Eriksson and Forward (2011) also confirm the significant role of descriptive norm on the intention to use buses. Though some recent works such as Donald et al. (2014) and Zhang et al. (2016) could not show a significant role for descriptive norms in their extended TPB model, we believe that the perceptions of others' behavior offer a more comprehensive view of social pressures on impacting behavioral intention. Hence, we hypothesize that:

H4: Personal norms are positively related to behavioral intention;

H5: Descriptive norms are positively related to behavioral intention.

Environmental concerns

As a result of high population growth and urbanization, there has been a large increase in the number of vehicles in developing countries (Suman et al., 2017). In the latest report by International Energy Agency (2018), the transport sector contributes substantially to CO_2 per-capita emissions. More usage of public transport can therefore be seen as a good way to reduce this environmental impact (Joireman et al., 2004; Redman et al., 2013). Some studies have found that environmental concern is an antecedent of pro-environmental behavior (Daziano & Bolduc, 2013; Fujii, 2006). Heath and Gifford (2002) suggested that environmental concerns influence the intentions of commuters to use public transport. In a similar context, Fujii and Van (2009) found that an awareness of the mitigating effects of bus usage on air pollution and traffic congestion would make motorcyclists in Ho Chi Minh more likely to use the bus. The indirect influence of environmental concern on behavioral intention was suggested by some researchers (Ajzen & Fishbein, 1980; Bamberg et al., 2003; Chen & Tung, 2014) and has been supported by Wang et al. (2016) who found environmental concern was mediated by the three primary elements of the TPB

model (attitude, PBC, subjective norms) as well as personal norms in decisions to use hybrid electric vehicles. Based on past research, we hypothesize that the attitudes of road users, as well as perceived behavioral control, subjective norms, and personal norms, are positively affected by environmental concerns when they decide to use public bus services.

H6a: Environmental concern is positively related to attitude;

H6b: Environmental concern is positively related to perceived behavioral control;

H6c: Environmental concern is positively related to subjective norms;

H6d: Environmental concern is positively related to personal norms.

Service satisfaction

Service satisfaction is found to have a positive influence on behavioral intent (Baker & Crompton, 2000; Joewono & Kubota, 2007; Ojo, 2019). Service satisfaction refers to "a person's feeling of pleasure or disappointment resulting from comparing a service's performance in relation to his or her expectations" (Kotler & Caslione, 2009). This overall post-purchase evaluation is an important antecedent to predict future usage. A customer's intention to reuse, revisit, or recommend a service will be higher if they are satisfied with the service provided. It is also found that road users are more likely to use public transportation more frequently when they are satisfied with the service. Some studies (see Bonsall et al., 2005; Fellesson & Friman, 2012; Lai & Chen, 2011) have also provided evidence that service satisfaction influences behavioral intentions in public transportation. Thus, we propose:

H7: Service satisfaction is positively related to behavioral intention.

Data and methodology

Sample and data collection

To examine the developed hypotheses and identify the motivating factors in the use of public transportation, a questionnaire survey was conducted in Hanoi. The survey instrument was developed by referring to previous literature and adapting this to the research context. It was translated into Vietnamese by a native speaker with a good command of English and then translated back into English by another researcher fluent in both languages. Comparing the original and alter English versions ensured the Vietnamese version had correctly translated the English original. We conducted a pilot study with 50 participants to ensure the questions were clear and easy to understand. After some minor changes, two trained research associates carried out the fieldwork for about two months. They conveniently approached 1,300 road users, which included bus passengers, pedestrians, motorcyclists, and car owners, through face-to-face invitation. The research associates requested these road users to fill out the paper questionnaires outside office towers and schools, in recreational parks and shopping malls, and on major streets in Hanoi. A total of 186 of them declined to take part in the survey. We further rejected 86 incomplete questionnaires, and thus only 1,028 questionnaires could be used in the analysis. However, a number of private vehicle users (155 respondents) had never used the Hanoi public bus service and this group was not used in the analysis because they could not evaluate the bus service. Therefore, a total of 873 responses were analyzed, giving an overall net response rate of just under 67 percent.

To test for potential non-response bias, respondents were divided into two groups: early response versus late response. The early responses were collected during the first week of fieldwork while the late responses were collected during the last week. No significant difference was found between the two groups after conducting the Chi-squares test on all variables used in the questionnaire. The demographic profile of the respondents is shown in Table 2. More than half

of the respondents (54.9 percent) were female and 64 percent of them were aged between 18 and 35. According to the latest census in 2019, Hanoi has approximately 51% (4.06 millions) of female. The percentage of people between the age of 15-24, 25- 49, and above 50 are 12.7%, 60.2%, and 27.1% respectively (General Statistics Office of Vietnam, 2018). Respondents in this study closely reflect the demographic composition of Hanoi.

Table 2 Demographic profile of respondents

Profile	Category	Frequency (%)
Gender	Male	394 (45.1)
	Female	479 (54.9)
Age group	18-25	324 (37.1)
	26-35	236 (27)
	35-45	182 (20.8)
	46-55	87 (10)
	Over 55	44 (5)
Education level	Secondary school certificate	16 (1.8)
	High school certificate	248 (28.4)
	Bachelor's degree	465 (53.3)
	Postgraduate degree	144 (16.5)
Income Level (1 million VND is about 43USD)	Below 3 million VND	325 (37.2)
	3-4.49 million VND	214 (24.5)
	4.5-6.49 million VND	127 (14.5)
	6.5-13.49 million VND	104 (11.9)
	13.5-25 million VND	64 (7.3)
	More than 25 million VND	39 (4.5)
Occupation	Student	239 (27.4)
	Office/Professional worker	366 (41.9)
	Manual worker	81 (9.3)
	Self-employed	152 (17.3)
	Others	36 (4.1)
Mode of Transport	Bus	335 (38.4)
	Motorcycle	395 (45.2)
	Car	102 (11.7)
	Taxi	10 (1.1)
	By foot	31 (3.6)

Measurements

The scales used to measure original constructs in TPB model were created with some adaptions from prior studies (Bamberg et al., 2007; Donald et al., 2014; Harland et al., 1999) using a 7-point scale in most cases, ranging from 1 'strongly disagree' to 7 'strongly agree,' unless otherwise

indicated below. The other measurements used in the extended model (personal norm, descriptive norm, service satisfaction and environmental concern) and their sources were listed in Appendix 1. The questionnaire also included questions on background characteristics such as gender, age, education, occupation, and income.

Results and analysis

The research framework was examined using statistical software called Smart-PLS 3.0. Partial least squares (PLS) is a variance-based structural equation modelling approach used to test complex multivariable relationships among observed and latent constructs (Vinzi et al., 2010). PLS path analysis is commonly used in empirical research in this field (see Zailani, Iranmanesh, Masron, & Chan, 2016; Wang, Li & Zhao, 2017). It is preferable to covariance-based structural equation-modeling techniques (e.g., AMOS type) when the objectives of a study are to understand individual constructs and the cause–effect relationships among the constructs (Sarstedt, Ringle, & Hair, 2014). PLS path analysis allows us to analyze composites, whereas covariance-based structural equation modeling does not. We applied the two-step model when analyzing the data: measurement model and structural model. According to Henseler et al. (2009), the relationships between a latent construct and its indicators must be validated in the measurement model before the structural model explaining the relationships between latent constructs can be determined.

Measurement model

To ensure that each of the constructs was reliable and valid, we followed the recommendation of Henseler et al. (2009) that each item must have at least 0.4 factor loadings. Some items that did not pass the threshold were eliminated; for example, three items on environmental concerns were not considered in the analysis. All items used in this analysis had a factor loading of at least 0.6.

The internal validity of each construct was measured by Cronbach's alpha, with values ranging from 0.78 to 0.92 (see Table 3). In order to measure the extent to which a series of an item can be denoted by the latent construct, composite reliability was measured. Table 3 also shows that composite reliability range for all constructs were from 0.79 to 0.91, confirming that the reliability of the construct is good (Fornell & Larcker, 1981; Hair et al., 2013).

Table 3 Measurement model evaluation

Constructs	Indicators	Outer Loadings	α	CR	AVE
Environmental Concern (EC)	EC1. Motorbike/car use causes serious pollution in the world.	0.78	0.91	0.91	0.66
	EC2. Motorbike/car use is a major source of noise problem in the world.	0.87			
	EC3. Motorbike/car use contributes to the depletion of energy sources	0.80			
	EC4. In Hanoi, air pollution caused by private vehicles is getting serious.	0.83			
	EC5. In Hanoi, motorbike/car use is a major source of noise pollution.	0.79			
Attitude (ATT)	AT1. For me, using public bus instead of private vehicles (motorbike/car) to go to work/school is Good	0.89	0.91	0.91	0.66
	AT2. For me, using public bus instead of private vehicles (motorbike/car) to go to work/school is Appropriate	0.80			
	AT3. For me, using public bus instead of private vehicles (motorbike/car) to go to work/school is Right	0.73			
	AT4. For me, using public bus instead of private vehicles (motorbike/car) to go to work/school is Beneficial	0.82			
	AT5. For me, using public bus instead of private vehicles (motorbike/car) to go to work/school is Useful	0.81			
Subjective Norm (SbN)	SbN1.Most people who are important to me would support me in using public bus to commute.	0.87	0.87	0.87	0.77
	SbN2. Most people who are important to me think that I should take public bus to work/school.	0.88			
Perceived Behavioral Control (PBC)	PBC1.There's nothing stopping me taking buses to commute to work/school.	0.81	0.86	0.86	0.68
	PBC. It is extremely easy for me to use public bus instead of private vehicles to go to work/school.	0.80			
	PBC3. It is extremely simple for me to use public bus instead of private vehicles to go to work/school.	0.85			
Descriptive Norm (DN)	DN1. Most of my family members use public bus every day.	0.87	0.78	0.79	0.65
	DN2. Most of my colleagues/schoolmates use public bus every day.	0.74			
Personal Norm (PN)	PN1. I feel guilty about it when I ride/drive to work/school.	0.83	0.80	0.79	0.57
	PN2. I do not feel bad about it when I ride/drive to work/school (reverse coded)	0.76			
	PN3. I feel personally responsible for the problems resulting from private vehicle when I ride/drive to work/school.	0.65			
Service Satisfaction (SS)	SS1. Overall, I am satisfied with Hanoi public bus services.	0.80	0.85	0.86	0.76
	SS2. I would say that Hanoi public bus offers excellent service.	0.94			
Behavioural Intention (INT)	INT1. During the next two weeks I intend to use public bus instead of private vehicles to work/school.	0.88	0.90	0.90	0.66
	INT2. During the next two weeks I will use public bus instead of private vehicles to work/school.	0.87			
	INT3. I will keep on taking public bus in the future.	0.86			
α is Cronbach's alpha; CR is Composiste Reliability; AVE is Average Variance Extracted					

To confirm the convergent validity in the measurement model, average variance extracted (AVE) in each construct should be greater than 0.5 according to Chin (2010). Table 3 confirms that this was achieved in all constructs in the measurement model. We further examined the indicator cross-loadings and confirmed that none of them surpassed any indicator load. This step allows us to ensure constructs that are not supposed to be theoretical related are actually not related. The discriminant validity for all constructs is presented in Table 4. Based on the statistical results, we could conclude the measurement model achieved threshold requirements in all reliability and validity tests.

Table 4 Discriminant validity

Constructs	Mean	SD*	EC	ATT	SN	PBC	DN	PN	SS	INT
Environmental Concern (EC)	5.29	1.20	**0.81**							
Attitude (ATT)	5.17	1.33	0.29	**0.81**						
Subjective Norm (SN)	3.85	1.68	0.29	0.40	**0.87**					
Perceived Behavioural Control (PBC)	4.13	1.45	0.36	0.44	0.78	**0.82**				
Descriptive Norm (DN)	3.0	1.61	0.05	0.32	0.76	0.55	**0.80**			
Personal Norm (PN)	4.48	1.18	0.44	0.34	0.41	0.43	0.34	**0.75**		
Service Satisfaction (SS)	3.87	1.42	0.22	0.46	0.48	0.51	0.56	0.37	**0.87**	
Behavioural Intention (INT)	3.72	1.88	0.20	0.45	0.69	0.65	0.73	0.44	0.56	**0.81**

SD=standard Deviation

Structural model

The structural model was evaluated to determine the significance of all hypothesized relationships. In order to do so, we needed to find the path significance using bootstrapping. The path significance was calculated by calculating 500 estimates for each parameter in the SmartPLS 3.0 as recommended by Chin (2010). The original TPB model, which only included attitude, subjective norm, and perceived behavioral control, was measured using PLS bootstrapping.

Bootstrapping is recommended in SmartPLS to estimate the path model. In bootstrapping, subsamples were created with randomly drawn observations from the original set of data (with replacement), to ensure stability of results. This process was repeated until a large number of random subsamples has been created. The original TPB model explained 53.3 percent of the variance in the behavioral intention to use public buses and all paths were significant. Again, PLS bootstrapping was run using the proposed research framework in this study. The inclusion of descriptive norm, personal norm, and service satisfaction in the integrative TPB model explained 66.2 percent of the variance in behavioral intention to use public buses, thus increasing the explained variance by 12.9 percent compared to the original TPB model. The results of path analysis for the structural model is presented in Table 5 and a graphical illustration of the research model in Figure 1.
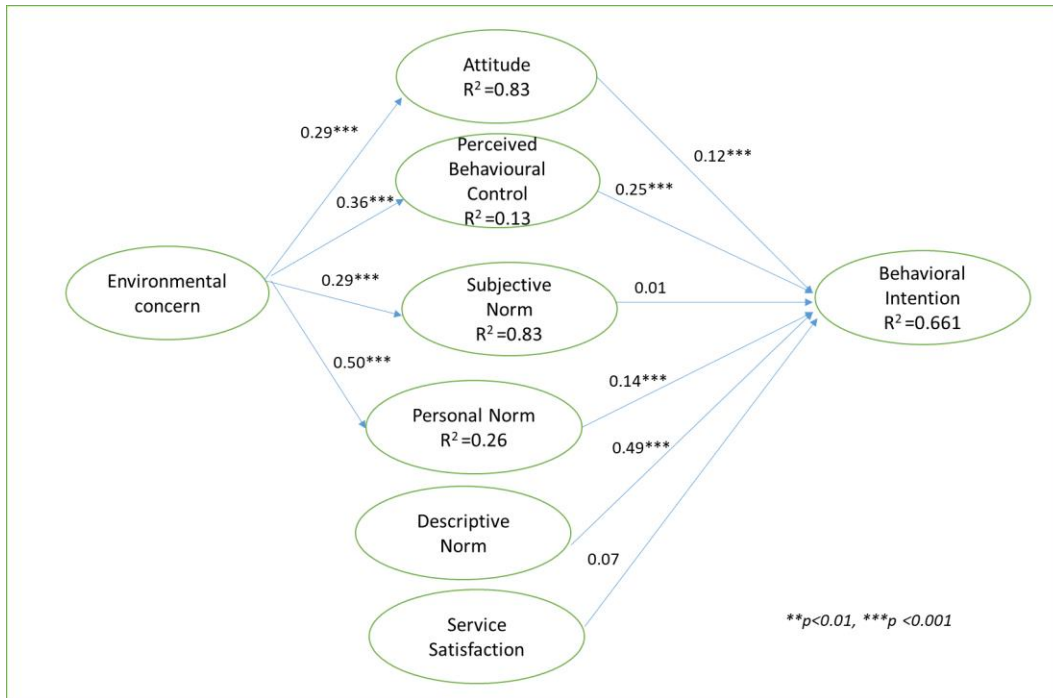

Figure 1 Path analysis graphic description

We can see that the path coefficients from attitude, perceived behavioral control, personal norm, and descriptive norm regarding the intention of using the public bus system were all statistically significant in positive directions. Thus, H1, H3, H4, and H5 are supported. Subjective norm and service satisfaction had no significant influence on the intention to use public buses in this context. The influence of subjective norm is diminished with the inclusion of personal norm and descriptive norm. Previous studies also identified subjective norm to be the weakest determinant in the original TPB model (Bamberg et al., 2007; Laudenslager et al., 2004; Zailani et al., 2016). Of the three norms examined in this model, descriptive norm and subjective norm are based on social pressure (Bamberg et al., 2007). Table 5 shows that descriptive norm had the strongest path coefficient with behavioral intention. These findings show that this group of respondents were more influenced by their significant others are doing (descriptive norm) than by social pressure to perform the behavior (subjective norm). However, the relationship between service satisfaction and intention to use public buses shows as non-significant. This might suggest that the respondents in the study were putting less emphasis in the service aspect.

Table 5 Path coefficients of the structural model

Path	Path coefficient	T-value	Hypothesis	Results
ATT->INT	0.12	3.50***	H1	Supported
SN->INT	0.01	0.2	H2	Not supported
PBC->INT	0.25	3.46**	H3	Supported
PN->INT	0.14	3.02**	H4	Supported
DN->INT	0.49	6.92***	H5	Supported
SS->INT	0.07	1.73	H7	Not supported
EC->ATT	0.29	7.45***	H6a	Supported
EC->PBC	0.37	9.86***	H6b	Supported
EC->SN	0.29	8.3***	H6c	Supported
EC->PN	0.51	13.05***	H6d	Supported
Gender->INT	0.02	0.64		
Age->INT	-0.06	-1.91		
Income->INT	-0.33	-10.1***		
Educational level ->INT	-0.17	5.10***		

$**p<0.01, ***p<0.001$

Results from the structural model also show that concern for the environment had significant positive impacts on four key variables, of which the personal norm had the highest coefficient, followed by the three others variables: perceived behavioral control, subjective norm, and attitude. Thus, H6a, H6b, H6c, and H6d are all supported. Some control variables were included in the analysis; of these, only income group; education level and transport mode provided significant results, both in negative directions. The path coefficients from income group to the use of the public bus system show that the higher the income or education level, the lower the intention of using the bus. We also examined the effect of current transport mode on the behavioral intention. As transport mode is in categorical scale and it is not hypothesized in the model, we used One-way ANOVA to test its relationship with behavioral intention transport. The results confirmed a significant difference between the different groups (F (4,,868) = 104.599, p = .000). Post-hoc tests showing the multiple comparisons (Table 6) identified a significant difference between the bus users and the other groups in their behavioral intention. Hence, we can conclude that the current transport mode affects the behavioral intention.

Table 6: Multiple comparisons based on transport mode

Group		Mean Difference (I-J)	Std. Error	Sig.
Bus user	Motorcyclist	2.11076*	.11526	.000
	Car user	2.59651*	.17549	.000
	Taxi user	1.64030*	.49799	.009
	Pedestrians	1.89084*	.29132	.000
Motorcyclist	Bus user	-2.11076*	.11526	.000
	Car user	.48575*	.17235	.040
	Taxi user	-.47046	.49689	.878
	Pedestrians	-.21993	.28944	.942
Car user	Bus user	-2.59651*	.17549	.000
	Motorcyclist	-.48575*	.17235	.040
	Taxi user	-.95621	.51421	.340
	Pedestrians	-.70567	.31826	.174
Taxi user	Bus user	-1.64030*	.49799	.009
	Motorcyclist	.47046	.49689	.878
	Car user	.95621	.51421	.340
	Pedestrians	.25054	.56434	.992

Pedestrians	Bus user	-1.89084*	.29132	.000
	Motorcyclist	.21993	.28944	.942
	Car user	.70567	.31826	.174
	Taxi user	-.25054	.56434	.992

 *. The mean difference is significant at the 0.05 level.

Discussion and implications

In examining the intentions of using the public transportation, the research findings show that attitude, perceived behavioral control, personal norm, and descriptive norm significantly influenced the behavioral intention to use bus in Hanoi. In addition, we identified environmental concern as a strong antecedent to attitude, perceived behavioral control, and personal norm, all of which directly influence behavioral intention. Service satisfaction, a frequently examined variable in consumer behavior studies, is not a determinant in behavioral intention to use the public bus. The inclusion of personal norm and descriptive norm in the integrative TPB model increased the explained variance, but the impact of subjective norm diminished in this model. These research findings, therefore, make theoretical contributions to the literature as well as highlighting policy implications.

First, the integrative TPB model reveals the indirect role of environmental concern in people's behavioral intention to use public buses. Environmental concern influences two of the TPB constructs—attitude and perceived behavioral control—which in turn affect the behavioral intentions. Previous studies such as Ambak et al. (2016) found that attitude was the strongest factor while Donald et al. (2014) noted that perceived behavioral control is the strongest factor in the TPB model. Our study adds to their findings by discovering one main antecedent of attitudes and perceived behavioral control. Strong environmental concern can affect the way people think and feel about public bus usage in a positive way. Similarly, this concern can also lead users to perceive how easy and convenient it is to use public buses. Apart from the original TPB constructs, environmental concern is also a strong antecedent to personal norms. Consistent with previous

studies (Abrahamse et al., 2009; Lind et al., 2015), our study supports the contention that personal norms positively influence people's intentions to use the public bus. This means that a high level of concern for environmental issues will influence ones' self-concept or internal principles, which would strengthen their intention to take the bus. This suggests that policy makers could run more campaigns to create environmental concern in Hanoi society. Although such concern might not affect intentional behavior directly (see Ajzen & Fishbein, 1980; Bamberg, Ajzen & Schmidt 2003; Wang et al., 2016), it could work through attitude, perceived behavioral control, and personal norms to achieve the best outcomes.

Second, this research shows that descriptive norm is the strongest factor in the integrative TPB model. Prior research shows a mixed result on the impact of descriptive norm with a group confirming its role (see Eriksson & Forward; 2011; Lo et al. 2016) while another group found a limited role (see Doran & Larsen 2016; Zhang et al. 2016) in explaining behavioral intention. Such inconsistency could be due to whether the respondents perceived the behavior of significant others as the "norm" in that particular research context. Our study supports the former by showing that normal ways of behaving in the social context affect behavioral intention to use public transport. As the research context is Vietnam, a socialist country where people attempt to behave in the same way as each other, it is not surprising that public adoption of a particular transport mode will affect individual choice. The current trend in the city of Hanoi is motorbikes or cars; the usage of public transport is comparatively low. As a result, a 'norm' in using public transport has yet to achieve. More initiatives are required to encourage the people to switch from private vehicles to public transport. Policy makers could transform the overall perception of the public bus system by making it "trendy" to use. For example, those in charge of the Hanoi public transportation system could organize a promotional campaign by encouraging bus users to hashtag (#) Hanoi Bus whenever travel in one. Social marketing of the public bus system could enhance and popularize this form

of transport, especially by showing people from all social classes are using the buses to strengthen the impact.

It is interesting to note that subjective norm is the only construct from TPB that had no significant impact on intentional behavior in this integrative model. This construct is usually found to be the weakest indicator in the TPB model, as discovered by Donald et al. (2014) and Zailani et al. (2016). This is consistent with the findings of Eriksson and Forward (2011) in Sweden, where the influence of subjective norm became insignificant in terms of intention to use public buses when descriptive norms were included in hierarchical regression analyses. Our result implies that the actions of other people have greater impact than the expectations of other people in adopting public bus travel. It therefore becomes more critical to convert infrequent or non-bus users to daily bus users.

The results also show that respondents with higher incomes and better education are less inclined to use public transport. In an emerging socialist country, private vehicle ownership symbolizes status and freedom. It was assumed that well-educated consumers were more likely to engage in pro-environmental behavior such as taking public buses (Diamantopoulos et al., 2003; Gallagher & Muehlegger, 2011), but we found contradicting results in our research context. This is possibly because the more highly educated group have higher incomes and thus are more likely to own private vehicles, meaning there is less intention of using the public system, as evidenced in Zhang et al. (2016). Currently, Vietnam's economy is expanding quickly, with strong GDP growth at around 6.0% over the past few years (World Bank 2016), and more Vietnamese are enjoying higher incomes. This has resulted in more private vehicle ownership, heightened traffic congestion, and serious pollution in big cities like Hanoi. It is therefore crucial to encourage all road users, regardless of income and occupation, to use the public bus system. Policy makers must consider implementing practical rules such as allocating special lanes for BRT to allow faster

transit than private vehicles to encourage high income and well-educated people to use public transport in this congested city.

The post-hoc tests to examine behavioral intention in different groups based on their current transport mode showed the distinction between bus users and the other groups (motorcyclists, car users, taxi users and pedestrians). It is likely that bus users will continue to use public bus while the others would not change their travel mode. This finding highlights the crucial need to change the behaviors of the non-bus user groups. Clark, Chatterjee and Melia (2016) confirmed that environmental-driven attitudes increase the likelihood of switching from car to non-car. This supports what we found in the relationship between environmental concern, attitude and behavioral intention, though we did not examine their changes in transport mode. With the results gathered through the integrated TPB model, policy makers should implement measures and initiatives that focus on the significant constructs mentioned.

Finally, the empirical results could not identify a significant relationship between service satisfaction and behavioral intention. The recent implementation of BRT in Hanoi appears to have had limited influence on individual decisions to use the public bus system. This implies that more work could be carried out by the transport authority and bus operators to draw public attention to the system. Currently, there is little information on BRT services available to the public and few promotional and advertising campaigns publicizing the BRT's focus on providing seamless public transport in this highly congested city. As environmental concern is a critical factor in influencing attitude, perceived behavioral control, and personal norms, policy makers should strive to promote the BRT by linking it with environmental improvements, especially as Hanoi is the most polluted city in South-East Asia.

Conclusion

This study highlights the importance of the influence of descriptive norms on intentions to use the Hanoi public bus system. It also confirms the influence of other factors, including attitude, and personal norms, which are of lesser significance in terms of behavioral intention. Our findings indicate that environment concern is a strong motivator for attitude, perceived behavioral control, subjective norms, and personal norms. These findings shed some light on the application of the TPB model by integrating it with multiple approaches, namely psychology and environmental concerns. This study is also one of the earliest examinations of behavioral intention in terms of the public transport system in a populous and polluted city.

   Like other empirical studies, the research had certain limitations. First, the results are solely based on surveys of public road users. Opinions from other stakeholders, such as government and city council, transportation agencies, and public transport service providers, could be collected and added to offer a more comprehensive view of the city's public transport system. The intention of using public buses may not reflect the actual behavior of commuters, and this might limit the research results. However, there is significant evidence of a high correlation between intentions and actual behavior in prior studies (De Cannière, De Pelsmacker & Geuens 2009; Si, Shi, Tang, Wu, Lan, 2020). Using the knowledge gained from this study, future research could focus on the conditions in which road users are most likely to switch to public transport. Intervention methods, such as providing free rides for a period, could be implemented so that the actual behavior of commuters could be observed. Future studies considering such factors could build on the model provided here.

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Appendix 1

Measurement items in the questionnaire

Attitudes toward public bus usage (adapted from Bamberg et al., 2007; Donald et al., 2014; Harland et al., 1999)
For me, using public buses instead of private vehicles (motorbike/car) to go to work/school is:

Good	3	2	1	0	1	2	3	Bad
Appropriate	3	2	1	0	1	2	3	Inappropriate
Right	3	2	1	0	1	2	3	Wrong
Pleasant	3	2	1	0	1	2	3	Unpleasant
Fun	3	2	1	0	1	2	3	Boring
Beneficial	3	2	1	0	1	2	3	Harmful
Useful	3	2	1	0	1	2	3	Useless

Perceived Behavioral Control (adapted from Bamberg et al., 2007; Donald et al., 2014; Harland et al., 1999)
There's nothing stopping me taking buses to commute to work/school
It is extremely easy for me to use public buses instead of private vehicles to go to work/school.
It is extremely simple for me to use public buses instead of private vehicles to go to work/school.

Subjective Norm (adapted from Bamberg et al., 2007; Donald et al., 2014; Harland et al., 1999)
Most people who are important to me would support me in using public buses to commute.
Most people who are important to me think that I should take public buses to work/school.

Descriptive Norm (adapted from Eriksson & Forward, 2011).
Most of my family members use public buses every day.
Most of my colleagues/schoolmates use public buses every day.

Personal Norm (adapted from Bamberg et al., 2007; Zhang et al., 2016)
I feel guilty about it when I ride/drive to work/school.
I do not feel bad about it when I ride/drive to work/school (reversed)
I feel personally responsible for the problems resulting from private vehicle when I ride/drive to work/school.

Environmental Concern (adapted from Heath and Gifford, 2002)
Motorbike/car use causes serious pollution in the world.
Motorbike/car use is a major source of noise pollution in the world.
Motorbike/car use contributes to the depletion of energy sources
In Hanoi, air pollution caused by private vehicles is getting serious.
In Hanoi, motorbike/car use is a major source of noise pollution.
Traffic congestion is a problem in Hanoi. *(removed from the analysis)*
Finding a parking spot is a problem in Hanoi. *(removed from the analysis)*
Hanoi is becoming unsafe because there is too much traffic. *(removed from the analysis)*

Service Satisfaction (adapted from Oliver, 1997).
Overall, I am satisfied with Hanoi public bus services.
I would say that Hanoi public buses offer an excellent service.

Behavioral Intention (adapted from Bamberg et al. 2007; Donald et al., 2014)
During the next two weeks I intend to use public buses instead of private vehicles to go to work/school.
During the next two weeks I will use public buses instead of private vehicles to go to work/school.
I will keep on taking public buses in the future.

References

Abrahamse, W., Steg, L., Gifford, R., Vlek, C., 2009. Factors influencing car use for commuting and the intention to reduce it: a question of self-interest or morality? *Transp Res Part F Traffic Psychol Behav*, *12*(4), 317-324.

Ajzen, I., 1985. From intentions to actions: A theory of planned behavior. In Kuhl, J., Beckmann, J. (Eds.), *Action Control: from Cognition to Behavior* (pp. 11-39). Springer, Berlin, Heidelberg.

Ajzen, I., 1991. The theory of planned behavior. *Organ Behav Hum Perform*, *50*(2), 179-211.

Ajzen, I., Fishbein, M., 1980. Understanding attitudes and predicting social behavior.

Ambak, K., Kasvar, K. K., Daniel, B. D., Prasetijo, J., Ghani, A. R. A., 2016. Behavioral intention to use public transport based on Theory of Planned Behavior. In *MATEC Web of Conferences* (Vol. 47, p. 03008). EDP Sciences.

Baker, D. A., Crompton, J. L., 2000. Quality, satisfaction and behavioral intentions. *Annals of Tourism Research*, *27*(3), 785-804.

Bamberg, S., Ajzen, I., Schmidt, P., 2003. Choice of travel mode in the theory of planned behavior: The roles of past behavior, habit, and *reasoned* action. *Basic and Applied Social Psychology*, *25*(3), 175-187.

Bamberg, S., Hunecke, M., Blöbaum, A., 2007. Social context, personal norms and the use of public transportation: Two field studies. *J. Environ. Psychol., 27*(3), 190-203.

Baomoi, 13 July 2017, *Infographic Current situation of transportation in Hanoi*, retrieved from https://baomoi.com/infographic-hien-trang-phuong-tien-giao-thong-o-thu-do-ha-noi/c/22739119.epi

Baodansinh.vn, 2020. Hanoi reduces 900 bus trips per day to prevent Covid-19. 21 March 2020. Viewed 18 June 2020. http://baodansinh.vn/ha-noi-giam-900-luot-xe-bus-ngay-de-phong-dich-covid-19-20200321091905939.htm

Batterbury, S., 2003. Environmental activism and social networks: campaigning for bicycles and alternative transport in West London. *Ann Am Acad Pol Soc Sci*, *590*(1), 150-169.

Bonsall, P., Beale, J., Paulley, N., Pedler, A., 2005. The differing perspectives of road users and service providers. *Transport Policy*, *12*(4), 334-344.

Burbidge, S., & Goulias, K. (2009). Active travel behavior. *Transportation letters*, *1*(2), 147-167.

Carrus, G., Passafaro, P., Bonnes, M., 2008. Emotions, habits and rational choices in ecological behaviors: The case of recycling and use of public transportation. *J. Environ. Psychol.*, *28*(1), 51-62.

Chen, C. F., Chao, W. H., 2011. Habitual or reasoned? Using the theory of planned behavior, technology acceptance model, and habit to examine switching intentions toward public transit. *Transp Res Part F Traffic Psychol Behav*, *14*(2), 128-137.

Chen, M.F., Tung, P. J., 2014. Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *Int J Hosp Manag, 36*, 221-230.

Chin, W. W., 2010. How to write up and report PLS analyses. In Esposito Vinzi, V., Chin, W. W., Henseler, J., Wang, H. (Eds.), *Handbook of Partial Least Squares* (pp. 655-690). Springer, Berlin, Heidelberg.

Cialdini, R. B., Reno, R. R., Kallgren, C. A., 1990. A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *J. Pers. Soc. Psychol. ,* 58, 1015–1026.

Clark, B., Chatterjee, K., & Melia, S. (2016). Changes to commute mode: The role of life events, spatial context and environmental attitude. *Transportation Research Part A: Policy and Practice*, *89*, 89-105.

Conner, M., Armitage, C. J., 1998. Extending the theory of planned behavior: A review and avenues for further research. *J. Appl. Soc. Psychol., 28*(15), 1429-1464.

Daziano, R. A., Bolduc, D., 2013. Incorporating pro-environmental preferences towards green automobile technologies through a Bayesian hybrid choice model. *Transportmetrica A: Transport Science*, *9*(1), 74-106.

De Bruijn, G. J., Kremers, S. P., Singh, A., Van den Putte, B., Van Mechelen, W., 2009. Adult active transportation: adding habit strength to the theory of planned behavior. *Am. J. Prev. Med. , 36*(3), 189-194.

De Cannière, M. H., De Pelsmacker, P., & Geuens, M. 2009. Relationship quality and the theory of planned behavior models of behavioral intentions and purchase behavior. *Journal of business research*, *62*(1), 82-92.

Dell'Olio, L., Ibeas, A., Cecin, P., 2011. The quality of service desired by public transport users. *Transport Policy*, *18*(1), 217-227.

Diamantopoulos, A., Schlegelmilch, B. B., Sinkovics, R. R., Bohlen, G. M., 2003. Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation. *J. Bus. Res., 56*(6), 465-480.

Donald, I., Cooper, S. R., 2001. A facet approach to extending the normative component of the theory of reasoned action. *Br. J. Soc. Psychol.*, *40*(4), 599-621.

Donald, I. J., Cooper, S. R., Conchie, S. M., 2014. An extended theory of planned behavior model of the psychological factors affecting commuters' transport mode use. *J. Environ. Psychol., 40*, 39-48.

Doran, R., Larsen, S., 2016. The relative importance of social and personal norms in explaining intentions to choose eco-friendly travel options. *International Journal of Tourism Research*, *18*(2), 159-166.

Eriksson, L., Forward, S. E., 2011. Is the intention to travel in a pro-environmental manner and the intention to use the car determined by different factors? *Transportation Research Part D: Transport and Environment*, *16*(5), 372-376.

Fellesson, M., Friman, M., 2012. Perceived satisfaction with public transport service in nine European cities. In *Journal of the Transportation Research Forum*, *47*(3), 93-103.

Fornell, C., Larcker, D. F., 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *J. Mark. Res.*, 382-388.

Fu, X., Juan, Z., 2017. Exploring the psychosocial factors associated with public transportation usage and examining the "gendered" difference. *Transportation Research Part A: Policy and Practice*, *103*, 70-82.

Fujii, S., 2006. Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions. *J. Environ. Psychol.*, *26*(4), 262-268.

Fujii, S., Van, H. T., 2009. Psychological determinants of the intention to use the bus in Ho Chi Minh City. *Journal of Public Transportation*, *12*(1), 6.

Gallagher, K. S., & Muehlegger, E. (2011). Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology. *Journal of Environmental Economics and management*, *61*(1), 1-15.

General Statistics Office of Vietnam, 2018. *Innovation of Public Transportation Services*, 2 January 2018, retrieved from https://www.gso.gov.vn/default_en.aspx?tabid=774

Grujičić, D., Ivanović, I., Jović, J., Đorić, V., 2014. Customer perception of service quality in public transport. *Transport*, *29*(3), 285-295.

Guirao, B., García-Pastor, A., López-Lambas, M. E., 2016. The importance of service quality attributes in public transportation: Narrowing the gap between scientific research and practitioners' needs. *Transport Policy*, *49*, 68-77.

Haghshenas, H., Vaziri, M., 2012. Urban sustainable transportation indicators for global comparison. *Ecological Indicators*, *15*(1), 115-121.

Hair, J. F., Ringle, C. M., Sarstedt, M., 2013. Partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance. *Long Range Planning*, *46*(1-2), 1-12.

Harland, P., Staats, H., Wilke, H. A., 1999. Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior. *Journal of Applied Social Psychology*, *29*(12), 2505-2528.

Heath, Y., Gifford, R., 2002. Extending the theory of planned behavior: predicting the use of public transportation. *J. Appl. Soc. Psychol.*, *32*(10), 2154-2189.

Henseler, J., Ringle, C. M., Sinkovics, R. R., 2009. The use of partial least squares path modelling in international marketing. In Sinkovics, R. R., Ghauri, P. N. (Eds.), *New Challenges to International Marketing* (pp. 277-319), Emerald Group Publishing Limited, Bingley, UK.

Lo, S. H., van Breukelen, G. J., Peters, G. J. Y., & Kok, G. 2016. Commuting travel mode choice among office workers: Comparing an Extended Theory of Planned Behavior model between regions and organizational sectors. *Travel Behaviour and Society*, *4*, 1-10.

Hunecke, M., Haustein, S., Böhler, S., Grischkat, S., 2010. Attitude-based target groups to reduce the ecological impact of daily mobility behavior. *Environ. Behav.*, *42*(1), 3-43.

International Energy Agency (IEA), 2018. *Global Energy and CO_2 Status Report 2017*. OECD: Paris.

Joewono, T. B., Kubota, H., 2007. User satisfaction with paratransit in competition with motorization in Indonesia: anticipation of future implications. *Transportation*, *34*(3), 337-354.

Joireman, J. A., Van Lange, P. A., Van Vugt, M., 2004. Who cares about the environmental impact of cars? Those with an eye toward the future. *Environ. Behav.*, *36*(2), 187-206.

Kotler, P., Caslione, J. A., 2009. How marketers can respond to recession and turbulence. *Journal of Customer Behavior*, *8*(2), 187-191.

Lai, W. T., Chen, C. F., 2011. Behavioral intentions of public transit passengers—The roles of service quality, perceived value, satisfaction and involvement. *Transport Policy*, *18*(2), 318-325.

Laudenslager, M. S., Holt, D. T., Lofgren, S. T., 2004. Understanding Air Force members' intentions to participate in pro-environmental behaviors: An application of the theory of planned behavior. *Perceptual and Motor Skills*, *98*(3 suppl), 1162-1170.

Lind, H. B., Nordfjærn, T., Jørgensen, S. H., Rundmo, T., 2015. The value-belief-norm theory, personal norms and sustainable travel mode choice in urban areas. *J. Environ. Psychol.*, 44, 119-125.

Malhotra N. K., 1999. *Marketing Research. An Applied Orientation*, International Edition, Prentice Hall, London.

Ministry of Transportation, 2018. *Hanoi: Innovation of Public Transportation Services*, 2 March 2018, retrieved from http://mt.gov.vn/vn/tin-tuc/53571/ha-noi--%C3%B0oi-moi-loai-hinh-dich-vu-van-tai-cong-cong.aspx

Ng, P. Y., Phung, P. T., 2015. From motor biking to public transportation: what matters in Hanoi? *World Journal of Management, 6* (2), 1-15.

Ojo, T. K. (2019). Quality of public transport service: An integrative review and research agenda. *Transportation Letters*, *11*(2), 104-116.

Oliver, R.L. 1997. Satisfaction: A Behavioral Perspective on the Consumer. McGraw-Hill, New York, NY.

Pérez, S. M., Gázquez. C. J., Carrillo, M. G., Fernández, S. R., 2007. Effects of service quality dimensions on behavioral purchase intentions: A study in public-sector transport. *Managing Service Quality: An International Journal*, *17*(2), 134-151.

Redman, L., Friman, M., Gärling, T., Hartig, T., 2013. Quality attributes of public transport that attract car users: A research review. *Transport Policy*, *25*, 119-127.

Riley, K., 2002. Motor vehicles in China: the impact of demographic and economic changes. *Population and Environment*, *23*(5), 479-494.

Rivis, A., Sheeran, P., 2003. Descriptive norms as an additional predictor in the theory of planned behaviour: A meta-analysis. *Current Psychology*, *22*(3), 218-233.

Sarstedt, M., Ringle, C. M., Smith, D., Reams, R., & Hair Jr, J. F. 2014. Partial least squares structural equation modeling (PLS-SEM): A useful tool for family business researchers. *Journal of Family Business Strategy*, *5*(1), 105-115.

Shi, H., Wang, S., Zhao, D., 2017. Exploring urban resident's vehicular PM2. 5 reduction behavior intention: An application of the extended theory of planned behavior. *Journal of Cleaner Production*, 147, 603-613.

Si, H., Shi, J. G., Tang, D., Wu, G., & Lan, J. 2020. Understanding intention and behavior toward sustainable usage of bike sharing by extending the theory of planned behavior. *Resources, Conservation and Recycling*, *152*, 104513.

Sumaedi, S., Yarmen, M., Bakti, I. G. M. Y., Rakhmawati, T., Astrini, N. J., Widianti, T., 2016. The integrated model of theory planned behavior, value, and image for explaining public transport passengers' intention to reuse. *Management of Environmental Quality: An International Journal*, *27*(2), 124-135.

Suman, H. K., Bolia, N. B., Tiwari, G., 2017. Comparing public bus transport service attributes in Delhi and Mumbai: Policy implications for improving bus services in Delhi. *Transport Policy*, *56*, 63-74.

Thanh Nien News, 2012. Hanoi: most polluted city in South East Asia. 22 March 2012 viewed 23 December 2013. http://www.thanhniennews.com/index/pages/20120322-hanoi-most-polluted-city-in-southeast-asia.aspx>

UN, 2013. Human Development Report. 2013. *The Rise of the South: Human Progress in a Diverse World*. http://hdr.undp.org/sites/default/files/hdr2013_en_summary.pdf

Van, H. T., Choocharukul, K., & Fujii, S. (2014). The effect of attitudes toward cars and public transportation on behavioral intention in commuting mode choice—A comparison across six Asian countries. *Transportation research part A: policy and practice*, *69*, 36-44.

Vethangxebuytonline.com.vn, 2020, "Online Ticket", viewed 7 June 2020. http://vethangxebuytonline.com.vn/TicketOnline/Help.aspx

Vilakazl, A., Govender, K., 2014. Exploring bus service quality in South Africa: A structural equation modelling approach. *Journal of Transport and Supply Chain Management, 8* (1), 1-10.

Vinzi, E. V., Chin, W. W., Henseler, J., Wang, H., 2010. *Handbook of partial least squares: Concepts, methods and applications*. Springer, Heidelberg, Dordrecht, London, New York.

Vugt, M., Meertens, R. M. Lange, P. A., 1995. Car versus Public Transportation? The Role of Social Value Orientations in a Real-Life Social Dilemma. *J. Appl. Soc. Psychol.*, *25*(3), 258-278.

Wang, S., Fan, J., Zhao, D., Yang, S., Fu, Y., 2016. Predicting consumers' intention to adopt hybrid electric vehicles: using an extended version of the theory of planned behavior model. *Transportation,* 43(1), 123-143.

Widianti, T., Sumaedi, S., Bakti, I. G. M. Y., Rakhmawati, T., Astrini, N. J., Yarmen, M., 2015. Factors influencing the behavioral intention of public transport passengers. *International Journal of Quality & Reliability Management*, 32(7), 666-692.

World Bank, 2018. 13 December, 2018, retrieved from http://data.worldbank.org/country/vietnam

Vovgiaothong.vn, 2019. Transerco implements non-cash payment system for bus monthly subscriptions. 20 December 2019. Viewed 18 June 2020. https://vovgiaothong.vn/transerco-trien-khai-thanh-toan-khong-dung-tien-mat-khi-mua-ve-thang-xe-buyt-1

Zailani, S., Iranmanesh, M., Masron, T. A., Chan, T. H., 2016. Is the intention to use public transport for different travel purposes determined by different factors? *Transportation Research Part D: Transport and Environment*, *49*, 18-24.

Zhang, D., Schmöcker, J. D., Fujii, S., Yang, X., 2016. Social norms and public transport usage: empirical study from Shanghai. *Transportation, 43*(5), 869-888.