The behavior of young people toward electric motorbikes: Evidence from Vietnam

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ARTICLE INFO

DOI:10.46223/HCMCOUJS.econ.en.14.4.2792.2024

Received: May 30th, 2023
Revised: November 07th, 2023
Accepted: November 28th, 2023

JEL classification code:
D12; O10

Keywords:
electric motorbikes; SEM; TAM model; TPB model; Vietnam

ABSTRACT

The study uses a hybrid model, namely C-TAM-TPB. The model combines the Technology Acceptance Model (TAM) and the Planned Behavior Theory (TPB) to investigate factors influencing the behavior of young people toward electric motorbikes. We applied the convenience sampling method to gather data. The survey questions employ the Likert scale, with 05 strongly agree and 1 strongly disagree. There were 579 responses but only 573 were valid for analysis. We find that attitude toward using, perceived environment, subjective norm, and perceived ease of use can impact young people's behavior of choosing electric motorbikes, while perceived usefulness and perceived behavioral control do not influence this consumption behavior. The research results provide a reference for businesses, environmental organizations, and managers to make decisions that guide consumers to choose environmentally friendly products.

1. Introduction

The process of urbanization leads to an increasing migration to urban areas, which in turn boosts the demand for mobility in urban areas. Much of this demand is satisfied by public transport such as buses and trams, and private transport such as cars and two-wheeled motorbikes. These vehicles are considered to be the main cause of greenhouse gas emissions leading to environmental pollution (Tran, Luong, & Tran, 2020). Of these, petrol-powered two-wheelers contribute significantly to air pollution.

Ho Chi Minh City (HCMC) is one of the most developed economies in the country as the General Statistics Office estimates that the city's GDP accounts for 22% of the country's total GDP in 2020. According to the 2019 census results, the population of HCMC increased rapidly to nearly 09 million people, 1.8 million people higher than the same period in 2009. Most of the population in this city is 30 or under 30 years old (Nguyen, 2021). In other words, HCMC has become one of the places with the youngest and largest population in the country. As a result, the city's travel demand is always very high. However, the means of transport in the city are still mainly private vehicles. The Ministry of Transport estimates that on average, motorbikes account for more than 85% of all vehicles in circulation in Vietnam, while this figure in HCMC is 97%. Therefore, HCMC always faces the dilemma of traffic congestion and emissions from motorbikes using fuels that pollute the environment.

Environmental pollution has recently attracted a lot of attention from experts and researchers. More and more alternative energy sources are being developed, and manufacturers pay more attention to environmentally friendly vehicles. Hence, there are many studies on the development of electric motorbikes in Asia, which accounts for 80% of global motorbikes

(Eccarius & Lu, 2020). Taiwan is considered to have the highest density of motorbikes in Asia, and traditional motorbikes lead to problems such as air pollution and traffic congestion, so Chen, Chen, Chen, and Hsieh (2012) investigated attitudes to green consumption, perception of risk, and perceived value for the intention to purchase hydrogen-powered motorbikes. Furthermore, the government plays a core role in promoting green consumption (Huang, Kuo, & Chou, 2018). However, consumers' use of alternative fuel-powered two-wheelers is not a well-researched topic in the country. Particularly, very few studies have examined the use of electric motorbikes by young consumers in big cities, which are emerging recently and are a more environmentally sustainable alternative to traditional gasoline-powered two-wheelers. Some domestic studies have investigated the cognitive attitudes of consumers in general with a limited number of survey samples (Pham & Nguyen, 2021; Tran & Tran, 2021).

This paper investigates the factors affecting young people's behavior in using electric motorbikes. We focus on young people under 30 years old because they make up the majority of the population in Ho Chi Minh City. They are highly adaptable and can often change quickly with the environment, so the impact on these subjects will be more obvious. The paper contributes to the current literature in several ways. First, as far as is known, this is the first research applying the C-TAM-TPB model to explore the behavior of young people toward electric motorbikes in the context of Vietnam. This provides an additional application of theory to practice. Second, the research results can be a reference for regulators, organizations, businesses, and consumers in promoting, educating, and marketing towards green and sustainable consumption.

2. Theoretical basis

2.1. Theory of planned behavior

The Planned Behavior Theory (TPB) shows the relationship between the beliefs and behavior of certain individuals. According to this theory, belief includes belief about behavior, belief about common standards, and belief about self-control. The theory was originally initiated by Ajzen (1991), which aimed to increase the predictive power of the Theory of Reasoned Action or TRA (Fishbein & Ajzen, 1975). While TRA is concerned with attitude and subjective norm factors, TPB adds cognitive factors of behavioral control to improve the prediction and explanation of an individual's behavior in a given context. This makes TPB one of the most widely applied and cited theories in behavioral research (Cooke & Sheeran, 2004), and it is perfectly relevant when applied to explain many types of behavior in different contexts such as health behavior, education, investment, marketing, or participation behavior in collective groups (Ajzen, 1991; Xiang & Sumelius, 2010). The theory suggests that the intention or motivation of each subject is the most powerful motivating factor for them to perform their own behaviour. Attitude is a subject's feelings about performing a behavior based on that subject's evaluation of the outcome of these behaviors. A subjective norm is a person's awareness of the general pressure to implement or not to implement a behavior. The behavioral control factor is related to how easy or difficult to perform the behavior; this factor can come from within each subject, such as the determination and capacity to perform, or from outside, such as opportunity, time, and economic conditions. If individuals have strong control beliefs, they will have greater cognitive control to implement the behavior and vice versa.

2.2. Technology acceptance model

The Technology Acceptance Model (TAM) is built on the Theory of Reasonable Action (TRA). Davis (1989) developed TAM to predict behavior related to technology information and

technology products. The model helps explain the behavior of new users to accept technology in the most basic and reasonable way. The TAM theory appropriately examines the variety of changes in individuals' usage intentions and behaviours. Specifically, if an individual finds digital products too difficult or a waste of time, they may find it difficult to accept the technology. Meanwhile, an individual who perceives digital products as providing the necessary mental stimulation as well as easy to learn will be more inclined to learn how to employ digital products. This is also the reason why TAM is an influential technology adoption model today with two main factors affecting technology usage behavior: perceived ease of use and perceived usefulness. The former involves the degree to which individuals suppose that using a system will be easy, without consuming much time and effort, while the latter refers to the degree to which people think that using a technology product can promote their performance. Therefore, even if individuals do not prefer a technology product, the probability that they will use this product is high if they perceive that technology products will increase their performance at work.

2.3. C-TAM-TPB model theory

Taylor and Todd (1995) proposed a C-TAM-TPB model by combining TAM and TPB. Both TAM and TPB assume that intention is a possible determinant of behavior, and that intention itself is defined by individuals' attitude towards the behavior. The authors found that the ability of the TAM theory to predict behavioral decisions of new technology users and their actual use has been demonstrated by numerous empirical studies, but this model does not have the social factor and the behavioral control factor that may significantly influence users' actual use of the new technology. That is, the social factor and the behavioral control factor of TPB theory only reflect in detail the relationship between individual-society circumstances, technology perception, and user intentions but do not yet predict the level of adoption of new technology. Therefore, the combination of TPB and TAM is reasonable in the context of studying the behavior of accepting the use of electric motorbikes instead of traditional petrol-powered vehicles.

Because an electric motorbike is considered as an environmentally friendly vehicle and a solution to reduce greenhouse gas emissions, the study should not only consider the elements of the C-TAM model- TPB but also pay attention to environmental indicators. Therefore, the research model proposes to add environmental perception to measure the effects of these indicators on the behavior of choosing to use electric motorbikes.

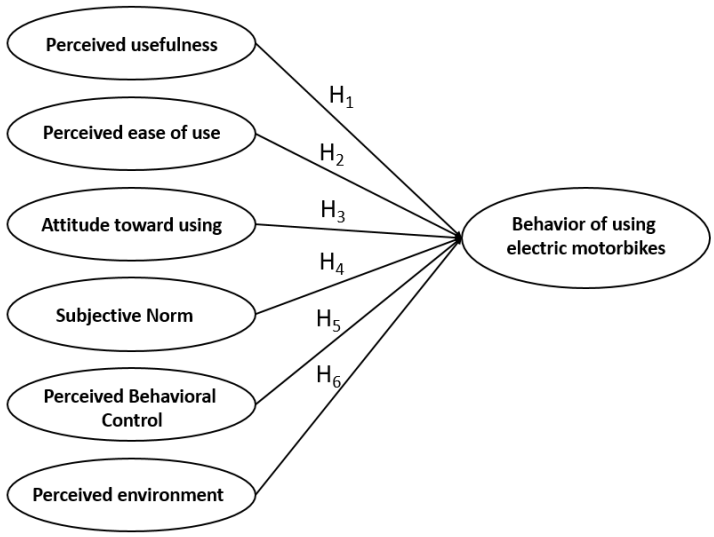

Figure 1. Proposed research model

2.4. Hypotheses development

Perceived usefulness is one of two variables that positively affect attitudes toward technology use behavior (Davis, 1989) and involves the degree to which individuals think that using an electric vehicle will bring many benefits regarding safety, convenience, time, and cost savings (Chen & Chao, 2011). There are many studies that have proven that usefulness is one of the two factors that have the strongest impact on users' acceptance of personal electric vehicles or shared vehicles such as electric cars, electric motorbikes, and electric bicycles (Ambak et al., 2016; Chen & Chao, 2011; Jamšek & Culiberg, 2020; Li et al., 2023). Which the utility factor is assessed as the main factor determining the trend of using electric vehicles in the shared use system (Samadzad, Nosratzadeh, Karami, & Karamil, 2023). Therefore, we suggest the first hypothesis:

H1: Perceived usefulness positively impacts the behavior of choosing to use electric motorbikes

Perceived ease of use is the second element of the TAM model that may be positively linked to the behavior to use technology. That is, perceived ease of use has been shown to be a stronger influencing factor than perceived usefulness in affecting the intention to lead consumer behavior to adopt new technology (Ambak et al., 2016). Venkatesh and Davis (2000) suggest that the TAM model has significant explanatory importance regarding perceived ease of use, so it is vital to grasp the determinants of this factor. Davis (1989) states that perceived ease of use is the degree to which a person supposes that the choice of a consumption behavior is associated with the ease of use of that technology. Chen (2016); Jamšek and Culiberg (2020) adjust the scale for ease of use of electric motorbikes on the basis that learning how to use electric vehicles is easy; the electric vehicle operating functions are clear and easy to understand; it is easy to proficiently use electric motorbikes for commuting purposes; the ease of use encourages users to use electric vehicles more. Hence, the second hypothesis is:

H2: Perceived ease of use positively impacts the behavior of choosing to use electric motorbikes

Attitude affects technology usage intention and, therefore, usage behavior (Davis, 1989). Based on the TPB structural equation modeling approach, the consumer attitude factor is also a strong influencing factor of the model (Ajzen, 1991). Consumer attitude is identified to be significantly associated with the intention to buy electric motorbikes (Chen et al., 2012; Secinaro, Calandra, Lanzalonga, & Ferraris, 2022). Specifically, attitude toward vehicles is assessed using basic scales towards goals for each electric vehicle consumer, such as comfort, convenience, safety, desire, and whether it is a good idea (Chen & Chao, 2011). Thus, the following hypothesis is constructed:

H3: Consumer attitude positively influences the behavior of choosing to use electric motorbikes

Subjective norm, a crucial factor related to social influence, is understood as the social pressure that a person feels about whether or not to engage in a usage behavior (Ajzen, 1991). Fishbein and Ajzen (1975) claim subjective norm is an individual's awareness that most of the people vital to the individual suppose that he should or should not conduct certain behavior. Moreover, social influence directly determines the user's behavioral intention in another extension of TAM proposed by Venkatesh and Davis (2000). The subjective norm in this structure is based on Chen and Chao (2011), which is evaluated by considering whether a person uses an electric vehicle due to the influence of important people such as relatives, friends, and colleagues or because it is a trend used by everyone around. Hence, we suggest the hypothesis below:

H4: Subjective norm is positively linked to the behavior of choosing to use electric motorbikes

Along with attitude and subjective norm factors, perceived behavioral control can positively affect the intention to conduct the behavior. Ajzen (1991) states that this factor refers to the perception of a person's confidence in the capacity to implement the behavior. Specifically, it is a set of controlling beliefs about techniques, resources, and opportunities that can be obtained to use an electric motorbike as a personal vehicle. Previous studies have referred to this construct to assess perceived behavioral control (Chen, 2016; Li et al., 2023; Yasir et al., 2022). This is the basis for evaluating whether individuals have the resources, techniques, and relative knowledge necessary for the use of electric motorbikes and whether they feel active and comfortable using electric motorbikes. Therefore, our hypothesis is:

H5: Perceived behavioral control promotes the behavior of choosing to use electric motorbikes

Environmental perception is an extension factor proposed to be added to the combined model C-TAM-TPB to consider consumers' environmental concern level regarding technology products. There have been many studies investigating the relationship between consumption values and environmental perceptions that impact green consumption. These studies confirm that environmental perception has a significant influence on the behavior of consuming green products (Hines, Hungerford, & Tomera, 1987; Kim & Choi, 2005; Mostafa, 2009; Paul, Modi, & Patel, 2016; Sekhokoane, Qie, & Rau, 2017). However, when analyzing the choice of transportation between private and public transport, Donald, Cooper, and Conchie (2014) indicate that variables of the TPB model, such as attitude, perceived behavioral control, and subjective norm, indirectly impact the use of both modes of transportation through their effect on behavioral intention. In contrast, the expanded variables that are not included in the TPB model, such as environmental perception, change depending on the modes of transportation. On the other hand, when considering the role of environmental perception and knowledge in choosing between a seated electric motorbike (SES) and a conventional one, Scorrano and Rotaris (2022) claim that the level of environmental concern is positively associated with the choice of electric motorcycle, while knowledge about electric motorcycle does not play a statistically significant role. Hence, we propose the below hypothesis:

H6: Environmental perception has a beneficial influence on the behavior of choosing to use electric motorbikes

3. Methodology

From the results of the theoretical basis overview and previous studies, we use the Likert scale, with 5 being Strongly Agree and 1 being Strongly Disagree, to design a questionnaire based on the expanded C-TAM-TPB combined model (Figure 1) in accordance with the research objectives. After preparing the questionnaire, we conducted a pilot survey to check the wording and understanding of the questions. These responses were not included in the analysis. Questionnaires were gathered online using the convenience sampling method. In March 2023, we received 579 responses. That is, the response rate is higher than 95%. However, after data cleaning, there were only 573 valid responses.

For collected data, we first performed data reliability analysis through Cronbach's Alpha tool. Next, Exploratory Factor Analysis (EFA) was conducted to confirm the measurement model with all observed variables to eliminate observed variables with low transmission or not suitable for the scale and the closeness between the factors. After that, we calculated Confirmatory Factor Analysis (CFA) to assess the quality of the observed variables. Finally, the study carried out hypothesis testing by Structural Equation Modelling (SEM) to identify and test the factors affecting the decision to choose to use electric motorcycles.

4. Result and discussion

4.1. Result

The research was performed on 573 observations with a validity rate of 100%. Table 1 exhibits the characteristics of the sample.

Table 1

Characteristics of the sample

Characteristic	Number	%
Gender		
Male	176	30.7%
Female	397	69.3%
Age		
18 - 22	524	91.4%
23 - 29	49	8.6%
Education		
High School Diploma	25	4.4%
Intermediate - College Degree	34	5.9%
Bachelor and above Degree	514	89.7%
Occupation		
Student	545	95.1%
Business - Administrative and non-business	11	1.9%
Freeland Labor	17	3.0%
Monthly income		
< 05 million VND	456	79.6%
05 million - < 10 million VND	92	16.1%
10 million - <= 20 million VND	16	2.8%
> 20 million VND	9	1.6%
Total	573	100%

Source: Authors' calculations

Cronbach's Alpha reliability test was performed to evaluate the correlation of observed variables in each factor group. Table 2 reveals that all the Cronbach's Alpha (α) values are greater than 0.7 (between 0.852 and 0.916), showing the factor with high reliability (Hair, Anderson, Tatham, & Black, 1998). Also, a scale is really good when the total correlation value of the observed variables is 0.3 or more (Cristobal, Flavián, & Guinalíu, 2007). Therefore, the scales in the proposed model are reliable enough to continue performing the next analysis.

After estimating the reliability of the scale, the research continues to conduct Exploratory Factor Analysis (EFA) to evaluate the relevance of the observed variables in the scales or determine the structure of the scales. EFA analysis not only tests the relationship between observed variables in a scale but also considers the relationship between observed variables of this scale and observed variables of other scales. Observable variables excluded from the research model are HI3, HI6, HI7, DS3, TD3, CQ6, NT1, NT2, and MT6 because they do not meet the standards in EFA analysis due to the factor loading factor lower than 0.5 or the variable does not belong to a certain scale (Table 2).

The study then performs Confirmatory Factor Analysis (CFA) to discover the discriminant validity and the convergence of the factors, evaluate the quality of the observed variables, confirm the structure of the factors, and examine if the data of the observed variable in that scale are consistent with other variables in the same scale. The results are presented in Table 2. We also check the model fit of the model. Particularly, we show that chi-square/df = 3.491 < 5, p-value = 0.000 < 0.05, TLI = 0.901, RMSEA = 0.073 < 0.8, and CFI = 0.920 > 0.9. With such results, the conditions in confirmatory factor analysis are satisfied, so the proposed model is suitable for the research data.

Table 2

Results of Cronbach's Alpha, EFA, and CFA

Construct/Items	α	Loading	CR	AVE
Perceived usefulness (HI)	0.903		0.89	0.669
HI1		0.722		
HI2		0.942		
HI4		0.681		
HI5		0.699		
Perceived ease of use (DS)	0.954		0.944	0.849
DS1		0.985		
DS2		0.909		
DS4		0.666		
Attitude toward using (TD)	0.9		0.886	0.721
TD1		0.782		
TD2		0.675		
TD4		0.662		
Subjective Norm (CQ)	0.931		0.939	0.755
CQ1		0.847		
CQ2		0.933		
CQ3		0.764		
CQ4		0.9		

Construct/Items	α	Loading	CR	AVE
CQ5		0.753		
Perceived Behavioral Control (NT)	0.892		0.86	0.674
NT3		0.623		
NT4		0.781		
NT5		0.709		
Perceived environment (MT)	0.892		0.924	0.71
MT1		0.665		
MT2		0.796		
MT3		0.974		
MT4		0.796		
MT5		0.776		
Behavior of using electric motorbikes (HV)	0.918		0.919	0.739
HV1		0.693		
HV2		0.799		
HV3		0.903		
HV4		0.836		

Note: Loading = Standardized estimate; α = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted

Following the methodology, in Table 2, the research scale considers the combined reliability of CR and the extracted variance AVE of the scales. We find that the scales have CR values > 0.7 (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014; Nunnally & Bernstein, 1994) and mean variance AVE > 0.6 (Fornell & Larcker, 1981; Lam, 2012). In addition, the MSV values are higher than the AVE index and the SQRTAVE indexes of each scale are greater than the correlation coefficient between that scale and other scales in the model, confirming that the scale ensures the discriminant (Hair, Black, Babin, & Anderson, 2010).

The above analysis results suggest that the proposed research model meets the requirements in terms of value and reliability, the compatibility between factors, from which these scales can be used for SEM analysis.

The Structural Equation Model (SEM) helps to investigate the multidimensional connections between indicators in a model (Haenlein & Kaplan, 2004). With the model determined, the study uses SEM to test the influence of factors HI, DS, TD, CQ, NT, and MT on HV.

Table 3 indicates that Chi-square /df = 3.491 < 5, GFI = 0.871, TLI = 0.939, CFI = 0.947, RMSEA = 0.066 < 0.08, all greater than the acceptable threshold. These results suggest the model is compatible with the actual data and the accepted factors, and gives the results consistent with the theoretical model of the study.

Table 3

Results of the structural model

Independent variable -> Dependent variable	Estimate	SE	C.R.	p-value	Conclude
HI --> HV	0.035	0.059	0.586	0.558	H1-Not supported
DS --> HV	-0.126	0.062	-2.052	0.04	H2-Not supported
TD --> HV	0.381	0.095	4.019	***	H3-Supported
CQ --> HV	0.244	0.052	4.691	***	H4-Supported
NT --> HV	0.094	0.087	1.089	0.276	H5-Not supported
MT --> HV	0.322	0.067	4.836	***	H6-Supported
Goodness-of-fit indices	χ2/df = 3.491	CFI = 0.947		TLI = 0.939	
	P < 0.001	GFI = 0.871		AGFI = 0.839	
		RMSEA = 0.064			

Note: *** p < 0.01, ** p < 0.05, * p < 0.1. SE = Standard Error. Perceived usefulness (HI), Perceived ease of use (DS), Attitude toward using (TD), Subjective Norm (CQ), Perceived Behavioral Control (NT), Perceived environment (MT), Behavior of using electric motorbikes (HV)

The study has 06 hypotheses that need to be tested. Using the 95% confidence standard, the P-values of HI and NT are 0.558 and 0.276, respectively, so the variables HI and NT have no impact on HV. The remaining variables all have P-values < 0.05, so these relationships are statistically significant. Thus, the variables that affect HV are DS, TD, CQ, and MT.

Next, the table of standardized regression coefficients (Standardized Regression Weights) reports the level of effect of the independent variables on the dependent variable through the estimated regression coefficient. Table 3 reveals that in 04 independent variables, the effects on the behavioral dependent variable are in descending order from TD > MT > CQ and DS.

Finally, the R-squared value of the dependent variable reports the impact of the independent variables TD, MT, CQ, DS on HV. With the R-squared value of 68.1%, it means that the independent variables affect 68.1% of the variation of the dependent variable HV. In short, the results of model testing by SEM analysis method reveal that the proposed model is in line with the actual collected data and clarifies the relationship between factors.

4.2. Discussion

After conducting the reliability test, the exploratory factor analysis, and the confirmatory factor analysis, we find that the proposed model is reliable and appropriate with the collected survey data. The results indicate that TD, DS, MT, and CQ are associated with the dependent variable HV. The above findings uncover that the behavior of choosing an electric motorbike is positively influenced by attitude, environmental awareness, and subjective standards and is negatively affected by perceived ease of use. This reflects the fact that consumers' behavior in choosing electric motorbikes is increasing not due to the ease of use of electric motorbikes but due to other factors. Specifically, the higher the attitude, environmental awareness, and subjective standards of consumers are improved, the higher the user's choice of electric motorcycle will be.

This finding is consistent with those by Tong and Duong (2021); Nguyen and Nguyen (2016). Which the attitude factor has the strongest impact on consumer behavior besides perceived environment and subjective standards. Therefore, government policies need to pay attention to propaganda to encourage consumers to choose to use electric motorbikes for the sake of environmental protection. Meanwhile, in Vietnam, the factors of perceived ease of use and perceived behavioral control, as well as perceived usefulness do not play an important role in making the choice of electric motorbikes consumers. Specifically, because young people learn very quickly and adapt quickly, the ease of use and the perceived behavioral control do not help promote the choice to use electric motorbikes. In addition, customers of electric motorbikes consider the utility of electric motorbikes and petrol motorbikes to be the same, so the perceived usefulness variable does not support an explanation for this behavior.

5. Conclusions & recommendations

This research result is a testament to the businesses that manufacture and trade in this electric motorcycle product that care about the psychological factors of consumers. Specifically, businesses should focus on promoting environmental friendliness instead of just focusing on easy-to-use designs and features. On the other hand, the research results suggest that managers and policymakers should have policies to orient people through communication channels toward green production and green consumption. They should also consider economic management tools such as subsidies for this item so that people are interested in environmentally friendly products.

This paper discovers the factors affecting young people's behavior in choosing electric motorbikes in Vietnam. It is, however, not free from limitations. First, due to limited resources, we applied convenience sampling so that more responses could be gathered. We acknowledge that this is a limitation of the research. Further studies can employ other sampling methods to investigate the determinants of individuals' electric vehicle use behavior. Second, our research uses the C-TAM-TPB model to analyze the factors influencing the behavior of using electric vehicles in a developing country. Other authors may consider whether this model helps explain such behavior in developed countries.

ACKNOWLEDGEMENTS

This research is funded by Ho Chi Minh City Open University under grant number T2022.02.2.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179 - 211.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In V. J. Kuhl & J. Beckmann (Eds.), *Action control. SSSP springer series in social psychology* (pp. 11-39). Berlin, Heidelberg: Springer.

Ambak, K., Harun, E. N., Rosli, N., Daniel, D. B., Prasetijo, J., Abdullah, M. E., & Md Rohani, M. (2016). Driver intention to use electric cars using technology acceptance model. *ARPN Journal of Engineering and Applied Sciences*, *11*(3), 1524-1528.

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

Chen, H. S., Chen, C. Y., Chen, H. K., & Hsieh, T. (2012). A study of relationships among green consumption attitude, perceived risk, perceived value toward hydrogen-electric motorcycle purchase intention. *Aasri Procedia*, *2*(2012), 163-168.

Chen, S. Y. (2016). Green helpfulness or fun? Influences of green perceived value on the green loyalty of users and non-users of public bikes. *Transport Policy*, *4*(2016), 149-159.

Cooke, R., & Sheeran, P. (2004). Moderation of cognition-intention and cognition-behaviour relations: A meta-analysis of properties of variables from the theory of planned behaviour. *British Journal of Social Psychology*, *43*(2), 159-186.

Cristobal, E., Flavián, C., & Guinalíu, M. (2007). Perceived e-Service Quality (PeSQ): Measurement validation and effects on consumer satisfaction and web site loyalty. *Managing Service Quality: An International Journal*, *17*(3), 317-340. doi:10.1108/09604520710744326

Davis, D. F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340.

Davis, D. F., Bagozzi, P. R., & Warshaw, R. P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science, 35*(8), 982-1003.

Doll, W. J., Xia, W., Torkzadeh, G. (1994). A confirmatory factor analysis of the enduser computing satisfaction instrument. *MIS Quarterly*, *18*(4), 357-369.

Donald, I. J., Cooper, S. R., & Conchie, S. M. (2014). An extended theory of planned behaviour model of the psychological factors affecting commuters' transport mode use. *Journal of Environmental Psychology, 40*(2014), 39-48.

Eccarius, T., & Lu, C. C. (2020). Powered two-wheelers for sustainable mobility: A review of consumer adoption of electric motorbikes. *International Journal of Sustainable Transportation*, *14*(3), 215-231. doi:10.1080/15568318.2018.1540735

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research.* Boston, MA: Addison-Wesley Publishing Co, Inc.

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18*(3), 382-388. doi:10.2307/3150980.

Haenlein, M., & Kaplan, A. M. (2004). A beginner's guide to partial least squares analysis. *Understanding Statistics*, *3*(4), 283-297.

Hair, J. F. J., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate data analysis* (5th ed.). Hoboken, NJ: Prentice Hall College Div.

Hair, J. F., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Hoboken, NJ: Pearson Prentice Hall.

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM): An emerging tool in business research. *European Business Review*, *26*(2), 106-121.

Hall, R. (2010). The work–study relationship: Experiences of full-time university students undertaking part-time employment. *Journal of Education and Work, 23*(5), 439-449.

Hines, J., Hungerford, H., & Tomera, A. (1987). Analysis and Syntheses of research on environmental behaviour: A meta-analysis. *Journal of Environmental Education, 18*(2), 1-8.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55.

Huang, S. K., Kuo, L., & Chou, K. L. (2018). The impacts of government policies on green utilization diffusion and social benefits - A case study of electric motorcycles in Taiwan. *Energy Policy, 119*, 473-486. doi:10.1016/j.enpol.2018.04.061

Jamšek, S., & Culiberg, B. (2020). Introducing a three-tier sustainability framework to examine bike-sharing system use: An extension of the technology acceptance model. *International Journal of Consumer Studies*, *44*(2), 140-150.

Kim, Y., & Choi, S. R. (2005). Antecedents of green purchase behaviour: An examination of collectivism, environmental concern and PCE. *Advances in Consumer Research*, *32*(1), 592-599.

Lam, L. W. (2012). Impact of competitiveness on salespeople's commitment and performance. *Journal of Business Research, 65*(9), 1328-1334. doi:10.1016/j.jbusres.2011.10.026

Li, W., Yang, Y., Cheng, L., Meng, X., Zhang, F., & Ji, Y. (2023). understanding adoption intent and behavioral response to shared electric bicycles: A survey in Ningbo, China. *Transportation Research Record*, *2677*(1), 1311-1326.

Mostafa, M. M. (2009). Shades of green: A psychographic segmentation of the green consumer in Kuwait using self-organizing maps. *Expert Systems with Applications, 36*(8), 11030-11038.

Nguyen, H. T. H. (2021). Ho Chi Minh City's population change in the period 2009 - 2019: Status, causes and solutions for population control. Scientific *Journal of Human Resource Development, 2(2*).

Nguyen, K. T., & Nguyen, A. T. L. (2016). Research on green consumption intention of consumers in Ho Chi Minh City. *Ho Chi Minh City Open University Journal of Science - Economics and Administration, 11*(1), 127-138.

Nunnally, J. C., & Bernstein, I. H. (1994). The assessment of reliability. *Psychometric Theory*, *3*(1), 248-292.

Paul, J., Modi, A., & Patel, J. (2016). Predicting green product consumption using theory of planned behavior and reasoned action. *Journal of Retailing and Consumer Services*, *29*(C), 123-134.

Pham, C. H., & Nguyen, H. T. Q. (2021). Electric motorcycle consumption behavior with the green consumption trend in Ho Chi Minh city. *Journal of International Economics and Management, 136*(2021), 63-81.

Samadzad, M., Nosratzadeh, H., Karami, H., & Karami, A. (2023). What are the factors affecting the adoption and use of electric scooter sharing systems from the end user's perspective? *Transport Policy*, *136*(2023), 70-82.

Scorrano, M., & Rotaris, L. (2022). The role of environmental awareness and knowledge in the choice of a seated electric scooter. *Transportation Research Part A: Policy and Practice*, *160*(2022), 333-347.

Secinaro, S., Calandra, D., Lanzalonga, F., & Ferraris, A. (2022). Electric vehicles' consumer behaviours: Mapping the field and providing a research agenda. *Journal of Business Research, 150*(2022), 399-416.

Sekhokoane, L., Qie, N., Rau, P. L. P. (2017). Do consumption values and environmental awareness impact on green consumption in China? *CCD 2017: Cross-cultural design*, 713-723.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2), 144-176.

Tong, L. H., & Duong, M. T. T. (2021). The impact of environmental protection tax on plastic bag use: a case study of Vietnam. *The Journal of Asian Finance, Economics and Business*, *8*(2), 213-221.

Tran, T. D. B., Luong, H. Q., & Tran, M. D. T. (2020). Evaluation of co-benefits for passenger transport sector based on the transportation planning of Ho Chi Minh City by 2020, with a vision after 2020. *Vietnam Journal of Hydrometeorology 2020, 718,* 11-21. doi:10.36335/VNJHM.2020(718).11-21

Tran, T. T., & Tran, L. K. (2021). Factors affecting the intention to buy vinfast electric motorcycle of people in Ho Chi Minh City. *Journal of Science and Technology-IUH, 50*(2), 90-105.

Venkatesh, V., & Davis, D. F. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186-204.

Xiang, L. Y., & Sumelius, J. (2010). Analysis of the factors of farmers' participation in the management of cooperatives in Finland. *Journal of Rural Cooperation*, *38*(2), 134-155.

Yasir, A., Hu, X., Ahmad, M., Alvarado, R., Anser, M. K., Işık, C., ... Khan, I. A. (2022). Factors affecting electric bike adoption: Seeking an energy-efficient solution for the post-Covid era. *Frontiers in Energy Research, 9*(817107), 1-13.