

A STUDY ON THE IMPACT OF CONSUME INNOVATIVENESS TO PURCHASE INTENTION OF BATTERY ELECTRIC CAR IN THAILAND

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ABSTRACT

The purpose of this paper is to develop and empirically test a conceptual model to establish how consumer innovativeness can be used as a variable to positively impact to purchase intention of battery electric car in Thailand. The literature concerning consumer innovativeness and the theory of planned behavior reviewed to develop a conceptual model. The impact of consumer innovativeness has been empirically validated by Partial Least Squares Structural Equation Modeling (PLS-SEM) using a sample of 481 of car users in Thailand. Results reveal that consumer innovativeness which is a key construct has both direct and indirect impact on purchase intention of battery electric car in Thailand through attitude toward battery electric car and subject norm to purchase intention. There is a lack of studies which connect consumer innovativeness and the theory of planned behavior context especially in Thailand scenario. The results expand one's knowledge on this relationship, propounding interesting empirical evidence of the model among consumer innovativeness and the theory of planned behavior.

Keywords: Consumer innovativeness, purchase intention, battery electric car, Thailand

Introduction

An ongoing technological advance in transportation has led new developed vehicles to become less consumption of traditional petroleum and focus on cleaner energy like electricity. The innovative propulsion in electric cars helps to reduce the dependency on petroleum (Chan, 2007; Helmers & Marx, 2012). Electric vehicles (EVs) are a personal mobility needs concern over social desirability, technological and infrastructural developments (Graham-Rowe, Gardner, Abraham, Skippon, Dittmar, Hutchins, & Stannard, 2012). The more adoption of EVs can also support the transition from the use of traditional petroleum-related energies towards other renewable sources (Bradley and Frank, 2009). The change in driving technology has become increasingly obvious since the debut of hybrid cars which became successful in many countries, particularly Japan, North America and Europe (Chan, 2007). Nowadays, there are many types of alternative fueled cars (Wu & Liu, 2012). Innovative propulsion technology and air pollution reduction are the reasons of coming of electric vehicles (EVs) (Bradley & Frank, 2009). The adoption of EVs can help enable the transition from petroleum energy consumption to electricity as reducing petroleum consumption (Helmers & Marx, 2012). The technology of battery electric vehicle (BEV) has many advantages over ICEs. Firstly, the propulsion using electric motor is more efficient than propulsion using internal combustion engines (ICEs). (Helmers & Marx, 2012) Secondly, an electric motor has higher torque capability compared to an ICE technical information. (Eberhard & Tarpenning, 2006) Additionally users perceive that battery electric vehicle (BEV) are livelier and have good acceleration (Skippon & Garwood, 2011; Vilimek, Keinath, Schwalm, 2012) and fun to drive (Mangram, 2012). Thai government has a policy to support electric vehicles (EVs) to reduce oil importation as well as air pollution and make cities to become green and several auto firms are looking for the opportunity (Thai Minister of Energy, 2015). The crucial role of public infrastructure, consumer behavior, and perception were found in many studies (Hardester, 2010; Mangram, 2012; Sadler & Dalal-Clayton, 2012).

The insight of the factors affecting battery electric cars (BEVs) purchase intention is required by businesses and the government to promote and catalyze the market diffusion. Therefore, it is necessary for car manufacturer to examine and analyze which socioeconomic and socio- psychological characteristics of battery electric cars (BEVs) have an effect on purchase intention in Thailand.

Objective of the study

To make decision in marketing plan and achieving on new innovative cars launch, business firms consider not only related theory of factors affecting purchase intentions but also specific factors caused by characteristics of new product. Previous researches about battery electric cars purchase intention have been studied by using the theory planned behavior. However, most of the studies focus on existing products or similar products to test and examining the behavioral intention model. Anyway this research had not only developed the theory planned behavior but also added the specific factors, consumer innovativeness, which is a key characteristics of new product. The research objectives are 1) to develop a purchase intention model with perception of new innovated product in Thailand and 2) to investigate whether perceived consumer innovativeness has an effect on the purchase intention of battery electric cars in Thailand. This research focuses on Thai consumers that live in capital city and surrounding areas because there is high density of traffic. Consumers' inclination to purchase battery electric vehicle (BEV) is examined, and the effects of socio-economic and socio- psychological characteristics and a conceptual model of consumer general intention to purchase was developed in order to understand Thai consumers behavior. The period of research was set from December 2016 to February 2017.

Literature review

Consumer innovativeness is the tendency to buy, to try and to use new products more quickly than other people, or typical thought of a personal characteristics underlying adoption of new products (Midgley & Dowling, 1978). Innovativeness is "the degree to

which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system" (Rogers, 2002, 2005), so more innovative consumers, who are willing to engage in new experiences, are expected to be more willing to purchase innovative product. Due to the new arrival, innovations play as a key role in consumers behavior, such as purchasing habits and improving customers standard of living (Awan & Zahra, 2014). Innovators are independent decision makers who are driven by their personality rather than by others' opinions. Hirschman (1980) conceptualized innovativeness as "one's desire to acquire information about the new product" (Hirschman, 1980). Goldsmith and Hofacker (1991) argued that "consumers' perceptions and interests often vary across product categories and developed domain specific measures of innovativeness" (Goldsmith & Hofacker, 1991). Several literatures summarized and suggested that consumer innovativeness often includes multi-dimensional motivations such as functional, hedonic, social, and cognitive factors (Baumgartner and Steenkamp, 1996; Tian, Bearden, & Hunter, 2001; Voss, Spangenberg & Grohmann, 2003). Hauser, Tellis, and Griffin (2005) and Im, Mason, and Houston (2007) suggested for further research needs to be done to clarify the role of consumer innovativeness across product categories (Hauser, Tellis, and Griffin, 2006; Im, Mason, and Houston, 2007). The relationship between consumer innate innovativeness and adoption of product innovation is positive but weak (Goldsmith, Freiden, and Eastman, 1995; Im, Bayus, and Mason, 2003; Im, Mason and Houston, 2007). So, there is a need to better understand the relationship between domain specific innovativeness, vicarious innovativeness and consumer innate innovativeness (Im, Mason, and Houston, 2007).

The theory of planned behavior (TPB) is a theory that links beliefs and behavior whose concept was proposed by Ajzen (1985) who improved the predictive power of the theory of reasoned action by including perceived behavioral control. Intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior,

subjective norms, and perceived behavioral control; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior (Ajzen, 1985, 1987). It posits that intention captures motivational factors to perform behavior and is strongly correlated with actual behavior (Ajzen, 1991).

The relationship of variables and hypothesis

Consumer innovativeness is a key construct to improve online retail adoption intention both directly and by its effective role in reducing consumer risk perception of using internet channel for making purchase of physical goods (Thakur, & Srivastava, 2014). Horng-Cherng Shiau had studied the impact of product innovation on behavioral intention and found that product innovation affected the behavior intention through the mediating effect of the brand image (Shiau, 2014). Consumer innovativeness and attitude toward innovation varies across perceived novelty, perceived value, and perceived risk (Truong, 2012, 2013). Consumer perceptions of retailer innovativeness can be conceptualized as emotions, cognitions, and behavior responses evoked by store-related stimuli that are part of the offerings, services, design, and activities of a store (Lin, 2015). Social influence, environmental concern, green product knowledge, specific environmental knowledge have an impact to green purchase behavior (Wahid, Rahbar & Shyan, Ramayah, 2011). Additionally, consumer innovativeness includes multi-dimensional motivations for instance functional, hedonic, social, and cognitive factors (Baumgartner and Steenkamp, 1996; Tian et al., 2001; Voss, Spangenberg & Grohmann, 2003). Consumer innovations need clarity to clarify roles in each category across product categories (Hauser, Tellis, and Griffin, 2006; Im, Mason, and Houston, 2007). Consequently, it could be hypothesized in term of consumer innovativeness in that:-

H1: Consumer innovativeness (CI) has a positive impact on intention to purchase (PI).

H2: Consumer innovativeness (CI) has a positive impact on attitude toward battery electric car(AT).

H3: Consumer innovativeness (CI) has a positive impact on subjective norm (SN).

In the part of the theory of planned behavior, intentions to perform behaviors can be predicted with high accuracy from attitudes toward the behavior, subjective norms, and perceived behavioral control; and behavioral intentions, together with perceptions of behavioral control (Ajzen, 1985, 1987). There are several studies on this subject confirming this idea which involves innovative product. Attitude was effective on the intentions of consumers to re-purchase innovations in mobile marketing services (Kiff, 2012). Mostafa's study confirmed the influence of attitudes and perceived effectiveness on intention to purchase

green products (Mostafa, 2006). Social influence and green product knowledge have an impact on green purchase behavior (Wahid, et al., 2011).

Consequently, it could be hypothesized in the part of the theory of planned behavior in that:-

H4: Attitude toward battery electric car (AT) has a positive impact on intention to purchase (PI).

H5: Subjective norm (SN) has a positive impact on intention to purchase (PI).

H6: Perceived behavioral control (PB) has a positive impact on intention to purchase (PI).

Conceptual model

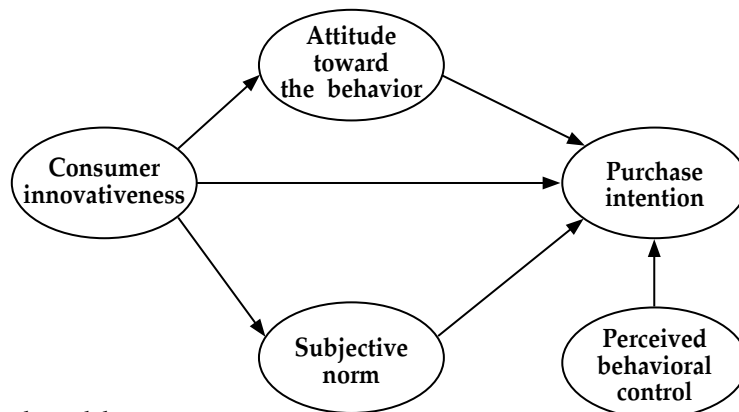


Figure 1 Conceptual model

Sample and Data

Researcher collected data from respondents who were car users based in general office throughout Bangkok and regional province in Thailand, particularly large cities. Sample size required to meet theory of using the Partial Least Squares Structural Equation Modeling (PLS-SEM) is at least 10 times the largest number of formative indicators used to measure a latent variable (Hair, Hult & Christian; Ringle & Marko Sarstedt, 2013). The research frame work consists of 5 latent variables. The most number of formative variable, consumer innovativeness, is 13 indicators; therefore sample size requirement is at least 130 samples. Sampling to obtain real population representative, researcher has to collect data to cover car users in Thailand, so the data must be collected by two reasons not only PLS-SEM threshold but also covering car users in Thailand in both capital city and surrounding

provinces. The data from a total of 481 car users in Thailand were collected.

Methodology

This research used a cross-sectional survey as well as empirical study to test its hypotheses.

The impact of consumer innovativeness has been empirically validated by Partial Least Squares Structural Equation Modeling (PLS-SEM).

Questionnaire development

The survey questionnaire was composed of 2 sections. In Section 1, the measures designed to evaluate variables consisted of consumer innovativeness, attitude toward behavior, subjective norm, perceived behavioral control, and intention to purchase. For all the measures, a seven-point Likert scale was used, with anchors ranging from 1 (strongly disagree) to 7 (strongly agree). Section 2 of the questionnaire included demographic data, such as gender, age,

status, level of education, occupation and income. Validity and Reliability

To test the validity and reliability of the measurement models using the corrected item total correlations, Cronbach's α and correlations among constructs in the path model are used. All multiple items of the measures are assessed for their internal consistency by computing the corrected item total correlation and coefficient α for each composite measure. Validity is the extent to which a scale or set of measures accurately represents the concept of interest (Hair, Anderson, Tatham, & Black, 1998) to maximize the validity and reliability of the responses to evaluate the psychometric properties of the measures for the 5 latent constructs. The questionnaire had been reviewed by 5 experts and the results were summarized by Index of Consistency (IOC). The IOC results of every manifest variables are more than 0.5 which met the criterion. Reliability is an assessment of the degree of consistency between multiple measurements of variables (Hair, Anderson, Tatham & Black, 1998). Then the 32 sets of questionnaires were sent as a pilot study and the results were processed by Cronbach's alpha. The cronbach's alpha results of all 5 latent variables are more than 0.7 which passed the criterion threshold.

Data collection

The data were collected through field survey of car users in Thailand and a questionnaire was structured for this purpose. This research used non probability sampling method to cover target population. Questionnaires were administrated and sent to participants by researcher and assistants in the various areas. Researcher and assistants used multiple ways to collect data such as face to face, drop-off/ pick up and particular internet survey

research. The samples would connect and give details in the questionnaires. Researcher and assistants used scanning questions to ask respondents the following questions: "Do you have a car? ", "Do you drive a car to work? ", or similar questions to screen the target respondents before handing the questionnaire.

Results

The impact of consumer innovativeness has been empirically validated by Partial Least Squares Structural Equation Modeling (PLS-SEM). The method concerning measures is employed and there are two steps in data analysis. The first step is to confirm the factor structure of measurement items, discriminant validity and convergent validity, and Combining Loading and Cross-Loading. The second step is to test the hypothesis of the relationship among factors to establish the model followed by the analysis of direct and indirect effect.

Step 1 and the results

Model fit and quality indices

Model fit and quality indices results consist of average path coefficient (APC), average R-squared (ARS), average adjusted R-squared (AARS), average block variance inflation factor (AVIF), average full collinearity VIF (AFVIF), Tenenhaus GoF (GoF), Simpson's paradox ratio (SPR), R-squared contribution ratio (RSCR), and statistical suppression ratio (SSR), and nonlinear bivariate causality direction ratio (NLBCDR) are provided. The results in Table 1 indicated that both inner and outer model compared to the criterion are confirmed by values of APC, ARS, AARS, AVIF, AFVIF, GoF, SPR, RSCR, SSR and NLBCDR. The model fitness tests were associated with p-value. The structural equation model of this study is consistent with empirical data.

Table 1 Summary results of Model fit and quality indices

Coherence of association	Acceptance level	Ideally	Results
Average path coefficient (APC)	$p < .05$		0.350, $P < 0.001$
Average R-squared (ARS)	$p < .05$		0.443, $P < 0.001$
Average Adjust R-squared (AARS)	$p < .05$		0.441, $P < 0.001$
Average Block VIF (AVIF)	≤ 5	≤ 3.3	2.142
Average Full Collinearity VIF (AFVIF)	≤ 5	≤ 3.3	2.274
Tenenhaus GoF (GoF)	small ≥ 0.1 , medium ≥ 0.25 , Large ≥ 0.36		0.583
Simpson's Paradox Ratio (SPR)	≥ 0.7	1	1.000
R-squared contribution ratio (RSCR)	≥ 0.9	1	1.000
Statistical suppression ratio (SSR)	≥ 0.7		1.000
Nonlinear bivariate causality direction ratio (NLBCDR)	≥ 0.7		1.000

Latent variable liability and validity

This research used the mostly used methods to assess measurements' reliability which is internal consistency. Measurements' internal consistency analysis followed Bagozzi and Yi (1998) approach of comparing three consistency indicators (composite reliability, Cronbach's alpha and average extracted variances) with a critical (Bagozzi & Yi, 1988).

R^2 coefficients indicate the percent of variance explained by the model. R^2 value should be large, and larger is better than smaller.

The composite reliability for all the latent variables is above the 0.707 threshold for reliable constructs (Fornell & Larcker, 1981). Composite reliability is recommended for structural equation modeling over Cohen's alpha which assumes equal reliability for all indicators (Bagozzi & Yi, Nassen, 1988; Chin, Marcolin & Newsted, 2003).

The average variance extracted (AVE) is close to or above 0.5 for convergent validity (Fornell & Larcker, 1981).

Composite reliability and Cronbach's alpha coefficients

are measures of reliability. Questions have been constructed regarding Cronbach's alpha's (Cronbach, 1951; Kline & Boyd, 2010) and psychometric properties. The Cronbach's alpha coefficients associated with formative latent variables are equal to or greater than 0.6, for reasons related to measurement error theory (Kock, 2014; Nunnally, 1978; Nunnally & Bernstein, 1994).

The full collinearity variance inflation factor (VIF) is calculated for all the latent variables in the model and is below the 3.3 threshold for multicollinearity (Cenfetelli & Bassellier, 2009; Petter, Straub & Rai, 2007). It is recommended that VIFs be lower than 5; a more relaxed criterion is that they are lower than 10 (Hair et al., 1987, 2009; Kline, 1998).

The Stone-Geisser Q^2 coefficients for all the latent variables are positive, confirming the predictive validity for each latent variable block in the model (Tenenhaus, Vinzi, Chatelin, & Lauro, 2005).

The results in Table 2 indicated that the criterion is met for all latent variables

Table 2 Latent Variable Reliability and Validity

	CI	AT	SN	PB	PI
R ² coefficients		0.439	0.299		0.590
Composite reliability Coefficients	0.949	0.959	0.944	0.945	0.943
Cronbach's alphacoefficients	0.941	0.937	0.930	0.912	0.919
Average variances extracted	0.590	0.888	0.706	0.851	0.805
Full collinearity VIFs	1.857	2.388	2.361	2.373	2.390
Q ² coefficients		0.441	0.301		0.589

Discriminant validity and Convergent validity

The square roots of average variances extracted (AVEs) are used for discriminant validity assessment and for convergent validity assessment. For discriminant validity assessment, AVEs are used

in conjunction with latent variable correlations. For convergent validity assessment, the AVE recommended for acceptable validity is 0.5 (Fornell & Larcker, 1981), and is applied to reflective latent variables. The results in the table 3 show that the criterion is met for all latent variables.

Table 3 Discriminant Validity

	CI	AT	SN	PB	PI
CI	0.768	0.640	0.546	0.542	0.532
AT	0.640	0.942	0.671	0.589	0.614
SN	0.546	0.671	0.840	0.651	0.647
PB	0.542	0.589	0.651	0.923	0.703
PI	0.532	0.614	0.647	0.703	0.897

Note: Square roots of average variances extracted (AVEs) shown on diagonal.

Combining Loading and Cross-Loading

Combined loadings and cross-loadings are provided in Table 4 with each cell referring to an indicator-latent variable link. Latent variable names are listed at the top of each column, and indicator names at the beginning of each row. The expectation here is that for reflective latent variables loadings, which are shown within parentheses, will be high; and cross-loadings will be low. Two criteria are

recommended as the basis for the research model has acceptable convergent validity meaning that the P values associated with the loadings are equal to or lower than 0.05; and that the loadings are equal to or greater than 0.5 (Hair, Black, Babin & Anderson, 2009). The results in the table 4 show that the criterion is met all indicators and their respective constructs.

Table 4 Combined Loading and Cross-Loading

	CI	AT	SN	PB	PI	Type	SE	P value
CI1	0.669	-0.038	-0.149	0.229	-0.087	Reflect	0.042	<0.001
CI2	0.715	-0.080	-0.087	-0.176	0.465	Reflect	0.042	<0.001
CI3	0.781	-0.214	0.026	0.079	-0.011	Reflect	0.041	<0.001
CI4	0.667	-0.141	0.127	0.062	-0.141	Reflect	0.042	<0.001
CI5	0.800	-0.062	-0.001	-0.209	0.345	Reflect	0.041	<0.001
CI6	0.821	0.000	-0.055	-0.108	0.299	Reflect	0.041	<0.001
CI7	0.782	0.072	0.109	-0.165	0.111	Reflect	0.041	<0.001
CI8	0.813	0.122	-0.054	0.075	-0.159	Reflect	0.041	<0.001
CI9	0.843	0.084	0.015	-0.020	-0.056	Reflect	0.041	<0.001
CI10	0.773	-0.037	0.028	0.042	-0.129	Reflect	0.041	<0.001
CI11	0.773	0.227	-0.068	0.051	-0.198	Reflect	0.041	<0.001
CI12	0.811	-0.081	0.061	-0.032	-0.057	Reflect	0.041	<0.001
CI13	0.713	0.122	0.043	0.231	-0.426	Reflect	0.042	<0.001
AT1	-0.038	0.943	0.013	-0.002	-0.075	Reflect	0.041	<0.001
AT2	-0.040	0.940	0.016	0.007	0.038	Reflect	0.041	<0.001
AT3	0.077	0.943	-0.029	-0.006	0.037	Reflect	0.041	<0.001
SN1	-0.011	-0.066	0.836	-0.126	0.161	Reflect	0.041	<0.001
SN2	-0.046	0.019	0.872	0.004	0.086	Reflect	0.041	<0.001
SN3	-0.091	0.070	0.844	0.010	0.111	Reflect	0.041	<0.001
SN4	0.133	-0.161	0.713	0.238	-0.419	Reflect	0.042	<0.001
SN5	-0.019	0.059	0.874	-0.033	-0.044	Reflect	0.041	<0.001
SN6	0.031	0.028	0.883	-0.045	-0.004	Reflect	0.041	<0.001
SN7	0.025	0.022	0.848	-0.008	0.044	Reflect	0.041	<0.001
PB1	-0.104	0.021	-0.061	0.900	0.075	Reflect	0.041	<0.001
PB2	0.051	0.016	0.054	0.935	-0.121	Reflect	0.041	<0.001
PB3	0.049	-0.036	0.004	0.933	0.049	Reflect	0.041	<0.001
PI1	-0.172	0.264	-0.056	0.160	0.849	Reflect	0.041	<0.001
PI2	0.134	-0.126	0.004	-0.140	0.906	Reflect	0.041	<0.001
PI3	0.083	-0.113	0.019	-0.100	0.940	Reflect	0.041	<0.001
PI4	-0.060	-0.004	0.030	0.095	0.892	Reflect	0.041	<0.001

Notes: Loadings are unrotated and cross-loadings are oblique-rotated. SEs and P values are for loadings. P values < 0.05 are desirable for reflective indicators

Step 2 and the hypothesis test results

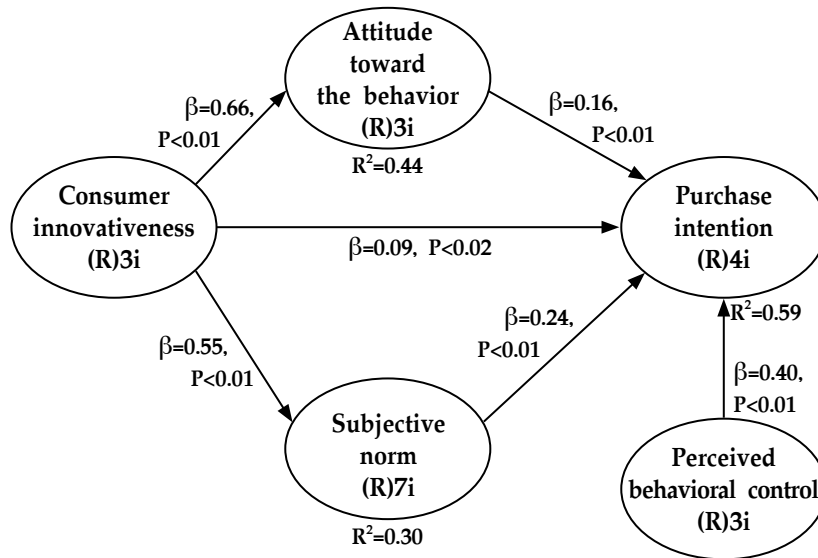


Figure 2 hypothesis test results

The hypotheses are tested by examining path coefficients levels 0.05 in the PLS regression structural model. Figure 2 shows path coefficients and significance levels for each hypothesis as well as the variances (R2) for the dependent constructs: Consumer innovativeness (CI) explains 44.0% of Attitude toward behavior (AT). Consumer innovativeness (CI) explains 30.0% of Subjective norm (SN). Attitude toward behavior (AT), Consumer innovativeness (CI), Subjective norm (SN) and Perceived behavioral control (PB) explain 59.0% of Intention to purchase (PI). From the empirical results in figure 2, all of hypothesis are supported at significant level of 0.05. The indications are as follows : H1. Consumer innovativeness (CI) has a positive impact on Intention to purchase (PI), H2. Consumer innovativeness (CI) has a positive impact on Attitude toward battery electric car (AT), H3. Consumer innovativeness (CI) has a positive impact

on Subjective norm (SN), H4. Attitude toward battery electric car (AT) has a positive impact on Intention to purchase (PI), H5. Subjective norm (SN) has a positive impact on Intention to purchase (PI), and H6. Perceived behavioral control (PB) has a positive impact on Intention to purchase (PI).

Direct and indirect effect

Table 5 show that Consumer innovativeness (CI) has significantly direct effect on Attitude toward behavior (AT), Subjective norm (SN) and Intention to purchase (PI), and Consumer innovativeness (CI) have significantly indirect effect on Intention to purchase (PI), Attitude toward behavior (AT), and Subjective norm (SN) to Intention to purchase (PI) as well. Attitude toward behavior (AT), Subjective norm (SN) and Perceived behavioral control (PB) have significantly direct effect on and Intention to purchase (PI)

Table 5 Direct, indirect and total effects

		CI	AT	SN	PB	PI
CI	direct					
	indirect					
	total					
AT	direct	0.663*				
	indirect					
	total	0.663*				
SN	direct	0.547*				
	indirect					
	total	0.547*				
PB	direct					
	indirect					
	total					
PI	direct	0.092*	0.161*	0.237*	0.401*	
	indirect	0.236*				
	total	0.329*	0.161*	0.237*	0.401*	

at significant level 0.05

Conclusion

Sample Characteristics

The survey gathered 481 complete responses and concluded remarkable features of the respondents who are male (59.3%), and female (40.7%). The majority of the respondents (89.2%) are between 30 to 49 years old, and 35.8% are single and 60.9% are married. To education, the majority of the respondents (88.6%) had finished bachelor degree or above, and 11.4% finished lower than bachelor degrees. To occupations, most of them (59.0 %) work for a private sector, 29.7% are entrepreneurs, and 11.2% work for a government sector or other occupations. To income, most of them (71.1 %) have 60,000-120,000 baht revenue per month and 28.9% have more than 120,000 baht revenue per month.

The relationship of variables

Consumer innovativeness has a positive impact on Intention to purchase, attitude toward battery

electric car and subjective norm. Attitude toward battery electric car, subjective norm and perceived behavioral control have positive impact on intention to purchase battery electric car. Focusing on the relationship of consumer innovativeness as an independent variable in the research model which has direct effect to purchase intention which is consistent with the study of Ali, A., Khan, A. A., Ahmed, I., & Shahzad, W., (2011), consumer innovativeness effect through attitude towards buying behavior to purchase intention is consistent with the study of Truong, Y., (2013) in that consumer innovativeness has effect through subjective norm to purchase intention which is consistent with the study of Vida, I., (2007). Considered in detail within the frame of Theory of Planned Behavior (TPB) attitude towards buying behavior, subjective norm and perceived behavioral control could explain purchase intention of battery electric car which is consistent with the Theory of Planned Behavior

(TPB) of Ajzen, 1985, 1987, 1991) and the study of De Cannire, De Pelsmacker & Geuens, (2009).

Contribution to knowledge

The conceptual model of this study was developed by previous researches and added consumer innovativeness as a determinant factor. The conceptual framework had been constructed by using Ajzen's Theory Planned Behavior which explained battery electric car purchase intention. In addition, the factors which are the characteristic features of product involved in innovativeness should be included. The results of this study found a new model expanding the knowledge that the conceptual model comprises of five latent variables that are two independent variables (consumer innovativeness and perceived behavioral control), two intervening variables (attitude toward behavior and subjective norm), and one dependent variable (purchase intention of battery electric car). The entire variables are constructed to be a conceptual framework which explains the impact of consumer innovativeness on purchase intention of battery electric car in Thailand.

Contribution to business

The results of this study found a new model which contributes to business practice that is useful for marketing idea which is involved in new technology product launching. The following are benefits to be used in business practice:-

1. Potential customers

Auto firms and marketers could figure out from this distinctive demographic to specify their potential customers at whom business has decided to aim and towards whom its marketing efforts has been tried ultimately to merchandise the battery electric cars. Due to the fact that to the demographic factor, car users in Thai marketplace are well educated, aged between 30 and 49 years which is in working age, have much experience, are matured, work for a private sector, are entrepreneurs, and have more than 60,000 baht income per month.

2. Market segmentation and positioning

As the results of this study, the four main categories of market segmentation are clear defined as follows: 1) Geographic segmentation is divided by the location of market, which is Thailand

marketplace. 2) Demographic segmentation is car users who are defined as potential customers at whom auto firms have to aim a message. In fact, they have a particular demographic factor and are confined in a specific segment. 3) Psychographic segmentation is related to their personality, attitudes and general interests. From the result of this study, it is implied that consumer innovativeness is the impact factor to purchase intention. 4) Behavioral segmentation depends on how customers behave towards a battery electric car. The results in the model show that to what extent behavioral factors have relationship with intention to purchase and they are the best points to identify market segments. Consumer innovativeness considered as independent variables is the factor which auto firms have to survey, encourage, even create into the potential customers. Perceived behavioral control is self-control of customers purchasing and using a battery electric car. Marketers should provide customers all of the necessary resources of the product feature and a battery electric car. Attitude toward behavior is a good feeling of customer when purchasing and using a battery electric car. The results indicated that marketers have to encourage customers to use a battery electric car because it is good for traveling and they love it too. Subjective norm is the perception on expectations of their friends, family and the society for them to perform the recommended behavior of using a battery electric car. Marketers have to encourage and make customers to understand that who influences them, for instance social leaders, friends, family and self-image. For more practical issue, after auto firms had clearly defined market segmentation and marketing mix strategy (consisting of four elements: product, price, place, and promotion), they determine the success of the product and service in the marketplace. Besides public relation and advertising activity, there are things to do according to the characteristics of the product. Battery electric car is a new invention with clean energy, air pollution reduction, and durability, so it has high prices. When customer makes decision to buy it, he has to think carefully. Making an overview of the customer's purchase decisions

is clear and solid. Besides the mentioned issues, there are normal activities car makers should do are: 1) Showcase of battery electric car's features, such as progress of innovation, driving simplicity and environmental friendliness to fine tune of customer attitude., 2) Give customers a test drive in order to make cars friendly to customers., 3) Use a social celebrity person along with the trade show to impact purchase intention and purchase at the end.

Recommendations

This study is a cross sectional survey research collecting data from car users in Thailand from June 2016 to January 2017. It is suggested that future research may use different products to examine the model. The study was specifically conducted for consumers side, so it is recommended that for future research the survey should also be conducted for manufacturer and distributor sides. According to the findings in the new conceptual model, there are some remarks for future research in which the researcher should pay attention to demographic data and properly analyze comparative data of the specific features of products which are useful for market segmentation identification.

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