FACTORS INFLUENCING ATTITUDE, PURCHASE INTENTION AND PURCHASE BEHAVIOR OF ELECTRIC VEHICLES IN THAILAND

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Abstract

This research aims to investigate the factors which have influences on attitude, purchase intention and purchase behavior of electric vehicles in Thailand. The conceptual framework contains 8 variables, including environmental concern, knowledge, attitude, subjective norm, perceived behavioral control, price sensitivity, purchase intention and purchase behavior. The study used a survey research design and collected a valid sample (n=500) from people who are 18 years old and above, eligible to drive a car (according to Thai laws), and who have interests in cars and also recently visited the two biggest automotive exhibitions in Thailand. The researcher applied nonprobability sampling technique; judgmental, quota and convenience sampling via online and offline channels. To analyze the data, a confirmatory factor analysis was used where it examined the associations between items and constructs. Afterward, structural equation model (SEM) was applied to investigate the relationships between the constructs. The results established environment concern has a significant influence on knowledge and attitude toward electric vehicle. In addition, attitude, subjective norm and price sensitivity have a significant influence on purchase intention. Furthermore, purchase intention has a significant influence on purchase behavior. On the other hand, knowledge related to electric vehicle was not found to have a significant influence on attitude and perceived behavioral control does not have a significant influence on purchase intention. This research provides a theoretical and practical guidance for the automotive companies, car dealers and government agencies to have a better understanding of consumer's purchase decision making process and ultimately implement an appropriate strategy to increase the Thai consumer's willingness of purchasing an electric vehicle.

Keywords: Environmental Concern, Knowledge, Attitude, Subjective Norm, Perceived Behavioral Control, Price Sensitivity, Purchase Intention and Purchase Behavior

Introduction

Climate change has been listed on the top of the global agenda. It becomes one of the greatest threats to our living planet. Climate change is predicted to influence the weather, environment and everything on earth (Hartman, 2016). During the past decades, global CO2 emissions have been increasing continuously. In general, the global warming is caused by human's fossil fuel consumption, especially in the transportation sector, the main sources of energy are fuels which are derived from petroleum. Nowadays, thanks to the development of technology, electric batteries become one of the main powers for automotive vehicles as well. It contributes to reduce the fossil fuel consumption and air pollution. To solve the issue of global climate change, electric mobility probably become the most important key (Ahuja, et al., 2020).

Electric Vehicles (EVs) are defined as ultra-low emissions vehicles. In the category of low emissions vehicles, it includes hydrogen and several natural gas power generated vehicles. Battery powered vehicles are recognized as zero emissions vehicles. Hybrid electric vehicles are known as one of the electric vehicles that combine both engine and batteries. It utilizes the independent engine to generate the power for the batteries or charge other on-board energy storage (Buca & Brausen, 1997).

As the environment issues and climate changes have become more and more serious in the recent years, Thailand also set up a national goal and commit to achieve carbon neutrality by 2050. In order to reach this, one of the essential policies is to accelerate the automotive industry transforming from traditional gasoline vehicles to electric vehicles. Since electric vehicles have been considered to save more energy and reduce the gas emissions, Thailand is positively promoting electric vehicles. However, it still faces many challenges, such as attracting electric vehicles from an economic perceptive, infrastructure support, charging station facilities, car brand, quality, and others. Although electric vehicles are considered energy-efficient and environmental-friendly products compared to traditional engine-based vehicles, most people still need more awareness of their vehicles, or public vehicles will impact the environment and climate change. Promoting electric vehicles still needs more efforts, like education and knowledge sharing. Those factors may determine the consumer's attitude toward electric vehicles. Moreover, when consumers intend to purchase electric vehicles, sometimes the decision-making will be influenced by the important group, such as family, friends, colleagues, and other important persons. Concerned that electric vehicles still face the higher cost of manufacturing, which further causes the higher selling price, and infrastructure in Thailand, such as charging stations and home charging, is still not widely built, consumers may need to consider more before purchasing a new vehicle. Thai consumers' decision making of purchasing electric vehicles is a one of the keys. Having a better

understanding of factors influencing the attitude, purchase intention and purchase behavior can be a reference for government and companies to adapt some strategies to contribute to an increasing ratio of electric vehicles.

Literature Review

Environmental Concern

Environmental Concern is defined as self-evaluation of facts and attitudes and behaviors related to the environment and environmental issues, such as climate change, energy depletion, water contamination, biodiversity, land use, chemical and heavy metal, air pollution, waste management, ozone layer depletion, ocean and fisheries, and deforestation (Dash, 2021; Hassan, 2014; Thieme et al., 2015;). According to Bennett and Vijaygopal (2018), it emphasized that high environmental concern could encourage individuals to look for more knowledge of a product's effects on environment. Although the research found high environment concern doesn't significantly cause greater product knowledge, it believed the stimulation of environmental concern should be paid more attention. Moreover, based on Kautish and Dash (2017), environment concern is considered as a prior factor to affect individual's knowledge. Individual's concern about the environment is a significant factor that influences how individual collects and organizes the related information, further, to influence the decision making. People who have more environment concerns seems to have a willingness to search more information and learn about a product (Laroche et al., 2001). According to Franssonn and Garling (1999), environment concern is also relevant to behaviors. Individual with more concerns on environment would like to pay more efforts on information search and obtain more knowledge of a product. However, some studies revealed that people need to be educated for having a better understanding of a product's effect on the environment (Wang et al., 2020).

Many previous literatures focused on the analysis about the relationship between environment and attitude. According to Hassan (2014), environmental concern has a significant effect on customer behavior in a particular environmental behavior. The study found customers who have a high environmental concern have a higher attitude towards environment friendly products. In addition, Kashi (2020) and Dash (2021) both emphasized environmental concern plays a vital role on decision of environment friendly products. Customers who have more consciousness about the environment and ecosystem problems seem to have more considerations of choosing a environment friendly product, for example electric vehicle. Several studies also investigated the correlation between environmental concern and customer's buying behavior. The consequence verified that environmental concern strongly affects consumer's attitude toward electric vehicles. Bennett and Vijaygopal (2018) summarized that environmental concern is considered as a significant factor of attitude toward protecting the ecosystem. This study further indicated a positive environment concern

is the determinant of a favorable attitude towards purchasing a electric vehicle.

Moreover, Moslehpour et al. (2014) explored the correlation between consumers' environmental concerns and purchase behavior and the relationship between environmental concerns and knowledge in Indonesia and Taiwan. The result found in Taiwan the relationship between consumers' environmental concerns and attitude is significantly positive, however, not supported that for Indonesia.

Therefore, the study proposes the following hypothesis:

H1: Environment concern has a significant influence on knowledge.

H2: Environment concern has a significant influence on attitude towards electric vehicle.

Knowledge

Knowledge is the level of experience and familiarity of a product. It refers to the acquisition of thoroughly new information about the product by increasing the search efficiency. Product knowledge provides a better understanding of the products and enhances customers' rational assessment (Bui et al., 2021; Lin & Chen, 2006; Rachmawati et al., 2022). Several past studies have explored the correlation between knowledge and attitude from an environmental perspective (Suki, 2016). In more recent, Dash (2021) concluded that knowledge has been identified as a rooted factor of consumer's behaviors. Additionally, product knowledge can be recognized as an important determinant influencing customers' attitudes. The knowledge of a product can be formed by an individual's experience or touching with the information from various social media communication. Furthermore, knowledge is recognized as the basement of consumer's understanding of a product. Product knowledge influences the decision making of purchase. It was found that knowledge significantly affects the attitude of consumers. Another research also explored the relationship between knowledge and attitude. The findings implied customers who increase their knowledges related to the environment will develop a more positive attitude toward environment protecting products (Hassan, 2014).

According to Sun and Wang (2020), product knowledge positively impacts consumers' attitudes. It was agreed that product knowledge is a vital determinant that affect customers' purchasing attitudes. Product knowledge can influence the overall evaluation on specific products. This study also indicated that when consumers know more about the products, they seem to understand and compare the similar products from an environmental perspective. Knowledge about environment friendly products can help to develop customers' environmental attitudes and intentions to perform related behaviors.

Furthermore, referring to another study, Wang et al. (2020) suggested that behavior related knowledge significantly impact on pro-environmental behaviors. In addition, the research found both subjective and objective knowledge positively affect attitude and intention towards environment friendly hotel.

Therefore, this study proposes the following hypothesis:

H3: Knowledge has a significant influence on attitude towards electric vehicle.

Attitude

Attitude is defined as the degree to which a person has a favorable or unfavorable appraisal of the behavior in question for forming consumer-intention and consumer-behavior. It is understood as a behavioral phenomenon including judgment about whether the given behavior under consideration is good or bad and whether or not the actor wants to perform the behavior (Ajzen, 1991; Hoque et al., 2018; Vafaei-Zadeh et al., 2019; Zhang et al., 2021).

Ko and Jin (2017) explained customers with a more positive attitude, they will have stronger intention to perform a behavior. Liu et al. (2020) supported those attitudes toward purchasing environment friendly products is correlated positively with the intention to perform pro-environmental purchasing behaviors. The research supported that attitude significantly affects purchase intentions. Nguyen et al. (2017) also confirmed that engaging in green purchase behavior is caused by their positive environmental attitudes. More recent research found that both experiential and instrumental attitudes toward environment positively affect purchase intention of environment friendly product (Siddique et al., 2021).

Therefore, hypothesis is proposed as below:

H4: Attitude toward electric vehicles has a significant influence on purchase intention of electric vehicle.

Subjective Norm

Subjective norm refers to responses of important reference groups such as family members, close friends etc. to a particular behavior and whether an individual will consider these responses when deciding to perform the behaviour or not (Agnoli et al., 2016; Ajzen, 1991; Chung et al., 2012; Thoradeniya et al., 2015; Widyanto & Sitohang, 2021).

Subjective norms related to purchase environment friendly products are correlated positively with the intentions to perform pro-environmental purchasing behavior (Liu et al., 2020). Bui et al. (2021) affirmed the important positively influence of subjective norms on purchase intention. Ko and Jin (2017) also agreed subjective norms directly impact on purchase intention significantly. Furthermore, from a perspective of environment protection, Wang (2014) supported subjective norms significantly influence on purchasing intentions.

Therefore, the hypothesis is proposed as below:

H5: Subjective norm has a significant influence on purchase intention of electric vehicle.

Perceived Behavioral Control

Perceived behavioral control is defined as individual perception of the ease or difficulty of performing the behavior of interest. It reflects an individual’s perception about the ability, capacity, availability of necessary resources or obstacles to carry out a specific action (Ajzen, 1991; Bhutto, et al., 2022; Duong, 2021; Park & Huang, 2017).

Sun and Wang (2020) supported that perceived behavioral control positively affect purchase intentions. Another study conducted by Nguyen and Nguyen (2020) explored the relations among attitude, perceived behavior control and purchase intention of environment friendly products. The findings showed that there exit significant and positive relationships. Moreover, Joshi and Srivastava (2020) confirmed perceived behavioral control positively impact consumers' intentions of purchase environmental apparel products. A positive impact of perceived behavioral control on purchase intention implied consumers who have more confidence will develop more purchase intentions.

Therefore, hypothesis is proposed as below:

H6: Perceived behavioral control has a significant influence on purchase intention of electric vehicle.

Price sensitivity

Price sensitivity is defined as the extent of consciousness and reaction displayed by consumers when finding the differences among the prices of a given product or services (Bhutto et al., 2022; Jiang et al., 2015; Lin & Chen, 2016; Monroe, 1973).

Price sensitivity was found to have an influence on the consumers' purchase intention. The research also indicated that customers with more price sensitivity on the green products tend to affect purchase intention. Because in general the price of environment-friendly product is more expensive than the conventional products (Sun et al., 2021). In more recent, Cakici and Tekeli (2022) also confirmed consumers' price sensitivity affects their purchase intention. Furthermore, Brandão and Costa (2021) considered price sensitivity is one of the important predictors to have influences directly on purchase intention of environment concerned products.

Therefore, the hypothesis is proposed as below:

H7: Price sensitivity has a significant influence on purchase intention of electric vehicle.

Purchase Intention

Purchase intention is an approach to predict and examine consumer behavior on their attention towards a specific product and their willingness to purchase. It also refers to the mental stage in the decision-making procedure in which consumers already have an interest and willingness to act on a product or brand (Chakraborty, 2019; Widyanto & Sitohang, 2021). Barber and Taylor (2013) pointed out intention are used to predict behavior. It is a key factor of a person's actual purchase behavior. Siddique et al. (2021) also suggested purchase intention toward environment positively effect on pro-environmental purchase behavior. The study explained that consumers with a higher purchase intention fuels the purchase behavior toward environment friendly products. In 2022, Mazhar et al. proved that consumers who have a higher purchase intention will cause higher possibility on purchase behavior of a environment friendly product. In the other words, a strong relationship exists between

purchase intention and purchase behavior.

Therefore, hypothesis is proposed as below:

H8: Purchase intention has a significant influence on purchase behavior of electric vehicle.

Purchase Behavior

Purchase behavior refers to the theory of planned behavior model, an individual's decision-making comes from a rational assessment of the result of his or her behavior. The intention to act a behavior is understood that the person is prepared to perform. Purchase behavior motivates people to involve in purchasing and consuming products which contain the social and mental process. When behavior is under volitional control, performance of a behavior is caused by the intentions (Bashir, 2019; Chaudhary, 2018). Based on Baumgartner (2010), purchase behavior can be encouraged by both functional or cognitive and psycho-social or emotional considerations. It is a corresponding interest or a focus in utilitarian or hedonic products.

Many previous studies explored the correlation between purchase intention and purchase behaviour. The intention is recognized as the direct predictor of behaviour (Liu et al., 2020; Nedra et al., 2015). Refer to Mohammed (2021), consumers who have higher purchase intention will have a higher possibility to perform an actual purchase behaviour. The research revealed the correlation between purchasing intention and actual behaviour. Besides all the above, other determinates are also considered to influence purchase behaviour. Some literatures have shown a correlation between peer influence, consumers' intention, and actual purchase behavior. In addition, Channa et al. (2021) supported that peer influence is to involve and engage in the specified behaviours. The research found that peer influence is positively affecting purchasing behavior.

Some other literature also explored the purchase behaviours of environment friendly products. Consumers perform an action of buying and using only products that is good to environment. This consequence contributes to a sustainably developed society (Wang et al., 2020). According to Khare and Varshneya (2017), purchase behavior is affected by consumers' attitudes toward environment and their willingness to pay. Consumers' pro-environmental attitude is significant in their purchase decisions of environment friendly product. Although, several previous studies have doubted the role of behavioral intention on purchase behavior. However, the major of researchers illustrated behavioral intention as a mediator under various contexts (Choo et al., 2004).

Therefore, the hypothesis is proposed as below:

H8: Purchase intention has a significant influence on purchase behavior of electric vehicle.

Conceptual Framework

The conceptual framework of this paper is mainly composed of three previous theoretical frameworks. The first theoretical framework is conducted by Bennett and Vijaygopal (2018), the research verified the influences of gamification linkage between customers' self-image congruence related to the purchase of electric vehicles. Customers' attitudes towards environment-friendly vehicles concern their environmental consciousness and product knowledge. In addition, the study investigated the relationship between attitudes and willingness to purchase electric vehicles. The second theoretical framework is conducted by Bhutto et al. (2022), the study suggested a model referring to the TPB model to investigate the customer's reaction in terms of purchase intention for hybrid vehicles, further it exanimated the influence of price sensitivity between attitude, subjective norms and perceived behavioural control and customer's green purchase intention of hybrid vehicles. The third theoretical framework is conducted by Mishal et al. (2017), the research developed a survey instrument which applied a two-step process to analyze the correlations between environmental consciousness, green attitude, green purchase intention, perceived customer effectiveness, green behaviour and green purchase behaviour. Figure 1 shows the conceptual framework of this study, followed by all proposed hypotheses.

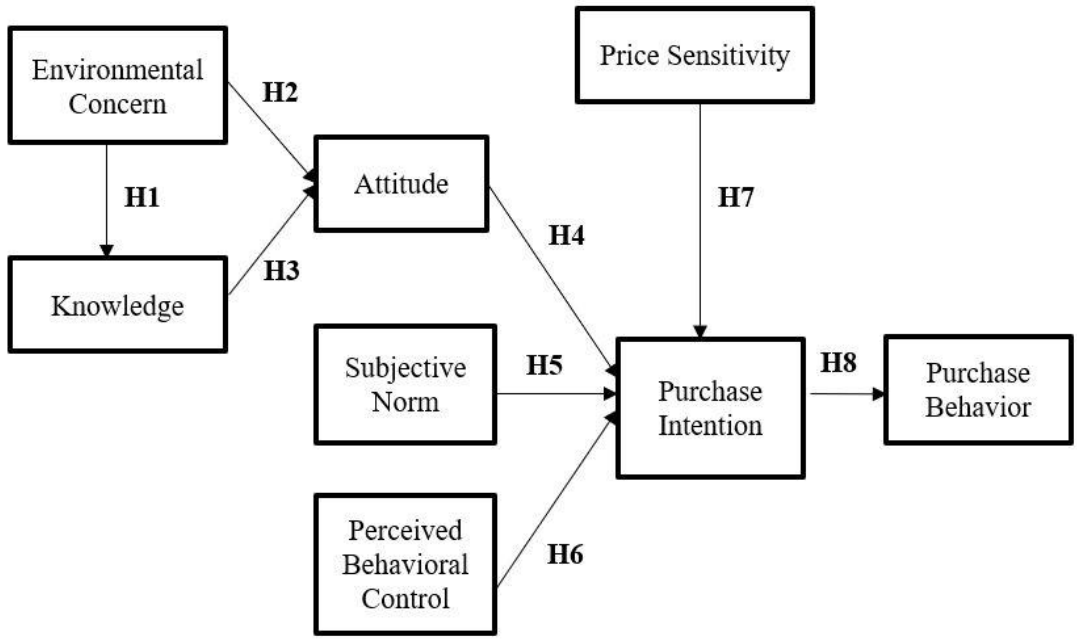

Figure 1: Conceptual Framework
Source: Created by the author

H1: Environment concern has a significant influence on knowledge.
H2: Environment concern has a significant influence on attitude towards electric

vehicle.

H3: Knowledge has a significant influence on attitude towards electric vehicle.

H4: Attitude toward electric vehicles has a significant influence on purchase intention of electric vehicle.

H5: Subjective norm has a significant influence on purchase intention of electric vehicle.

H6: Perceived behavioral control has a significant influence on purchase intention of electric vehicle.

H7: Price sensitivity has a significant influence on purchase intention of electric vehicle.

H8: Purchase intention has a significant influence on purchase behavior of electric vehicle.

Research Methods and Materials

Research Methodology

Nonprobability sampling was conducted in this study. Both online and offline questionnaires were distributed to the people who are 18 years old and above, eligible to drive a car in Thailand (according to Thai laws), ever visited the two biggest exhibitions, Bangkok International Motor Show and Thailand International Motor Expo. The two exhibitions are held once every year and the recent average number of visitors are over millions. Most of the automotive companies will launch new models during the two exhibitions and the reservation number of vehicles is considered to be an important index of vehicle sales. The components of the questionnaire are screening questions, measuring variables with the five-point Likert scale from strongly disagree (1) to strongly agree (5), and demographic information. Before the data collection, the item-objective congruence (IOC) index was initially examined. Three experts scored each scale item, resulting in all items being approved at a score above 0.5. Afterwards, a pilot test of 50 respondents was carried out. Cronbach's Alpha coefficient values were approved and ensured all constructs' reliability. The data were analyzed by SPSS and SPSS AMOS. Confirmatory factor analysis (CFA) was used to test the validity and reliability of the results, and the structural equation model (SEM) was used to verify the causal relationship between variables.

Population and Sample Size

The main target population of this paper is the people who are 18 years old and above, eligible to drive a car (according to Thai laws), and recently visited two biggest automotive exhibitions in Thailand. By setting the relevant factor parameters and the number of variables (Soper, 2021), through calculation, the minimum sample size was 444. In order to enhance effective measures, the researcher selected 500 as sample size to achieve the research objectives.

Sampling Techniques

Nonprobability samplings were used as sampling techniques. Firstly, the nonprobability sampling method of purposive sampling was used to select the two biggest automotive exhibitions in Thailand. Secondly, quota sampling was used to target people who recently visited those two automotive exhibitions, Bangkok International Motor Show and Thailand International Motor Expo, as shown in Table 1. Third, convenience sampling was applied to choosing the persons who are 18 years old and above, eligible to obtain a driving license and legal to drive a car, using online and offline to distribute the questionnaire to the target group. Data have been collected from the 38th Thailand International Motor Expo and 43rd Bangkok International Motor Show.

Table 1 Sample Units and Sample Size

Automotive Exhibition	Approximate Population Size (Visitors in Million)	Sample Size
38th Thailand International Motor Expo	1.15	211
43nd Bangkok International Motor Show	1.58	289
Total	2.73	500

Source: Created by the author

Results and Discussion

Demographic Information

The demographic results are shown in Table 2. There were 235 males and 265 females, accounting for 47% and 53% respectively. The majority age was 31-40 years old with 58.4%, whereas the least group was more than 60 years old with 0.2%. For the respondents' occupations, the most were company employees with a percentage of 74.8%, while the least was students at 1.4% respectively. For monthly income level, the highest range was under 40,001-60,000 THB per month consisting of 50.4%, while the lowest was 20,000 THB or less per month at 1.2%. In terms of education level, the highest range was bachelor's degree at 67.6%, while high school or vocational was at 0.8% respectively.

Table 2 Demographic Profile

Demographic and general Data (n=500)		Frequency	Percentage
Gender	Male	235	47.0%
	Female	265	53.0%
Age	18-20 years old	3	0.6%
	21-30 years old	47	9.4%
	31-40 years old	292	58.4%
	41-50 years old	117	23.4%
	51-60 years old	40	8.0%
	More than 60 years old	1	0.2%
Occupation	Student	7	1.4%
	Government employee	35	7.0%
	Company employee	374	74.8%
	Self-employment	71	14.2%
	Other	13	2.6%
Income per month	20,000 THB or less	6	1.2%
	20,000-40,000 THB	80	16.0%
	40,001-60,000 THB	252	50.4%
	Above 60,000 THB	162	32.4%
Education level	High school/Vocational Certificate or lower	4	0.8%
	Diploma	23	4.6%
	Bachelor's degree	338	67.6%
	Master's degree	117	23.4%
	Doctor's degree	18	3.6%

Source Created by the author

Confirmatory Factor Analysis (CFA)

CFA has been widely analyzed in social and behavioural sciences fields. The structural equation modelling (SEM) technique allows CFA to determine causal relations among latent and observed variables in a proposed theoretical framework. CFA provides the researcher with valuable information regarding the data fit model, and theory-derived measurement model and specifies the potential weakness of specific items. In this study, the researcher used CFA for a better understanding of model conceptualization, identification and parameter measurement. Moreover, it was also used to assess the data-model fit and model modification (Mueller & Hancock, 2001). As shown in Table 3, factor loadings are greater than 0.5, and the p-value is less than 0.05. Furthermore, Cronbach's Alpha coefficient values are over 0.7 or above, composite reliability is greater than 0.7, and the average variance extracted

is greater than cut-off point of 0.4 (Fornell & Larcker, 1981). In this study, goodness of fit indices was examined in the criteria of CMIN/df, GFI, AGFI, NFI, CFI, TLI and RMSEA. All results measurement model were approved as shown in Table 4.

Table 3 Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Environmental Concern (EC)	4	0.802	0.679-0.730	0.803	0.506
Knowledge (KN)	4	0.809	0.674-0.784	0.810	0.516
Attitude (AT)	4	0.798	0.634-0.776	0.803	0.507
Subjective Norm (SN)	4	0.771	0.641-0.717	0.774	0.462
Perceived Behavioral Control (PBC)	3	0.783	0.628-0.815	0.788	0.557
Price Sensitivity (PS)	3	0.709	0.581-0.725	0.718	0.461
Purchase Intention (PI)	3	0.883	0.825-0.880	0.882	0.714
Purchase Behavior (PB)	3	0.883	0.818-0.878	0.883	0.716

Source: Created by the author

Table 4: Goodness of Fit for Measurement Model

Index	Acceptable Values	Statistical Values
CMIN/DF	< 3.00 (Hair et al.,2006)	**435.833/322=1.354**
GFI	≥ 0.85 (Sica & Ghisi, 2007)	**0.942**
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	**0.927**
NFI	≥ 0.80 (Wu & Wang, 2006)	**0.934**
CFI	≥ 0.80 (Bentler, 1990)	**0.982**
TLI	≥ 0.80 (Sharma et al., 2005)	**0.978**
RMSEA	< 0.08 (Pedroso et al., 2016)	**0.027**
Model summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, IFI = Incremental Fit Indices, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

Source: Created by the author

Fornell and Larcker (1981) pointed out that if the square root of the average variance extracted is larger than the coefficient of other related structures, the discriminant validity is acceptable. As shown in Table 5, all results of this study confirm to discriminant validity and convergence validity.

Table 5 Discriminant Validity

	EC	KN	AT	SN	PBC	PS	PI	PB
EC	**0.711**							
KN	0.229	**0.718**						
AT	0.535	0.168	**0.712**					
SN	0.673	0.268	0.661	**0.680**				
PBC	0.166	0.142	0.373	0.288	**0.746**			
PS	0.539	0.259	0.671	0.658	0.461	**0.679**		
PI	0.533	0.308	0.514	0.673	0.306	0.645	**0.845**	
PB	0.562	0.282	0.501	0.634	0.347	0.652	0.747	**0.846**

Source: Created by the author.

Structural Equation Model (SEM)

SEM is a multivariate statistical method that has widely tested the direct and indirect impacts among observed (latent) variables (Stein et al., 2012). To ensure the reliability and validity of data. As shown in Table 6, CMIN/df, GFI, AGFI, NFI, CFI, TLI and RMSEA are in harmony with empirical data, representing acceptable fit.

Table 6: Goodness of Fit for Structural Model

Index	Acceptable Values	Statistical Values
CMIN/DF	< 3.00 (Hair et al., 2006)	**1002.246/339=2.956**
GFI	≥ 0.85 (Sica & Ghisi, 2007)	**0.868**
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	**0.841**
NFI	≥ 0.80 (Wu & Wang, 2006)	**0.847**
CFI	≥ 0.80 (Bentler, 1990)	**0.893**
TLI	≥ 0.80 (Sharma et al., 2005)	**0.880**
RMSEA	< 0.08 (Pedroso et al., 2016)	**0.063**
Model summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, IFI = Incremental Fit Indices, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

Source: Created by the author

Research Hypothesis Testing Result

The research model in this paper mainly calculated the significance relationship of the variables through standardized regression weight and t-value. When the significance $p<0.05$, it is considered to be significant. According to the results in Table 7, six of the eight hypotheses are significant.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	Standardized path coefficient (β)	t-value	Testing result
H1: EC⟶KN	0.230	4.040*	**Supported**
H2: EC⟶AT	0.488	7.613*	**Supported**
H3: KN⟶AT	0.047	0.937	**Not Supported**
H4: AT⟶PI	0.184	3.934*	**Supported**
H5: SN⟶PI	0.447	7.716*	**Supported**
H6: PBC⟶PI	0.085	1.880	**Not Supported**
H7: PS⟶PI	0.452	7.054*	**Supported**
H8: PI⟶PB	0.826	16.28*	**Supported**

Note: * $p<0.05$

Source: Created by the author.

The results in Table 7 and Figure 2 can be further refined as:

H1 shows that environmental concern has a significant influence on knowledge and was supported with a standardized coefficient value of 0.230. The result was contradicted by a previous study that the connection between environmental concern and product knowledge remained insignificant. Consumer attitudes towards electric vehicles are based on the posited influences of a specific stereotype of electric vehicle owners possibly held by people without experience of electric vehicles (Bennett & Vijaygopal, 2018). This result can be caused by different education or information in different countries. The users of electric vehicles in Thailand are still few and people are lack experience. Laroche et al. (2001) established positive and significant connections between environmental concern and the search for product knowledge. Environment concern is considered as a prior factor to affects knowledge (Franssonn & Garling, 1999; Kautish & Dash, 2017). Therefore, marketing communications related to less gas emission and more energy saving may encourage Thai consumers to put more effort into searching for such information and obtaining the knowledge.

H2 confirms that environmental concern has a significant influence on attitudes towards electric vehicles was supported by a standardized coefficient value of 0.488. Environment concern is a key construct of attitude. This result agrees with many previous

studies, there is a significant relationship between environmental concern and attitude (Bennett & Vijaygopal, 2018; Hassan 2014). It also proved environmental concerns have a significant effect on attitudes toward purchasing environment-friendly product (Kashi, 2020; Dash 2021)

H3 reveals that knowledge has a significant influence on attitude towards electric vehicles was not supported with a standardized coefficient value of 0.047. Although this result found there is no significant relationship between knowledge and attitude, it seems Thai consumer's attitudes may be affected more by other factors such as battery charging infrastructure, cost performance, quality and service and so on. However, many previously agreed that knowledge about environment-friendly products can help to develop an attitude related to environmental behaviours (Suki, 2016; Wang et al., 2020; Sun & Wang, 2020).

H4 affirms that attitude toward electric vehicles has a significant influence on purchase intention of electric vehicles was supported with a standardized coefficient value of 0.184. Customers with a positive attitude will have a strong intention to perform a behaviour (Ko & Jin, 2017). The result also supported that attitude is positively correlated with intention to purchase green products (Nguyen et al., 2017; Liu et al., 2020).

H5 presents that subjective norm has a significant influence on the purchase intention of electric vehicles with was supported standardized coefficient value of 0.447. According to the empirical study of Liu et al. (2020), subjective norms are correlated with intentions to perform the behavior. Subjective norm has a direct influence on purchase intention significantly (Bui et al., 2021; Ko & Jin, 2017; Wang, 2014).

H6 demonstrates that perceived behavioral control has a significant influence on the purchase intention of the electric vehicle was not supported with a standardized coefficient value of 0.085. Although some previous studies suggested perceived behavioral control positively affects purchase intention (Sun & Wang, 2020; Nguyen & Nguyen, 2020; Joshi & Srivastava, 2020), it can be assumed that Thai consumers may face other factors such as income, occupation, especially during the impact of Covid-19, the tourism economy suddenly decreased, and many people need to think about the risks and are difficult to make a purchase decision.

H7 pointed out that price sensitivity has a significant influence on the purchase intention of electric vehicles was supported by a standardized coefficient value of 0.452. The result confirmed previous studies that consumer price sensitivity directly affects purchase intention (Brandão & Costa, 2021; Cakici & Tekeli, 2022, Sun et al., 2021).

H8 indicates that purchase intention has a significant influence on the purchase behavior of electric vehicles was supported by a standardized coefficient value of 0.826. Intention is the key factor to predict behavior (Barber & Taylor, 2013; Siddique et al., 2021). The result strongly supported the previous study that consumers who have a high purchase intention will have high possibility to perform a purchase behaviour of environment-friendly

products (Mazhar et al., 2022).

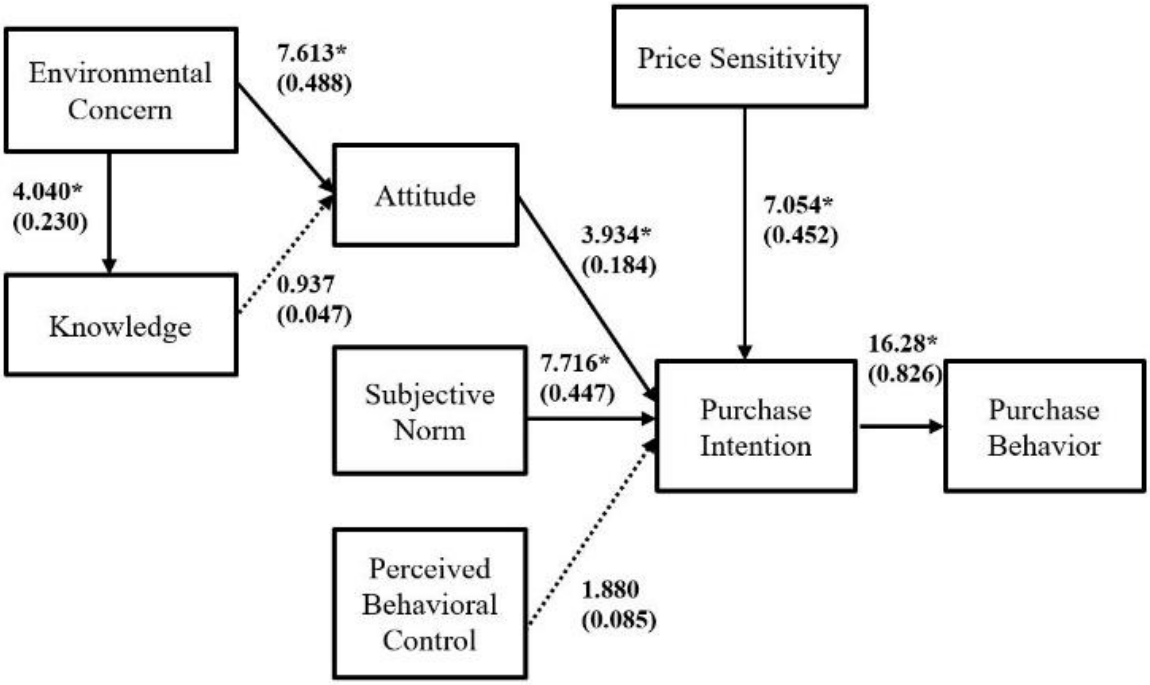

Figure 2 The Results of the Structural Model

Note: Solid line reports the Standardized Coefficient with * as p<0.05, and t-value in Parentheses; Dash line reports Not Significant

Source: Created by the author

Conclusions and Recommendations

Conclusion

This study aims to contribute to academic and business research aspects. For academic researchers, the findings could fill the gap between purchase intention and behavior of electric vehicles, as carbon neutrality is a goal of sustainable development. The electric vehicle is considered a benefit to the environment; switching from a traditional gasoline to an electric vehicle can help reduce carbon emissions. For automotive manufacturers, the practical implications could motivate them to develop or produce more environment-friendly vehicles, which can generate a favourable attitude and increase the willingness to buy a green vehicle. This paper aims to study the factors have influences the purchase intention and purchase behavior of the electric vehicles in Thailand. The results established environmental concern has a significant influence on knowledge and attitude. Previous research also confirmed a significant correlation between environmental concern and knowledge (Franssonn & Garling, 1999; Kautish & Dash, 2017; Laroche et al., 2001). This result also agrees with many previous studies that environmental concerns significantly affect attitudes toward purchasing

environment-friendly products (Bennett & Vijaygopal, 2018; Dash, 2021; Hassan, 2014; Kashi, 2020). Attitude, subjective norm and price sensitivity have a significant influence on purchase intention. Moreover, purchase intention was verified to have a significant influence on purchase behavior. It agreed with previous studies that customers with a positive attitude will strongly intend to perform a behavior (Ko & Jin, 2017; Liu et al., 2020; Nguyen et al., 2017). The result also confirmed previous studies that subjective norm significantly influences purchase intention (Bui et al., 2021; Ko & Jin, 2017; Wang, 2014). In this research, consumer's price sensitivity directly affects purchase intention also agreed with other previous studies (Brandão & Costa, 2021; Cakici & Tekeli, 2022). The result confirmed that purchase intention has a significant influence on the purchase behavior of electric vehicle. It supported previous studies that Intention is a key factor in predicting behavior (Barber & Taylor, 2013; Siddique et al., 2021; Mazhar et al., 2022). On the other hand, knowledge was not found to have a significant influence on attitude. Even though many previously supported that knowledge about environment-friendly products can help to develop an attitude related to environmental behaviors (Wang et al., 2020; Suki, 2016; Sun & Wang, 2020), this research was the opposite. It can be assumed that Thai consumers' attitudes may be affected more by other factors such as battery charging infrastructure, cost performance, quality, service, etc. The result also rejected that perceived behavioral control has a significant influence on purchase intention. Although some previous studies suggested perceived behavioral control positively affects purchase intention (Joshi & Srivastava, 2020; Nguyen & Nguyen, 2020; Sun & Wang, 2020), in this research, the result did not support perceived behavioral control has a significant influence on purchase intention of an electric vehicle. It can be assumed that Thai consumers may face other factors, such as income and occupation, especially during the impact of COVID-19, the tourism economy suddenly decreased, and many people need to consider the risks. It takes work to make a purchase decision. Those findings can imply that consumers with a higher environmental concern will have a higher attitude which further affects the purchase intention and behavior of electric vehicles. However, consumers with more knowledge about electric vehicles may not have a favourable attitude.

Recommendation

In this study, the results found environmental concern has a significant influence on knowledge. Therefore, increasing the consciousness or interests related to electric vehicle and environmental protection can cause consumers to search for more information and be familiar with the electric vehicles. Environmental concern also has a significant influence on attitude. A higher environmental concern can create a higher attitude, consumers who care more about the environment will have a higher positive attitude toward electric vehicles than traditional fuel vehicles. Electric vehicle manufacturers may promote electric vehicles are less gas emission, green and more beneficial to the ecosystem as so to increase a higher consumer purchase intention. Car dealers may also focus on advertisements or product brochures

showing electric vehicles are helpful to environment for building a favorable attitude for those people who have interests in purchasing or planning to switch to a new vehicle. As the recommendation or suggestion from the important group like family, friend or colleague and the price sensitivity are also key factors, companies may launch the specified theme campaigns related to electric vehicles. Thai consumers seem very sensitive to the price, a good price strategy should be implemented to attract more consumers. Thai government can consider making some polices to provide special tax exemption or subsidies to motivate automotive companies to produce electric vehicles and encourage Thai people to purchase and adopt electric vehicles.

Limitation and Further Study

This study has some limitations. First of all, this study only investigates people who ever visited the two biggest exhibitions in Thailand. Therefore, the future study should extend the coverage of respondents such as recently visited automotive dealer stores or online websites. Furthermore, researchers can further explore the groups who currently use other transportation methods instead of a private car, for example, subway, public bus, van and taxi to study whether those people have an interest or willingness to purchase electric vehicles or not. Next, this study only considers the several factors of attitude, subjective norm, perceived behavioural control and price sensitivity in the conceptual framework, which could also be extended to have more variables, such as personal values, risk perception, product experience and so on. Finally, the quantitative study can partially serve the significance from the statistical point of view. Hence, qualitative study should be added in order to compare results and produce better implications and recommendations.

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