# A STUDY OF FACTORS AFFECTING THE DECISION TO PURCHASING ELECTRIC VEHICLES (EVs) OF THE CONSUMER IN BANGKOK

# A STUDY OF FACTORS AFFECTING THE DECISION TO PURCHASING ELECTRIC VEHICLES (EVs) OF THE CONSUMER IN BANGKOK

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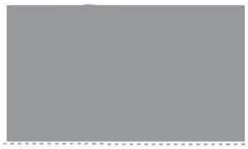
Advisor 

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## ABSTRACT

This research aimed to study the factors influencing decision making on buying electric vehicles. This study is survey research by the sample group people who driving and have cars in Bangkok, by use questionnaire for the sample group total 400 respondents. The research found that the variables that significantly influence choice decisions in purchasing electric vehicle include technology advancement of electric vehicles, information providing, after sales service, prices of electric vehicles, appearance of electric vehicles, environment (gasoline prices), and consumer behavior. In terms of marketing mix (7ps) the factor affecting the decision to purchase electric vehicle are information providing and after sales service, research and development of electric vehicles, physical environment (gasoline prices), promotional strategies in marketing the most concerning point are battery and all technology advancement. The sample group consider to purchasing electric vehicle due to concerning of environmental concern and energy saving. The research of factor affecting the decision to purchasing electric vehicles by the most of the respondents are age 31 – 40 years, gender male, education level Bachelor's Degree, occupation employee of private company and have income less than 30,000 Baht per Month.

*Keywords: Marketing Mix (7Ps), Consumer Behavior, Lifestyle, and electric vehicles (Evs.)*

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# CHAPTER 1

# INTRODUCTION

In this chapter, the research discusses the background of the principal subject of the research: factors affecting the decision to purchasing electric vehicle (EV) in Bangkok's population, Thailand. The research aims to study factors that will affect the consumer to purchasing electric vehicle such as product appearance, the quality of material, notable of brand, price, worthiness, service center, marketing promotion, after sale service, research and development, quality of battery, complexity, charger station, and risk of battery, consumer behavior, and government support policy. Additionally, the study of demographic and lifestyle factors that affecting the decision to purchasing electric vehicle.

## 1.1 Background

Electric vehicles (EVs) are as of now being presented as an arrangement for the issue of reliance on fossil fills, expanding carbon dioxide (CO2) emanations, and other natural issues. Street transport contributes to about one-fifth of the EU's add up to emanations of CO2, the most nursery gas (European Commission, 2012). Besides, CO2 outflows from street transport expanded by around 23% between 1990 and 2010 and are still rising inside the EU. Light-duty vehicles – cars and vans (frequently called traveler cars) – are a major source of nursery gas emanations, creating around 15% of the EU's CO2 emanations (European Commission, 2012). The larger parts of these cars right now in activity are possessed by private people (ICCT, 2013). Citing the significance of taking activity on climate alter, numerous governments have started arrangements for decreasing CO2 emanations by fortifying the generation,

presentation and selection of EVs (Brady and O'Mahony, 2011). In show disdain toward of the implied positive natural results of zapping the light obligation vehicle armada the share of EVs within the add up to number of vehicles sold is still little. In 2011, the EV showcase share was as it were 0.06% of the 51.1 million light duty vehicles sold within the EU, U.S., and the key Asian markets (European Commission, 2012). One point of view on such humble selection figures is that the mass acknowledgment of EVs is primarily dependent on consumers' recognition of them (Schuitema et al., 2013). Thus, in arrange to advance EV selection, it is critical to get it how shoppers see EVs and what the conceivable drivers for and obstructions against consumer EV adoption are. In other words, we have to know what components impact shopper eagerly to buy EVs.

Writing on shopper EV appropriation has analyzed a few components influencing the selection of EVs. The center of distributed thinks about has been on different angles of appropriation and non-adoption behavior. They have utilized diverse hypotheses and examined distinctive EVs in several parts of the world. This has made the investigated divided and progressively difficult to know where vital information crevices lie and where commitments can be made in future research. Consequently there's a creating writing that's in require of an outline in arrange to point at future inquire about headings. Since the early 2000s, non-rechargeable EVs (generally known as half breed electric vehicles) have been advertised at commercial scales and a significant number of thinks about on shopper recognition of these have been distributed. Be that as it may, as these sorts of cars can be seen as more fuel effective cars that don't require an essentially diverse behavior from ordinary cars, the most center of this paper is on cars that require a distinctive shopper behavior (i.e.

stopping the car in to the lattice for charging). These cars are most frequently alluded to as plug-in electric vehicles (PEVs). Be that as it may, since ideas from inquire about on non-rechargeable cars to a few degree too have suggestions for PEVs, considers on non-rechargeable cars are examined where important as well. The primary objective of this paper is to display a comprehensive diagram of the drivers for and boundaries against customer appropriation of plug-in EVs. The moment objective is to distinguish crevices and impediments in existing investigate and recommend a research plan for long-term. The strategy utilized for the survey will be examined in next section. Predominant hypothetical systems and observational considers are from that point surveyed in four areas separately. For the conclusions and inquire about plan areas, inquire about openings based on the audit, modern customer behavior and brain research considers in arrange to spur future investigate on shopper selection of EVs are expounded upon.

The U.S. market share of plug-in electric passenger cars increased from 0.14% in 2011 to 0.62% in 2013. The plug-in segment reached a market share of 0.75% in 2014 and fell to 0.66% in 2015. Then climbed to 0.90% in 2016, and achieved a record market share of 1.13% in 2017. California is the largest plug-in car regional market in the country, with 365,286 plug-in electric vehicles registered through December 2017, and accounted for approximately 48% of cumulative plug-in sales in the American market from 2011 to June 2016. The other nine states that follow California's Zero Emission Vehicle (ZEV) regulations accounted for another 10% of cumulative plug-in car sales in the U.S. during the same period.

1.2 Statement of Problems

In the present Thai population face a problem of the pollution in the Bangkok and also the fluctuation of the oil price for the motorists and civilian. Electric vehicle are one of the choice to solving these problem. Electric vehicle for the world market electric vehicle already sell to customer. Thai government launched the policies to reduce tax for the electric vehicle but selling price still high. To introduce electric vehicle to Thai market is not easy so we need to know the concerning point from Thai population.

Research question:

Subsequent to the background and statement of problems, in order to conduct the research study, the researcher establishes the research question as follow:

Main question:

The main research question is “The factors affecting the decision to purchasing electric vehicle (EV) in Bangkok’s population, Thailand”. Hence, the researcher is interested in the factors affecting the decision to purchasing electric vehicle (EV) in Bangkok population, Thailand.

Sub questions

1. Which factors of personality and attitudes toward factors affecting the decision to purchasing electric vehicle (EV) in Bangkok’s population, Thailand?
2. Which factors of knowledge and skills factors affecting the decision to purchasing electric vehicle (EV) Bangkok’s population, Thailand?

1.3 Purposes of study

1. To study factors of personality and attitudes toward purchasing decision factors that affecting the decision to purchasing electric vehicle (EV) in Bangkok's population, Thailand
2. To study factors of knowledge and skills that factors affecting the decision to purchasing electric vehicle (EV) in Bangkok's population, Thailand

1.4 Important of study

The output of this study will be productive to the business sector that related to automotive business. For business owner can use the output to improve, develop the specification to fit the consumer's need.

The importance of this study is to understand the customer behavior in factor affecting decision purchasing electric vehicle which helps developers to improve the strategy to make the business plan.

1.5 Scope of study

The research study surveys factors that factors affecting the decision to purchasing electric vehicle of Bangkok's population, Thailand. The tools used for the survey are questionnaires. The scopes of the research study are as follow:

1.5.1 Scope of Study

1. The research study focuses on personality and attitude toward car driver, knowledge and skills and demographic and lifestyle factors that influence decision to purchasing electric vehicle of Bangkok's population.

2. The research study is focused on Bangkok's population and includes both males and females.

3. The research study is conducted through a survey research with the use of questionnaires with a sample size of 500 respondents. Questionnaires are distributed in the areas of Bangkok, Thailand only.

4. The research study was conducted from the period of September 2016- January 2017

1. 6 Focus and Limitations of Study

Focus

The focus of the research study is decision to purchasing electric vehicle of Bangkok's population, Thailand. The researcher focuses on Bangkok's areas only. The data collected from the samples is sufficient for analytical analyzes.

Limitations

The output of this research study is applicable only to Bangkok's population, Thailand. Although the research study will be able to produce similar results to other researches undertaken in a similar manner, there are limitations with the output of this research study. The output of this research study could not be applied reliably to other age groups, factors, different locations of data collection and other research methodologies. Users of this research study should be aware of these inherent limitations.

# CHAPTER 2

# LITERATURE REVIEW

The detail in this chapter is to review and analyze electric vehicle definition including marketing mix (7ps), brand equity and customer behavior which based on related to electronic document (internet), textbooks, foreign journal and local journals that provide information about the factor effecting decision to purchase electric vehicle which efficiently influence in topic. In addition, the chapter has shown the result of consumer's intention to buying electric vehicle

## 2.1 Definition of Electric vehicle

An electric car is an elective fuel vehicle that employments electric engines and engine controllers for drive, input of more common impetus strategies such as the inside combustion motor (ICE). Power can be utilized as a transportation fuel to control battery electric vehicles (EVs). EVs store power in an vitality capacity gadget, such as a battery. The power powers the vehicle's wheels through an electric engine. EVs have constrained vitality capacity, which must be renewed by stopping into an electrical source.

Electric vehicles are diverse from fossil fuel-powered vehicles in that they can get their control from a wide run of sources, counting fossil fills, atomic control, and renewable sources such as tidal control, sun based control, and wind control or any combination of those. Be that as it may it is created, this vitality is at that point transmitted to the vehicle through utilize of overhead lines, remote vitality exchange such as inductive charging, or a coordinate association through an electrical cable. The power may at that point be put away onboard the vehicle employing a battery,

flywheel, supercapacitor, or fuel cell. Vehicles making utilize of motors working on the guideline of combustion can as a rule as it were infer their vitality from a single or some sources, as a rule non-renewable fossil powers. A key advantage of electric or half breed electric vehicles is their capacity to recoup braking vitality as power to be reestablished to the on-board battery (regenerative braking) or sent back to the lattice (V2G). 21st century, expanded concern over the natural effect of the petroleum-based transportation framework, at the side the ghost of top oil, driven to recharged intrigued in an electric transportation framework. As such, vehicles which can possibly be fueled by renewable vitality sources, such as cross breed electric vehicles or unadulterated electric vehicles, are getting to be more popular.

In an electric vehicle (EV), a battery or other vitality capacity gadget is utilized to store the power that powers the engine. EV batteries must be recharged by stopping within the vehicle to a control source. A few electric vehicles have onboard chargers; others plug into a charger found exterior the vehicle. Both sorts, be that as it may, utilize power that comes from the control framework. In spite of the fact that power generation may contribute to discuss contamination, EVs are considered zero-emission vehicles since their engines deliver no debilitate or emissions.

2.2 The Choice Model

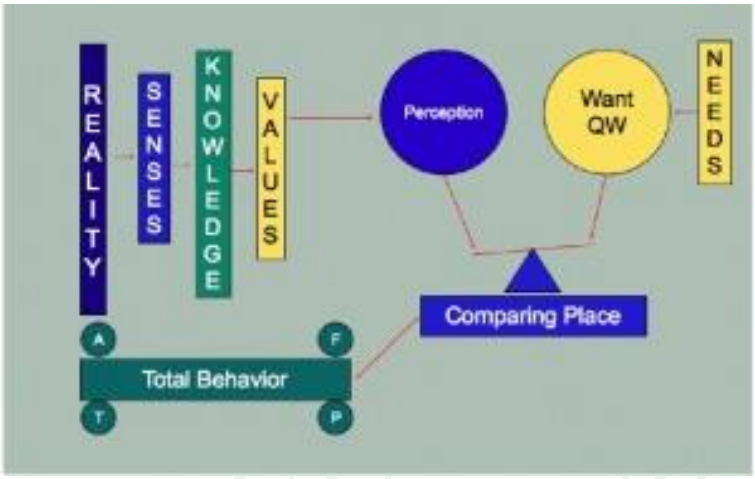


Figure 1: Model of Choice

Source: Glasser, W. (2011). *Choice Theory*. Retrieved from

http://www.funderstanding.com/educators/choice-theory/

2.3 Choice Theory

Choice Hypothesis speaks to an elective to behaviorism and other external control brain research projects. A essential understanding of Choice Hypothesis requires some knowledge of the taking after 5 key concepts: (Glasser, 2011)

1. Basic Needs

All individuals are born with 5 fundamental ought: to adore & have a place, to be effective, to be free, to have fun and to outlive. All behavior is intentional, spurred by our incessant want to fulfill the essential needs woven into our qualities. The quality of each need changes from individual to individual. For illustration, a few are morn driven by the social need to cherish and have a place whereas others are more driven by the got to be free and autonomous.

2. The Quality World

Concurring to conceptual thought of Quality World, it is clarified that each of us develops a special Quality World, the source of all inspiration. Though the Basic Needs speak to “nature”, The Quality World speaks to “nurture”. Whereas, we live in our put and associated with others, we are each building this Quality World to become a special that The Quality World are included the individuals, exercises, values, and beliefs that are most vital to us as people. Everything we put in our Quality World is requiring fulfilling. Choice Hypothesis proposes that guardians, teachers, and the community at expansive can advance situations that energize others to develop Quality World pictures that let them fulfill their needs dependably.

3. Reality and Perception

Although, we all live within the Genuine World, Choice Hypothesis ponder what matters is our recognition of reality. We carry on based on what we see to be genuine, whether we are right or off-base. Choice Hypothesis states that data passes through three distinct channels as we make our discernment of reality, these locale channels are compose of the tangible channel, the information channel and the esteem channel. Since of these filters, two or more individuals may witness the same event or take an interest within the same movement and develop drastically distinctive recognitions.

4. The Comparing Place

Our brain ceaselessly compares two pictures: our recognition of reality and our Quality World picture of what we need at that minute. The reason of all behavior is to make a coordinate between what we see and what we need. When there's a

match, we'll keep up the behaviors we have chosen. When there's sufficient of a mismatch to cause inner inconvenience, we naturally seek for unused behaviors that will make the coordinate we look for.

5. Total Behavior

All behavior has four components: acting, considering, feeling and physiology. When we alter any one component of behavior, the other components alter as well. The two most straightforward components to control straightforwardly are acting and considering. It is virtually inconceivable to alter your sentiments or physiology specifically.

2.4 Marketing Mix 7P's

Background of the service marketing mix (7Ps) (Vliet, 2013)

Increasingly organizations have competed one another deliberately to recognize themselves within the region of benefit and quality inside a advertise. Effective organizations unequivocally center on the benefit worldview with venture in individuals, innovation, work force approach, and compensation systems for their workers. This can be exceptionally vital as the behavior of the representatives can have a coordinate impact on the quality of the benefit. Representatives speak to the confront and the voice of their organization to the clients. They interpret the administrations arrangement into administrations for the client over all segments.

In 1981, utilizing the over specified data, Bernard H. Booms and Mary J. Bitner advance created the conventional promoting blend created by the American Teacher of Promoting Jerome McCarthy into the expanded showcasing blend or

administrations promoting blend. This administration showcasing blend is additionally called the 7P demonstrate or the 7 Ps of Booms and Bitner (1981). This benefit marketing mix procedure expands the initial promoting blend show from four to seven components. Whereas Jerome McCarthy has as it were characterized four irrefutable showcasing components, the 7Ps are an expansion as a result of which this administration promoting blend can moreover be connected in benefit companies and information seriously situations.

Service Marketing mix: 7 P's model (Booms & Bitner, 1981)

The 7 Ps model, moreover known as the administrations promoting blend, goes past the four essential promoting standards for item showcasing. Administrations have one of kind characteristics, for case intangibility, heterogeneity, inseparability and perish-ability. Bernard and Bitner (1981) knowledge in connection to physical items and administrations driven to an expansion of the conventional promoting blend. In expansion to the four conventional components, three imperative variables have been included: Individuals, Prepare and Physical Prove, that make the administrations showcasing blend.

### 2.4.1 Product

The Product is a thing that's built or produced to fulfill wants of a certain gather of people. The item can be intangible or substantial because it can be within the form of administrations or products. You must guarantee to have the correct sort of item that's in request for your showcase. So, amid the product advancement stage, the advertiser must do a broad inquire about on the life cycle of the item that they are making. An item features a certain life cycle that incorporates the development stage,

the maturity stage, and the deals decrease stage. It is imperative for marketers to reevaluate their items to invigorate more request once it comes to the deals decay stage. Marketers must moreover make the correct item blend. It may be astute to extend your current item blend by expanding and expanding the profundity of your item line.

This element is including fully electric vehicle, sustainable development and eco-friendly. Electric battery will efficiency electric technology, energy saving. The vehicle would be modern design and stylish personality. The technology should innovative and creative.

2.4.2 Price

The price of the item is essentially the sum that a client pays for to appreciate it. Cost could be an exceptionally vital component of the marketing blend definition. It is additionally a critical component of a marketing plan because it decides your firm's benefit and survival. Altering the cost of the item includes a huge effect on the whole promoting technique as well as incredibly influencing the deals and request of the item. This is often intrinsically a touchy area in spite of the fact that. In case a company is unused to the advertisement and has not made a title for themselves however, it is improbable that your target advertise will be willing to pay a tall cost. Although they may be willing within the future to hand over huge holes of cash, it is unavoidably harder to urge them to do so amid the birth of a business. Pricing continuously help shape the discernment of your item in buyers' eyes. Continuously keep in mind that a moo cost often implies an second rate great within the shopper's eyes as they compare your great to a competitor.

The price to purchase will be premium price, federal tax credit are allowances. The vehicle should provide optional price in different configuration.

2.4.3 Place

Placement or distributor could be an exceptionally important part of the item blend definition. You have got to position and disseminate the item in a put that's open to potential buyers. This comes with a profound understanding of your target showcase. Get it them inside out and you may find the foremost proficient situating and dissemination channels that straightforwardly talk together with yours advertise. The dealer of the electric vehicle provides official company website, company-owned stores and galleries and owned service center.

2.4.4 Promotion

Promotion is a very important component of marketing as it can boost brand recognition and sales. Publicizing ordinarily covers communication strategies that are paid for like tv promotions, radio commercials, print media, and web promotions. In modern times, there appears to be a move in center offline to the online world. Public relations, on the other hand, are communications that are ordinarily not paid for. This incorporates press discharges, presentations, sponsorship bargains, classes, conferences, and events. Word of mouth is additionally a sort of item advancement. Word of mouth is a casual communication almost the benefits of the item by fulfilled clients and conventional people. The sales staff plays a really critical part in open relations and word of mouth. It is vital to not take this truly. Word of mouth can too circulate on the web. Saddled successfully and it has the potential to be one of the foremost profitable assets you've got in boosting your benefits online. The great

illustration of usually online social media and overseeing a firm's online social media presence.

This element comprises all the efforts the company or organization makes to stimulate the popularity of their product in the market, for instance by advertising, promotional programmers, etc. For this research include membership sale.

2.4.5 People

Of both targets advertise and individuals straightforwardly related to the business. Thorough inquire about is critical to find whether there are sufficient individuals in your target advertise that's in request for certain sorts of items and services. The company's representatives are imperative in promoting since they are the ones who provide the benefit. It is vital to hire and prepare the proper individuals to provide prevalent benefit to the clients, whether they run a back-work area, client benefit, copywriters, programmers…etc. When a trade finds individual who really accept within the items or administrations that the particular business makes, it's is profoundly likely that the representatives will perform the leading they can. Additionally, they'll be more open to honest feedback about the commerce and input their possess considerations and interests which can scale and develop the business. This could be a mystery; "internal" competitive advantage commerce can have over other competitors which can intrinsically influence a business's position in the marketplace.

In this research included aftersales service and solving problem online due to the electric vehicle will have high technology which can use online service in emergency case.

### 2.4.6 Process

The component ‘Process’ of the benefit showcasing blend speaks to the exercises, strategies, conventions and more by which the benefit in address is inevitably conveyed to the client. As administrations are comes about of activities for or with clients, a prepare includes an arrangement of steps and exercises to induce there. The component ‘process’ of the benefit promoting blend is a basic component inside the complete benefit promoting blend technique. This component comprises all exercises and administrations in which the individuals included play an imperative part.

### 2.4.7 Physical Evidence

The physical proved inside the benefit showcasing blend alludes to an environment in which a benefit comes almost from an interaction between a representative and a client which is combined with a substantial product. The physical prove incorporates a representation of a benefit for occasion brochures, company stationery, trade cards, reports, company site, etc. In this research used technical support and roadside assistance. So, this research will show that what is factor of marketing mix (7Ps) to affect to customer choices decision in purchase Electric Vehicle.

## 2.5 Lifestyle

In spite of its visit colloquial utilize, the concept of life-style has not gotten much logical consideration since its conception amid the primary quarter of this century. It was created autonomously by a analyst (Adler, 1933) and a humanist (Weber, 1943 as detailed by Gerth & Plants, 1958) to depict a few characteristic of human creatures

which was no well-described by the existing wording of social science. Shared by both, as well as by their supporters, was the journey for a concept which captures the wholeness of the person and his or her behavior (Reed, 1976)

The clarification of human behavior is frequently done by the utilize of “low-level” descriptors, such as pay, uses, identity characteristics, states of mind toward particular issues, age and family structure etc. As it were seldom being there an endeavor to depict the person in a comprehensive setting. Tragically, indeed when such endeavors are made, by the utility of multivariate strategies, most regularly the worldly measurement is neglected. The cross-sectional nature of numerous of the “low-level” social descriptors has fizzled to account for consistency of behavior within the longer term. For this research include main purpose of purchasing electric vehicle in Bangkok, the reason that why you are buying electric vehicle in Bangkok, and the kind of your lifestyle that you prefer for electric vehicle in Bangkok of customer to purchasing electric vehicle only.

2.6 Conceptual Framework of Research

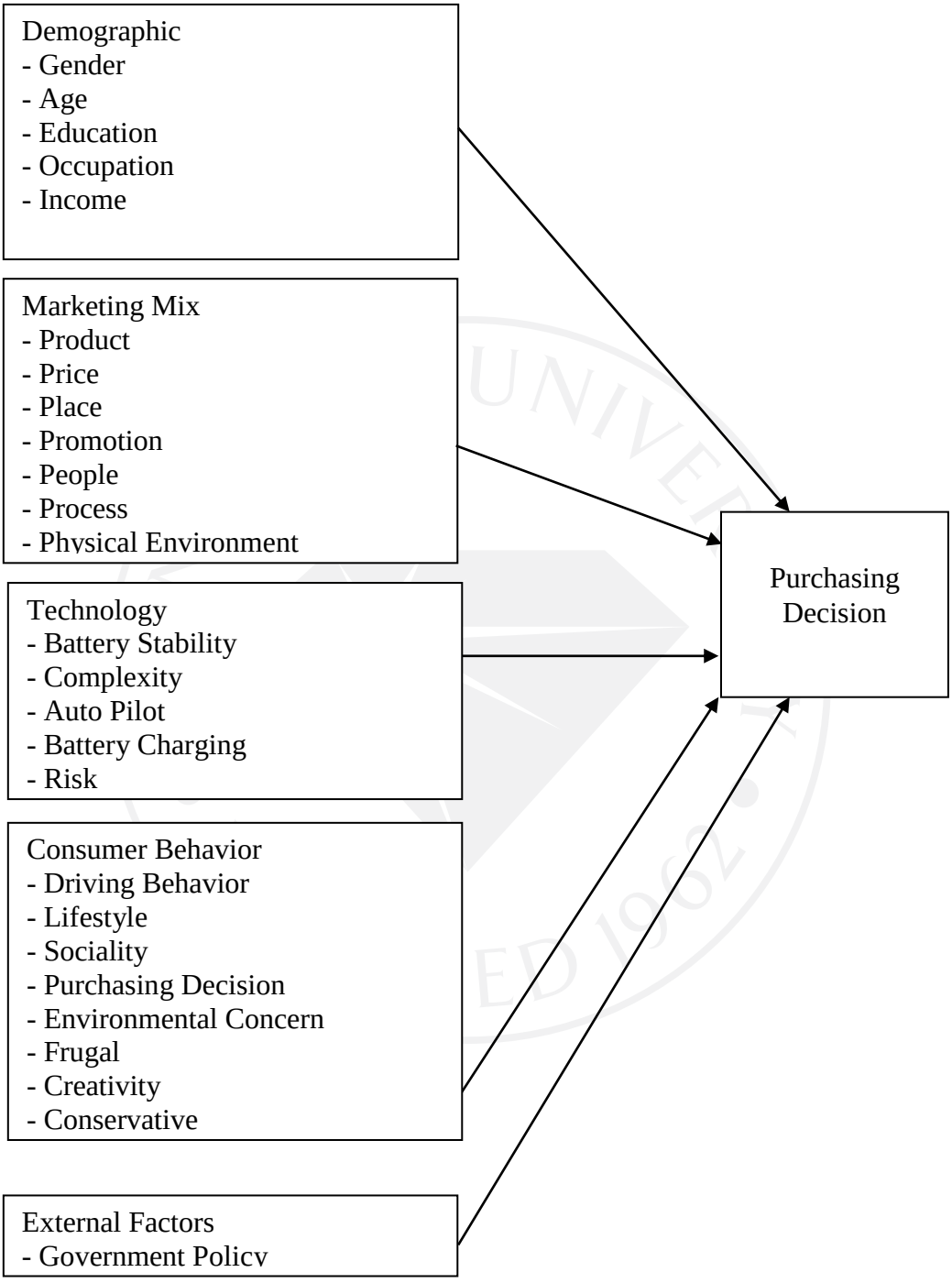


Figure 2.1: The conceptual framework of factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok

# CHAPTER 3

# METHODOLODY

Research on the factors influencing decision making on buying electric vehicles of the population in Bangkok is a survey research. The researcher has defined the following research methods:

1. Population and sample
2. Tools for data collection
3. The creation of research tools
4. Methods of data collection
5. Methods of data analysis and processing

## Population and sample

### Population

The population in this study is the population in Bangkok and only those who have ideas to buy electric vehicles.

### Sample

For the sample used in this study, the researcher does not know the population who have the idea to buy an electric vehicle. the sample size is unknown, with an acceptable error of 5% at the confidence level. 95% from the formula of Cochran (Cochran, 1977: 75, referred to in Boontham Kritpreedaborisut, 2010). The characteristics of interest in the population are 0.5 as follows:

Formula $n = \frac{Z^2}{4e^2}$

Where N represents the size of the population

n represents the required sample size

Z represents the required confidence level.

Z = 1.96 (typically 95% confidence level).

e represents the sample's tolerance. 95% confidence level and 0.05 error tolerance.

The formula for calculating the size of the sample was represented by the following

Formula

$$n = \frac{(1.96)^2}{4(0.05)^2}$$

= 385

The sample size was calculated from 385 people and to prevent errors from the incomplete questionnaire, researchers then reserved another sample of 15 people, so there were 400 samples in total.

**Sampling Method**

For this research, multi-stage sampling is divided into 3 steps as follows:

Step 1: Determine sample size of 400 samples. Choose sampling method using convenience sampling method from the population in Bangkok and only those who have ideas to buy electric vehicles.

Step 2: The researcher used the method of drawing of the administrative area of Bangkok Metropolis of 50 districts (Regions and Regions, 2560) by drawing 4 areas to use as samples because only 400 samples were needed in this research. The results of the drawing selection are represented in Table 3.1 as follows;

Table 3.1: Districts that represent data collection and quota

| District | Quota (No. of persons) |
|---|---|
| Chatuchak | 100 |
| Huay Khwang | 100 |
| Ratchathewi | 100 |
| Phayathai | 100 |
| **Total** | **400** |

From Table 3.1, the districts representing the data collection and quota for data collection were set up in four areas: Chatuchak, Huay Khwang, Ratchathewi and Phayathai, each with a quota of 100.

Step 3: Convenience Sampling was used in the population in Bangkok. Considered by the convenience of the sample population, 400 of people were asked to answer the questionnaires.

**Tools used to collect data**

Tools used to collect data were questionnaires. They were used to study the theoretical and related research on the factors influencing decision making on buying electric vehicles of the population in Bangkok to use as a guideline for creating a questionnaire divided into 4 parts, a total of 78 items as follows.

Part 1 factors influencing decision making on buying electric vehicles which have 10 items altogether. The respondents will evaluate their self-ratings. There are seven levels of rating scales: very low, low, quite low, medium, quite high, high, and very high. The scores are 1 2 3 4 5 6 7, respectively. The weight criteria are as follows.

Table 3.2: Opinion level and scores

| Opinion levels | Items |
|---|---|
| Very effective. | 7 |
| Effective. | 6 |
| Quite effective. | 5 |
| Medium effective | 4 |
| Quite low effective | 3 |
| Low effective | 2 |
| Very low effective. | 1 |

For the translation of scores, researcher had divided the range of scores by using the mean of the data as criteria for determining the width of the class interval as follows: (Pisanbut, 2009, p.13)

$$\text{Class interval} = \frac{\text{Maximum score - Minimum score}}{\text{Number of ranges required}}$$

$$= \frac{7 - 1}{7}$$

$$= 0.85$$

The size of the class is determined from the mean weight scores, with each unit having the following ranges:

| **Score** | **Interpretation** |
|---|---|
| 6.16- 7.00 | The level of feedback is very effective |
| 5.30- 6.15 | The level of opinion is effective. |
| 4.44- 5.29 | The level of opinion is quite effective. |
| 3.58- 4.43 | The level of opinion is medium. |
| 2.72- 3.57 | The level of opinion is quite low. |
| 1.86- 2.71 | The level of opinion is low. |
| 1.00- 1.85 | The level of opinion is very low. |

Part 2 The marketing mix of 21 items is divided into 7 categories, including the appearance of electric vehicles, prices, dealers, marketing promotion, information and after sales service, research and development of electric vehicles, Physical environment

Part 3 Factors affecting the decision to buy, which have 42 items are divided into 14 areas , including electric battery, difficulty of use, automatic driving system, charging battery, risk, travel habits , driving habits, lifestyle, social classes, environmental concerns, energy savings, creativity, conservation, and support policies from the government.

For the second and third part of the questionnaire, the respondents will evaluate their own opinions. There are 5 levels of Rating Scale which are strongly agree, quite agree, agree and disagree, quite disagree and strongly disagree. The questionnaire is rated from 5 4 3 2 1, respectively, but the negative question is rated as 1 2 3 4 5 (reverse) respectively instead.

| **Agreement levels** | **Positive Item** | **Negative Item** |
|---|---|---|
| Strongly agree | 5 | 1 |
| Quite agree | 4 | 2 |
| Agree and disagree | 3 | 3 |
| Quite disagree | 2 | 4 |
| Strongly disagree | 1 | 5 |

For the translation of scores, researchers have divided the score range using the mean of data as criteria for consideration to find the width of the class interval as follows (Siljatu, 2011, p.60)

$$\text{Class interval} = \frac{\text{Maximum score - Minimum score}}{\text{Number of ranges required}}$$

$$= \frac{5 - 1}{5}$$

$$= 0.80$$

The size of the class is determined from the mean weight scores, with each unit having the following ranges:

| **Score** | **Interpretation** |
|---|---|
| 4.21- 5.00 | Strongly agree. |
| 3.41- 4.20 | Quite agree |
| 2.61- 3.40 | Agree and disagree |
| 1.81- 2.60 | Quite disagree |
| 1.00- 1.80 | Strongly disagree. |

Part 4: 5 demographic factors: age, sex, occupation, and monthly income. The question is answered only one answer, or this is what it called a "closed ended question." Each demographic factor detail is as follows;

1. The Ordinal Scale is used to measure age.

2. The Nominal Scale is used to measure Gender.

3. The Ordinal Scale is used to measure Education.

4. The Nominal Scale is used to measure Occupation.

5. The Ordinal Scale is used to measure Monthly Income.

**Content Validity**

In order to test the validity of each question in the questionnaire the Item Objective Congruence (IOC) result which measures the objective and content, or questions and objective is utilized. Inputs were obtained from five qualified experts in order to calculate the result of the IOC. The names, job titles and company of the five qualified experts utilized to review consistency between the objective and content or questions and objective of the questionnaire are listed below.

Experts:

1) Mr.Akekarach Somsuan

   Manager Auto Finance Department

   AEON Thana Sinsap (Thailand) Public Company Limited

2) Mr.Kitti Wongsukdaycha

Sales Manager

Toyota K. Motors Toyota Dealer Co.,Ltd.

3) Ms. Sirinapa Saiyos

Marketing-Co Senior Officer, Auto Finance Department

AEON Thana Sinsap (Thailand) Public Company Limited

4) Mr. Mana Sookananchai

General Manager

BOT Lease (Thailand) Co.,Ltd.

5) Ms. Vinitta Leeaphorn

Assistant Manager, Corporate Business Division 1

BOT Lease (Thailand) Co.,Ltd.

The Item Objective Congruence (IOC) result can be calculated from the formula listed below.

$$IOC = \frac{\Sigma^{R}}{N}$$

IOC = Consistency between the objective and content.

$\Sigma^{R}$ = Total assessment points given from all qualified experts.

N = Number of qualified experts.

There are 3 levels of assessment for each question of the questionnaire.

- +1 means question is consistent with the objective of the questionnaire
- 0 means unsure if question is consistent with the objective of the questionnaire
- -1 means the question is inconsistent with the objective of the questionnaire

The Item Objective Congruence index must yield a value of at least 0.5 or above to be accepted. After feedback was received from the five qualified experts' revisions were made to ensure that each question has an index value more than 0.5. The result of the IOC is listed below.

Result of Item Objective Congruence:

$$IOC = \frac{81}{85}$$

$$= 0.953$$

According to the IOC result of the 74 questions in the questionnaire the Item Objective Congruence (IOC) index value is 0.953without any question yielding a value of less than 0.5. Thus, all questions are considered acceptable.

**Creating a research tool**

**The process of creating research tools**

1. Researching on factors influencing the purchase decision of the electric vehicle in the Bangkok from the articles, theories and related research to determine the scope of the research and the guidelines for the survey.

2. Once the questionnaire has been created, the questionnaire and content will be checked to match the terminology and the questionnaire will be presented to the experts to check the appropriate content to be corrected before being used.

**Tool Testing Procedure**

1. The researcher will present the completed questionnaire to the instructor to check the appropriateness of the language used, and to check in accordance with the terminology. Then try to correct it before the trial.

2. Take the questionnaire to try out with a sample of 30 samples to find the reliability of the questionnaire in each variable. The Cronbach's Alpha Coefficient was used to test the reliability and consistency of the questionnaire. The alpha value indicates the level of consistency of the questionnaire, with a value between 0 <<1 if the value is close to 1, indicating that there is a lot of reliability. The reliability of each question is as follows:

(1) Factors influencing decision making on buying electric vehicles

(2) Marketing mix factors.

(3) Factors affecting decision making on buying electric vehicles

Take the tested questionnaire to collect data from real samples and get them back manually to obtain 400 questionnaires in total.

**Data collection method**

In the study the researcher defined the method of collecting data as follows:

1. Primary Data: The questionnaire was distributed to 4 districts namely Chatuchak, Huay Khwang, Ratchathewi and Phayathai, each with 100 people or 400 samples in total.

2. Secondary Data: Research the theories, papers, articles, academic texts, journals and research on the factors influencing the purchase of electric vehicles in the Bangkok.

**Analysis and processing of data**

The method of data analysis and processing are statistical procedures. The program was used to calculate the statistics (Thanin Siljaru, 2011).

**Descriptive Statistics**

1. Frequency and Percentage are used to describe five demographic factors: age, sex, occupation, and monthly income.

2. Mean and Standard Deviation are used to describe part 1: Factors influencing decision making on buying electric vehicles, part 2: Marketing Mix Factors and part 3: Factors affecting decision making on buying electric vehicles**.**

**Inferential Statistics:**

Binary Logit was used to analyze data for hypotheses testing of all factors (mentioned in conceptual model) affecting purchasing of electric vehicles in Bangkok.

**Main Hypotheses Testing is shown below:**

- H01: Product design does not influence EV purchase decision.
- Ha1: Product design does influence EV purchase decision.
- H02: Price of EV does not influence EV purchase decision.
- Ha2: Price of EV does influence EV purchase decision.
- H03: Authorize Dealer does not influence EV purchase decision.
- Ha3: Authorize Dealer does influence EV purchase decision.
- H04: Marketing Promotion design does not influence EV purchase decision.
- Ha4: Marketing Promotion does influence EV purchase decision.
- H05: Aftersales Service does not influence EV purchase decision.
- Ha5: Aftersales Service design does influence EV purchase decision.
- H06: Research and Development does not influence EV purchase decision.
- Ha6: Research and Development does influence EV purchase decision.
- H07: Physical Environment does not influence EV purchase decision.
- Ha7: Physical Environment does influence EV purchase decision.
- H08: Technology does not influence EV purchase decision.
- Ha8: Technology does influence EV purchase decision.
- H09: Consumer Behavior does not influence EV purchase decision.

- Ha9: Consumer Behavior does influence EV purchase decision.
- H010: Government Support does not influence EV purchase decision.
- Ha10: Government Support does influence EV purchase decision.

# CHAPTER 4

## RESEACH FINDINGS AND DATA ANALYSIS

The research study about factors influencing decision making on buying electric vehicles of the population in Bangkok, questionnaires are used to collect data from a sample of 400 persons. The results of data analysis can be divided into the following sequences:

Part 1; factors influencing decision making on buying electric vehicles

Part 2; marketing mix factors

Part 3; factors affecting decision making on buying electric vehicles

Part 4; demographic factors

Part 5; hypothesis testing results of marketing mix factors influencing decision making on buying electric vehicles of population in Bangkok in Binary Logit.

**Part 1;** factors influencing decision making on buying electric vehicles

The data analysis results of factors influencing decision making on buying electric vehicles are as follow:

Table 1: Mean and standard deviation of overall factors influencing decision making on buying electric vehicles.

| Factors | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Appearance of electric vehicles | 5.95 | 1.103 | High | 8 |
| 2. Prices of electric vehicles | 6.01 | 1.026 | High | 7 |
| 3. Distributors of electric vehicles | 6.07 | 1.074 | High | 6 |
| 4. Promotional strategies in marketing of electric vehicles | 6.27 | .997 | Highest | 4 |
| 5. Information providing and after sales service | 6.34 | .928 | Highest | 2 |
| 6. Research and development of electric vehicles | 6.08 | .777 | High | 5 |
| 7. Physical environment (gasoline prices), | 5.64 | 1.214 | High | 9 |
| 8. Technology advancement of electric vehicles | 6.47 | .840 | Highest | 1 |
| 9. Consumer behavior | 5.52 | 1.391 | High | 10 |
| 10. Supportive government policies (Tax) | 6.29 | .981 | High | 3 |
| Overall Mean | 6.41 | .719 | Highest | |

Based on the Table 1, the data analysis of factors influencing decision making on buying electric vehicles revealed that overall they were in a very high degree with the mean equal to 6.41. Considering each aspect, the sample more likely gave importance to technology advancement of electric vehicles with the mean equal to 6.47, followed by information providing and after sales service with the mean equal to 6.34, supportive government policies (tax) with the mean equal to 6.29, promotional strategies in marketing with the mean equal to 6.27, research and development of electric vehicles with the mean equal to 6.08, distributors of electric vehicles with the

mean equal to 6.07, prices of electric vehicles with the mean equal to 6.01, appearance of electric vehicles with the mean equal to 5.95, physical environment(gasoline prices) with the mean equal to 5.64, and lastly consumer behavior with the mean equal to 5.52 respectively.

**Part 2; marketing mix factors**

The data analysis results of marketing mix factors are as follow:

Table 2: Mean and standard deviation of overall marketing mix factors in each aspect.

| Factors | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Appearance of electric vehicles | 4.19 | .450 | High | 5 |
| 2. Prices of electric vehicles | 3.97 | .349 | High | 7 |
| 3. Distributors of electric vehicles | 4.07 | .460 | High | 6 |
| 4. Promotional strategies in marketing of electric vehicles | 4.42 | .364 | Highest | 4 |
| 5. Information providing and after sales service | 4.68 | .399 | Highest | 1 |
| 6. Research and development of electric vehicles | 4.65 | .253 | Highest | 2 |
| 7. Physical environment of electric vehicles (gasoline prices). | 4.54 | .476 | Highest | 3 |
| Overall Mean | 4.36 | .163 | Highest | |

Based on the Table 2, the data analysis results of marketing mix factors revealed that overall they were in the highest degree with the mean equal to 4.36. Considering each aspect, the sample more likely gave importance to information providing and after sales service with the mean equal to 4.68, followed by research and development of electric vehicles with the mean equal to 4.65, physical environment (gasoline

prices) with the mean equal to 4.54, promotional strategies in marketing with the mean equal to 4.42, appearance of electric vehicles with the mean equal to 4.19, distributors of electric vehicles with the mean equal to 4.07, and lastly, prices of electric vehicles with the mean equal to 3.97 respectively.

Table 3: Mean and standard deviation of marketing mix factors Appearance of electric vehicles

| **Appearance of electric vehicles** | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Modern appearance | 4.06 | .853 | High | 3 |
| 2. Made of good quality materials | 4.41 | .545 | Highest | 1 |
| 3. Well-known brands. | 4.11 | .730 | High | 2 |
| Overall Mean | 4.19 | .450 | High | |

Based on the Table 3, the data analysis results of marketing mix factors regarding appearance of electric vehicles revealed that overall, they were in a high degree with the mean equal to 4.19. Considering each aspect, the sample more likely gave importance to electric vehicles are made of good quality materials with the mean equal to 4.41, followed by well-known brands with the mean equal to 4.11, and lastly, modern appearance with the mean equal to 4.06 respectively.

Table 4: Mean and standard deviation of marketing mix factors Prices of electric vehicles

| Prices of electric vehicles | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Prices are reasonable, and consumers can afford it. | 4.07 | .726 | High | 2 |
| 2. Electric vehicles are worth buying | 4.42 | .608 | Highest | 1 |
| 3. People do not care about prices. | 3.44 | .841 | High | 3 |
| Overall Mean | 3.97 | .349 | High | |

Based on the Table 4, the data analysis results of marketing mix factors revealed that overall, they were in a high degree with the mean equal to 3.97. Considering each aspect, the sample more likely gave importance to electric vehicles are worth buying with the mean equal to 4.42, followed by reasonable prices which consumers can afford it with the mean equal to 4.07, and lastly, people do not care about prices with the mean equal to 3.44 respectively.

Table 5: Mean and standard deviation of marketing mix factor Distributors of electric vehicles

| Distributors of electric vehicles | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Reliable investor groups | 3.88 | .922 | High | 3 |
| 2. Service centers are in many places | 4.32 | .639 | Highest | 1 |
| 3. Special offers from sales representatives. | 4.00 | .839 | High | 2 |
| Overall Mean | 4.07 | .460 | High | |

Based on the Table 5, the data analysis results of marketing mix factors regarding distributors of electric vehicles revealed that overall, they were in a high

degree with the mean equal to 4.07. Considering each aspect, the sample more likely gave importance to service centers are in many places with the mean equal to 4.32, followed by special offers from sales representatives with the mean equal to 4.00, and lastly, reliable investor groups with the mean equal to 3.88 respectively.

Table 6: Mean and standard deviation of marketing mix factors Promotional strategies in marketing of electric vehicles

| **Promotional strategies in marketing of electric vehicles** | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1.Organizing advertising campaigns | 4.43 | .617 | Highest | 2 |
| 2. Organizing sales promotion activities | 4.66 | .476 | Highest | 1 |
| 3. Sales representatives provide attentive customer service. | 4.19 | .724 | High | 3 |
| Overall Mean | 4.42 | .364 | Highest | |

Based on the Table 6, the data analysis results of marketing mix factors regarding promotional strategies in marketing of electric vehicles revealed that overall they were in the highest degree with the mean equal to 4.42. Considering each aspect, the sample more likely gave importance to organizing sales promotion activities with the mean equal to 4.66, followed by organizing advertising campaigns with the mean equal to 4.43 and lastly sales representatives provide attentive customer service with the mean equal to 4.19 respectively.

Table 7: Mean and standard deviation of marketing mix factors Information providing and after sales service

| Information providing and after sales service | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Technicians are professionally qualified | 4.66 | .549 | Highest | 3 |
| 2. Vehicle manufacturer's warranty | 4.68 | .466 | Highest | 2 |
| 3. Appreciating customer's opinion. | 4.70 | .459 | Highest | 1 |
| Overall Mean | 4.68 | .399 | Highest | |

Based on the Table 7, the data analysis results of marketing mix factors regarding information providing and after sales service revealed that overall they were in the highest degree with the mean equal to 4.68. Considering details, the sample more likely gave importance to appreciating customer's opinion with the mean equal to 4.70, followed by vehicle manufacturer's warranty with the mean equal to 4.68, and lastly technicians are professionally qualified with the mean equal to 4.66 respectively**.**

Table 8: Mean and standard deviation of marketing mix factors Research and development of electric vehicles

| Research and development of electric vehicles | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Vehicle appearance is developed endlessly | 4.63 | .555 | Highest | 2 |
| 2. Support center is open 24 hours a day | 4.73 | .445 | Highest | 1 |
| 3. Welcome customer appreciation and comments for better improvement. | 4.60 | .491 | Highest | 3 |
| Overall Mean | 4.65 | .253 | Highest | |

Based on the Table 8, the data analysis results of marketing mix factors with regards to research and development of electric vehicles revealed that overall, they were in the highest degree with the mean equal to 4.65. Considering details, the sample more likely gave importance to support center is open 24 hours a day with the mean equal to 4.73, followed by vehicle appearance is developed endlessly with the mean equal to 4.63, and lastly welcome customer appreciation and comments with the mean equal to 4.60 respectively.

Table 9: Mean and standard deviation of marketing mix factors Physical environment

| **Physical environment (gasoline prices)** | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Qualified and high-quality sales representatives are provided | 4.58 | .561 | Highest | 2 |
| 2. Characteristics of electric vehicles (image) | 4.60 | .492 | Highest | 1 |
| 3. Availability of online information. | 4.45 | .498 | Highest | 3 |
| Overall Mean | 4.54 | .476 | Highest | |

Based on the Table 9, the data analysis results of marketing mix factors regarding physical environment (gasoline prices) revealed that they were in the highest degree with the mean equal to 4.54. Considering details, the sample more likely gave importance to characteristics of electric vehicles (image) with the mean equal to 4.60, followed by qualified and high-quality sales representatives are provided with the mean equal to 4.58, and lastly availability of online information with the mean equal to 4.45 respectively.

**Part 3: Factors affecting decision making on buying electric vehicles**

Data analysis results of factors affecting decision making on buying electric vehicles can be divided into 3 parts as technology advancement, consumer behavior and supportive government policies which can be detailed as follow:

1. Technology advancement

Table 10: Mean and standard deviation of factors affecting decision making on buying electric vehicles with regards to each aspect of technology advancement.

| Factors | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Electric battery | 4.29 | .534 | Highest | 4 |
| 2. Difficulties of operating electric vehicles | 4.32 | .374 | Highest | 3 |
| 3. Automated driving system | 4.37 | .369 | Highest | 2 |
| 4. Battery charging methods | 4.46 | .358 | Highest | 1 |
| 5. Perceived risks of electric vehicles. | 4.28 | .462 | Highest | 5 |
| Overall Mean | 4.35 | .226 | Highest | |

Based on the Table 10, the data analysis results of factors affecting decision making on buying electric vehicles related to technology advancement revealed that overall, they were in the highest degree with the mean equal to 4.35. Considering each aspect, the sample more likely gave importance to battery charging methods with the mean equal to 4.46, followed by automated driving system with the mean equal to 4.37, difficulty of operating electric vehicles with the mean equal to 4.32, electric battery with the mean equal to 4.29, and lastly perceived risks of electric vehicles with the mean equal to 4.28 respectively.

Table 11: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding technology advancement related to electric battery

| Electric battery | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Capability of a fully charged battery on long-distance trips | 4.25 | .769 | Highest | 2 |
| 2. Battery safety | 3.88 | .975 | High | 3 |
| 3. Battery lifetime | 4.75 | .436 | Highest | 1 |
| Overall Mean | 4.29 | .534 | Highest | |

Based on the Table 11, the data analysis results of factors affecting decision making on buying electric vehicles regarding technology advancement related to electric battery revealed that overall, they were in the highest degree with the mean equal to 4.29. Considering details, the sample more likely gave importance to battery lifetime with the mean equal to 4.75, followed by capability of a fully charged battery on long-distance trips with the mean equal to 4.25, and lastly battery safety with the mean equal to 3.88 respectively.

Table 12: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of difficulty of operating electric vehicles.

| **Difficulties of operating electric vehicles** | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Smart dashboard is presented for an easy and quick comprehension of drivers | 4.25 | .697 | Highest | 2 |
| 2. Automatic warning system | 4.50 | .501 | Highest | 1 |
| 3. Common car problems can be easily fixed. | 4.21 | .627 | Highest | 3 |
| Overall Mean | 4.32 | .374 | Highest | |

Based on the Table 12, the data analysis results of factors affecting decision making on buying electric vehicles in terms of difficulty of operating electric vehicles revealed that overall, they were in the highest degree with the mean equal to 4.32. Considering details, the sample more likely gave importance to automatic warning system with the mean equal to 4.50, followed by smart dashboard is presented for an easy and quick comprehension of drivers with the mean equal to 4.25, and lastly common car problems can be easily fixed with the mean equal to 4.21 respectively.

Table 13: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of automated driving system.

| Automated driving system | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Active safety systems | 4.30 | .458 | Highest | 3 |
| 2. Easy setup of default values | 4.47 | .574 | Highest | 1 |
| 3. Electronic stability control. | 4.36 | .480 | Highest | 2 |
| Overall Mean | 4.37 | .369 | Highest | |

Based on the Table 13, the data analysis results of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of automated driving system revealed that overall, they were in the highest degree with the mean equal to 4.37. Considering details, the sample more likely gave importance to easy setup of default values with the mean equal to 4.47, followed by electronic stability control with the mean equal to 4.36, and lastly active safety systems with the mean equal to 4.30 respectively.

Table 14: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of battery charging methods.

| Battery charging methods | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1.Fast charging | 4.22 | .707 | Highest | 3 |
| 2. Availability of charging stations | 4.54 | .499 | Highest | 2 |
| 3. Safe charging. | 4.61 | .488 | Highest | 1 |
| Overall Mean | 4.46 | .358 | Highest | |

Based on the Table 14, the data analysis results of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of battery charging methods revealed that overall, they were in the highest degree with the mean equal to 4.46. Considering details, the sample more likely gave importance to safe charging with the mean equal to 4.61, followed by availability of charging stations with the mean equal to 4.54, and lastly fast charging with the mean equal to 4.22 respectively.

Table 15: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of perceived risks of electric vehicles.

| **Perceived risks of electric vehicles** | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Battery dies while driving | 4.43 | .617 | Highest | 2 |
| 2. Power outage occurs and being unable to charge battery | 4.55 | .623 | Highest | 1 |
| 3. The coming problems of electrical systems. | 3.89 | 1.051 | High | 3 |
| Overall Mean | 4.28 | .462 | Highest | |

Based on the Table 15, the data analysis results of factors affecting decision making on buying electric vehicles regarding technology advancement in terms of risks of electric vehicles revealed that overall, they were in the highest degree with the mean equal to 4.28. Considering details, the sample more likely gave importance to power outage occurs and being unable to charge battery with them mean equal to 4.55, followed by battery dies while driving with the mean equal to 4.43, and lastly the coming problems of electrical systems with the mean equal to 3.89 respectively.

**2. Consumer behavior**

Table 16: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding overall consumer behavior in terms of income.

| Factors | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Travel behavior | 3.73 | .782 | High | 7 |
| 2. Driving behavior | 4.02 | .757 | High | 6 |
| 3. Lifestyle | 3.71 | .735 | High | 8 |
| 4. Social status | 4.13 | .507 | High | 5 |
| 5. Environmental concern | 4.25 | .517 | Highest | 3 |
| 6. Energy saving | 4.37 | .394 | Highest | 1 |
| 7. Creativity | 4.29 | .350 | Highest | 2 |
| 8. Conservatism. | 4.14 | .438 | High | 4 |
| Overall Mean | 4.08 | .263 | High | |

Based on the Table 16, the data analysis results of factors affecting decision making on buying electric vehicles regarding consumer behavior revealed that overall, they were in the highest degree with the mean equal to 4.35. Considering each aspect, the sample more likely gave importance to energy saving with the mean equal to 4.37, followed by creativity with the mean equal to 4.29, environmental concern with the mean equal to 4.25, conservatism with the mean equal to 4.14, social status with the mean equal to 4.13, driving behavior with the mean equal to 4.02, travel behavior with the mean equal to 3.73, and lastly lifestyle with the mean equal to 3.71 respectively.

Table 17: Mean and standard deviation of factors affecting decision making on buying electric vehicles with regards to consumer behavior related to travel behavior.

| Travel behavior | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Driving one's own car | 4.00 | .854 | High | 1 |
| 2. Having a personal driver | 3.91 | 1.005 | High | 2 |
| 3. Travelling with public transport. | 3.28 | 1.090 | Moderate | 3 |
| Overall Mean | 3.73 | .782 | High | |

Based on the Table 17, the data analysis results of factors affecting decision making on buying electric vehicles with regards to consumer behavior related to travel behavior revealed that overall, they were in a high degree with the mean equal to 3.73. Considering details, the samples more likely gave importance to driving one's own car with the mean equal to 4.00, followed by having a personal driver with the mean equal to 3.91, and lastly travelling with public transport with the mean equal to 3.28 respectively.

Table 18: Mean and standard deviation of factors affecting decision making on buying electric vehicles regarding consumer behavior in terms of driving behavior.

| Driving behavior | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Driving with high speed | 4.07 | .876 | High | 2 |
| 2. Safe driving | 3.79 | 1.014 | High | 3 |
| 3. Having excellent driving skills. | 4.19 | .822 | High | 1 |
| Overall Mean | 4.02 | .757 | High | |

Based on the Table 18, the data analysis results of factors affecting decision making on buying electric vehicles in terms of driving behavior revealed that overall, they were in a high degree with the mean equal to 4.02. Considering details, the sample more likely more importance to having excellent driving skills with the mean equal to 4.19, followed by driving with high speed with the mean equal to 4.07, and lastly safe driving with the mean equal to 3.79 respectively.

Table 19: Mean and standard deviation of factors affecting decision making on buying electric vehicles with reference to consumer behavior in terms of lifestyle.

| Lifestyle | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Love travelling | 3.73 | .727 | High | 2 |
| 2. Preference of advanced innovative design | 3.85 | .953 | High | 1 |
| 3. Being economical. | 3.56 | .999 | High | 3 |
| Overall Mean | 3.71 | .735 | High | |

Based on the Table 19, the data analysis results of factors affecting decision making on buying electric vehicles in terms of lifestyle revealed that overall, they were in a high degree with the mean equal to 3.71. Considering details, the sample more likely gave importance to preference of advanced innovative design with the mean equal to 3.85, followed by love travelling with the mean equal to 3.73, and lastly being economical with the mean equal to 3.56 respectively.

Table 20: Mean and standard deviation of factors affecting decision making on buying electric vehicles with regards to consumer behavior in terms of social status.

| Social status | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Prefer to be a good-looking person in society | 4.10 | .753 | High | 3 |
| 2.Be a trendy person | 4.17 | .931 | High | 1 |
| 3. Be socially accepted in society. | 4.12 | .716 | High | 2 |
| Overall Mean | 4.13 | .507 | High | |

Based on the Table 20, the data analysis results of factors affecting decision making on buying electric vehicles with regards to consumer behavior in terms of social status revealed that overall, they were in a high degree with the mean equal to 4.13. Considering details, the sample more likely gave importance to be a trendy person with the mean equal to 4.17, followed by being socially accepted in society with the mean equal to 4.12, and lastly prefer to be a good-looking person in society with the mean equal to 4.10 respectively.

Table 21: Mean and standard deviation of factors affecting decision making on buying electric vehicles with reference to consumer behavior in terms of environmental concern.

| Environmental concern | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Reduce greenhouse effect | 4.32 | .639 | Highest | 2 |
| 2. Reduce carbon dioxide emission | 4.00 | .839 | High | 3 |
| 3. Reduce noise pollution. | 4.43 | .617 | Highest | 1 |
| Overall Mean | 4.25 | .517 | Highest | |

Based on the Table 21, the data analysis results of factors affecting decision making on buying electric vehicles with reference to consumer behavior in terms of environmental concern revealed that overall, they were in the highest degree with the mean equal to 4.25. Considering details, the sample more likely gave importance to reduce noise pollution with the mean equal to 4.43, followed by reduce greenhouse effect with the mean equal to 4.32, and lastly reduce carbon dioxide emission with the mean equal to 4.00 respectively.

Table 22: Mean and standard deviation of factors affecting decision making on buying electric vehicles in relation to consumer behavior regarding energy saving.

| Energy saving | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Reduce natural resources consumption | 4.68 | .466 | Highest | 1 |
| 2. Energy conservation | 4.34 | .688 | Highest | 2 |
| 3. Reduce fuel expense. | 4.10 | .710 | High | 3 |
| Overall Mean | 4.37 | .394 | Highest | |

Based on the Table 22, the data analysis results of factors affecting decision making on buying electric vehicles in relation to consumer behavior regarding energy serving revealed that overall, they were in the highest degree with the mean equal to 4.37. Considering details, the sample more likely gave importance to reduce natural resources consumption with the mean equal to 4.68, followed by energy conservation with the mean equal to 4.34, and lastly reduce fuel expense with the mean equal to 4.10 respectively.

Table 23: Mean and standard deviation of factors affecting decision making on buying electric vehicles in connection with consumer behavior in terms of creativity.

| Creativity | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Like to try new things | 4.02 | .849 | High | 3 |
| 2. Welcome new technology learning | 4.37 | .573 | Highest | 2 |
| 3. Gain attention when driving electric vehicles on the road. | 4.47 | .640 | Highest | 1 |
| Overall Mean | 4.29 | .350 | Highest | |

Based on the Table 23, the data analysis results of factors affecting decision making on buying electric vehicles in connection with consumer behavior in terms of creativity revealed that overall, they were in the highest degree with the mean equal to 4.29. Considering details, the sample more likely gave importance to gain attention when driving electric vehicles on the road with the mean equal to 4.47, followed by welcome new technology learning with the mean equal to 4.37, and lastly like to try new things with the mean equal to 4.02 respectively.

Table 24: Mean and standard deviation of factors affecting decision making on buying electric vehicles in the context of consumer behavior in terms of conservatism.

| Conservatism | Mean | S.D. | Level of significance | No. |
|---|---|---|---|---|
| 1. Preference of working performance of conventional gasoline engine | 4.43 | .617 | Highest | 1 |
| 2. Love car decorations | 3.78 | 1.001 | High | 3 |
| 3. Engine is more durable. | 4.21 | .725 | Highest | 2 |
| Overall Mean | 4.14 | .438 | High | |

Based on the Table 24, of factors affecting decision making on buying electric the data analysis results vehicles in the context of consumer behavior in terms of conservatism revealed that overall, they were in a high degree with the mean equal to 4.14. Considering details, the sample more likely gave importance to preference of working performance of conventional gasoline engine with the mean equal to 4.43, followed by engine is more durable with the mean equal to 4.21, and lastly loves car decorations with the mean 3.78 respectively.

Table 25: Mean and standard deviation of factors affecting decision making on buying electric vehicles in connection with supportive government policies.

| Supportive government policies | **Mean** | **S.D.** | **Level of significance** | **No.** |
|---|---|---|---|---|
| 1. Reduce import customs duty for electric vehicles | 4.63 | .556 | Highest | 3 |
| 2. Reduce personal income tax for those who use electric vehicles | 4.69 | .464 | Highest | 2 |
| 3. Support manufacturers to build factories for electric vehicles in the country. | 4.75 | .432 | Highest | 1 |
| Overall Mean | 4.69 | .385 | | |

Based on the Table 25, the data analysis results of factors affecting decision making on buying electric vehicles in connection with supportive government policies revealed that overall, they were in a high degree with the mean equal to 4.14. Considering details, the sample more likely gave importance to support manufacturers to build factories for electric vehicles in the country with the mean equal to 4.75, followed by reduce personal income tax for those who use electric vehicles with the mean equal to 4.69, and lastly reduce import customs duty for electric vehicles with the mean equal to 4.63 respectively.

**Part 4: Demographic factors**

The results of demographic factor analysis are presented in frequencies and percentages as follow:

Table 26: Numbers and percentages of demographic characteristics of the sample.

| Characteristics of the sample | Number | Percentage |
|---|---|---|
| **Age** | | |
| 20 – 30 years | 62 | 15.5 |
| 31 – 40 years | 127 | 31.8 |
| 41 - 50 years | 146 | 36.5 |
| Over 50 years | 65 | 16.3 |
| Total | 400 | 100.0 |
| **Gender** | | |
| Male | 224 | 56.0 |
| Female | 176 | 44.0 |
| Total | 400 | 100.0 |
| **Educational level** | | |
| High school | 23 | 5.8 |
| Bachelor's degree | 337 | 84.3 |
| Master's degree | 38 | 9.5 |
| Doctoral degree | 2 | .5 |
| Total | 400 | 100.0 |
| **Occupation** | | |
| Employee of public company limited | 74 | 18.5 |
| Employee of private company | 143 | 35.8 |
| Business owner | 116 | 29.0 |
| Student | 67 | 16.8 |
| Total | 400 | 100.0 |
| **Income** | | |
| Less than 30,000 baht per month | 147 | 36.8 |
| 30,001 – 50,000 baht per month | 108 | 27.0 |
| 50,001 – 70,000 baht per month | 87 | 21.8 |
| 70,001 – 90,000 per month | 18 | 4.5 |
| Higher than 90,000 baht per month | 40 | 10.0 |
| **Total** | 400 | 100.0 |

Based on the Table 26, the sample of 400 persons had the following demographic characteristics:

Age; it was found that most samples (146 persons) were aged between 41 - 50 years which accounted for 36.5 percent, followed by the sample of 127 persons between the ages of 31 – 40 years accounted for 31.8 percent, the sample of 65 persons were those whose age was over 50 years accounted for 16.3 percent, and lastly the sample of 62 persons whose age was between 20 – 30 years accounted for 15.5 respectively.

Gender; it was found that most samples (224 persons) were male accounted for 56.0 percent, followed by the sample of 176 females accounted for 44.0 percent respectively.

Educational level: it was found that most samples (337 persons) graduated with bachelor's degree accounted for 84.3 percent, followed by the sample of 38 persons who graduated with a master's degree accounted for 9.5 percent, the sample of 23 persons finished high school accounted for 5.8 percent and lastly the sample of 2 persons who graduated with a doctorate's degree accounted for 0.5 percent respectively.

Occupation; it was found that most samples (143 persons) were employees of private companies accounted for 35.8 percent, followed by 116 persons who were business owners accounted for 29.0 percent, 74 persons were employees of public organization companies accounted for 18.5 percent, and lastly 67 persons were students accounted for 16.8 percent respectively.

Income; it was found that most samples(147 persons) accounted for 36.8 percent had salary less than 30,000 baht per month, followed by 108 persons accounted for 27.0 percent whose salary was between 30,001 – 50,000 baht per month, 87 persons accounted for 21.8 percent whose salary was between 50,001 – 70,000 baht per month, 40 persons accounted for 10.0 percent whose salary was higher than 90,000 baht per month, and lastly 18 persons accounted for 4.5 percent whose salary was between 70,001 – 90,000 per month respectively.

**Part 5: Hypothesis testing results of marketing mix factors influencing decision making on buying electric vehicles of population in Bangkok in Binary Logit.**

Binary Logit was applied as a statistical analysis tool for hypothesis testing results of factors influencing decision making on buying electric vehicles of population in Bangkok. The meanings of symbols mentioned in this paper are:

Sig. Stands for level of significance

df. This is the degrees of freedom for the Wald chi-square test.

Wald This is the Wald chi-square test that tests the null hypothesis that the constant equals 0.

B This is the coefficient for the constant (also called the “intercept”) in the null model.

SE This is the standard error around the coefficient for the constant.

Exp (B) This is the exponentiation of the B coefficient, which is an odds ratio.

**Main Hypotheses Testing,**

Table 27: Variable in the equation

| Variables | B | S.E. | Wald | df. | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| The design of the EVs | 2.349 | .644 | 13.301 | 1 | .000 | 10.476 |
| Price of the EVs | -.537 | .580 | .855 | 1 | .355 | .585 |
| Authorize Dealer | .381 | .599 | .405 | 1 | .525 | 1.464 |
| Marketing Promotion | .078 | .466 | .028 | 1 | .866 | 1.081 |
| Professional Aftersales Service | 15.912 | 4121.359 | .000 | 1 | .997 | 8133925.775 |
| Research and Development | -.672 | .464 | 2.096 | 1 | .148 | .511 |
| Physical Environment | -.925 | .383 | 5.830 | 1 | .016 | .397 |
| Dose technology effect to the purchasing decision | -16.537 | 4121.359 | .000 | 1 | .997 | .000 |
| Consumer behavior is effecting to the purchasing decision | .601 | .410 | 2.145 | 1 | .143 | 1.824 |
| Government Support will effect to the purchasing decision | -.921 | .417 | 4.883 | 1 | .027 | .398 |

The SPSS output of binary logit on all main independent variables shows that product design, physical environment and government support all significantly influence EV purchase decision, due to their p-values are all less than .05 as highlighted above. Therefore, we can reject the following null hypotheses:

- H01: product design does not influence EV purchase decision.
- H07: physical environment does not influence EV purchase decision.

- H010: government support does not influence EV purchase decision.

And accept the alternative hypotheses as follows:

- Ha1: product design does influence EV purchase decision.
- Ha7: physical environment does influence EV purchase decision.
- Ha10: government support does influence EV purchase decision.

**Significance Testing of Each Factor's Dimension**

Table 28: Variable in the equation

| Variables | B | S.E. | Wald | df. | Sig. | Exp(B) |
|---|---|---|---|---|---|---|
| Notable Brand | -1.121 | .461 | 5.907 | 1 | .015 | .326 |
| Advertisement | -1.132 | .453 | 6.231 | 1 | .013 | .323 |
| Friendly Interface Command Monitor | -.905 | .436 | 4.314 | 1 | .038 | .404 |
| Risk of Running out of Battery | -1.625 | .676 | 5.780 | 1 | .016 | .197 |

The SPSS output of binary logit on details on each independent variable shows that notable brand, advertisement, friendly interface command monitor, and risk of running out of battery all significantly influence EV purchase decision, due to their p-values are all less than .05 as highlighted above.

# CHAPTER 5

# DISCUSSION AND CONCLUSION

The study on the factors influencing the decision to purchase electric vehicles in Bangkok is a survey research using questionnaires as a tool to collect data from 400 people. Computer program was used to calculate the statistics: percentage, mean, standard deviation. The results of this study were as follows:

## Conclusions

### Customer Profiling Study

Our cross-tabulation study reveals customer profile of each purchasing decision as follows:

Table 29: Gender * would you consider buying Electric Vehicles (Q1)

Crosstabulation

| | | | Q1 | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Gender | Male | Count | 180 | 44 | 224 |
| | | % within gender | 80.4% | 19.6% | 100.0% |
| | | % within Q1 | 51.9% | 83.0% | 56.0% |
| | | % of Total | 45.0% | 11.0% | 56.0% |
| | Female | Count | 167 | 9 | 176 |
| | | % within gender | 94.9% | 5.1% | 100.0% |
| | | % within Q1 | 48.1% | 17.0% | 44.0% |
| | | % of Total | 41.8% | 2.3% | 44.0% |
| Total | | Count | 347 | 53 | 400 |
| | | % within gender | 86.8% | 13.3% | 100.0% |
| | | % within Q1 | 100.0% | 100.0% | 100.0% |
| | | % of Total | 86.8% | 13.3% | 100.0% |

Probability that female will purchase Electric Vehicle is 94.9% and male is 80.4% in term of comparing within gender. We can conclude that both male and female interesting to purchase electric vehicle nearly the same level as 51.9 and 48.1% respectively.

Table 30: Age * Would you consider buying Electric Vehicles (Q1)

Crosstabulation

| | | | Q1 | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Age | 20-30 years old | Count | 62 | 0 | 62 |
| | | % within age | 100.0% | 0.0% | 100.0% |
| | | % within Q1 | 17.9% | 0.0% | 15.5% |
| | | % of Total | 15.5% | 0.0% | 15.5% |
| | 31-40 years old | Count | 127 | 0 | 127 |
| | | % within age | 100.0% | 0.0% | 100.0% |
| | | % within Q1 | 36.6% | 0.0% | 31.8% |
| | | % of Total | 31.8% | 0.0% | 31.8% |
| | 41-50 years old | Count | 143 | 3 | 146 |
| | | % within age | 97.9% | 2.1% | 100.0% |
| | | % within Q1 | 41.2% | 5.7% | 36.5% |
| | | % of Total | 35.8% | 0.8% | 36.5% |
| | Above 50 years old | Count | 15 | 50 | 65 |
| | | % within age | 23.1% | 76.9% | 100.0% |
| | | % within Q1 | 4.3% | 94.3% | 16.3% |
| | | % of Total | 3.8% | 12.5% | 16.3% |
| Total | | Count | 347 | 53 | 400 |
| | | % within age | 86.8% | 13.3% | 100.0% |
| | | % within Q1 | 100.0% | 100.0% | 100.0% |
| | | % of Total | 86.8% | 13.3% | 100.0% |

In conclusion probability age in the range of 20 – 40 years old respond to decide to purchase the electric vehicle for 100%. The reason is for these generations

will have the highest chance to consuming the electric vehicle. On the other hand, the respondent that age over 50 years old are not interesting in electric vehicle because they not open to new thing due to these generations will have low chance to purchase the electric vehicle.

Table 31: Education * Would you consider buying Electric Vehicles (Q1) Crosstabulation

| | | | Q1 | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Education | High School | Count | 23 | 0 | 23 |
| | | % within Education | 100.0% | 0.0% | 100.0% |
| | | % within Q1 | 6.6% | 0.0% | 5.8% |
| | | % of Total | 5.8% | 0.0% | 5.8% |
| | Bachelor Degree | Count | 288 | 49 | 337 |
| | | % within Education | 85.5% | 14.5% | 100.0% |
| | | % within Q1 | 83.0% | 92.5% | 84.3% |
| | | % of Total | 72.0% | 12.3% | 84.3% |
| | Master Degree | Count | 36 | 2 | 38 |
| | | % within Education | 94.7% | 5.3% | 100.0% |
| | | % within Q1 | 10.4% | 3.8% | 9.5% |
| | | % of Total | 9.0% | 0.5% | 9.5% |
| | Doctoral Degree | Count | 0 | 2 | 2 |
| | | % within Education | 0.0% | 100.0% | 100.0% |
| | | % within Q1 | 0.0% | 3.8% | 0.5% |
| | | % of Total | 0.0% | 0.5% | 0.5% |
| Total | | Count | 347 | 53 | 400 |
| | | % within Education | 86.8% | 13.3% | 100.0% |
| | | % within Q1 | 100.0% | 100.0% | 100.0% |
| | | % of Total | 86.8% | 13.3% | 100.0% |

Education level refer to the respondent shown that high school student have 100% majority to purchasing the electric vehicle. Refer to the age range the youngest generation have highest interested in the new technology on the electric vehicle. The

respondent under Bachelor's degree get highest proportion 83% comparing with other education level to purchase the electric vehicle. As mention earlier, the new generation such as generation Y and Z will interesting and participate with electric vehicle more than other generation.

Table 32: Occupation * Would you consider buying Electric Vehicles (Q1) Crosstabulation

| | | | Q1 | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Occupation | Employee of public company | Count | 46 | 28 | 74 |
| | | % within Occupation | 62.2% | 37.8% | 100.0% |
| | | % within Q1 | 13.3% | 52.8% | 18.5% |
| | | % of Total | 11.5% | 7.0% | 18.5% |
| | Employee of private company | Count | 134 | 9 | 143 |
| | | % within Occupation | 93.7% | 6.3% | 100.0% |
| | | % within Q1 | 38.6% | 17.0% | 35.8% |
| | | % of Total | 33.5% | 2.3% | 35.8% |
| | Entrepreneur | Count | 100 | 16 | 116 |
| | | % within Occupation | 86.2% | 13.8% | 100.0% |
| | | % within Q1 | 28.8% | 30.2% | 29.0% |
| | | % of Total | 25.0% | 4.0% | 29.0% |
| | Student | Count | 67 | 0 | 67 |
| | | % within Occupation | 100.0% | 0.0% | 100.0% |
| | | % within Q1 | 19.3% | 0.0% | 16.8% |
| | | % of Total | 16.8% | 0.0% | 16.8% |
| Total | | Count | 347 | 53 | 400 |
| | | % within Occupation | 86.8% | 13.3% | 100.0% |
| | | % within Q1 | 100.0% | 100.0% | 100.0% |
| | | % of Total | 86.8% | 13.3% | 100.0% |

Comparing within each occupation, the student has 100% respondent to purchase electric vehicle in the future which related with age range and education level. As mention before, electric vehicle is the vehicle for the new generation such as

generation Y and Z, so we have no doubt for the result. Refer to the question of "Would you consider buying electric vehicle?" The respondent working in the private company get highest percentage as 38.6% following by entrepreneur are interesting to purchase electric vehicle. The reason is they have money and they want to have good image in the social class.

Table 33: Income * Would you consider buying Electric Vehicles (Q1) Crosstabulation

| | | | Q1 | | |
|---|---|---|---|---|---|
| | | | Yes | No | Total |
| Income | Less than 30,000 per month | Count | 130 | 17 | 147 |
| | | % within income | 88.4% | 11.6% | 100.0% |
| | | % within Q1 | 37.5% | 32.1% | 36.8% |
| | | % of Total | 32.5% | 4.3% | 36.8% |
| | 30,001-50,000 per month | Count | 95 | 13 | 108 |
| | | % within income | 88.0% | 12.0% | 100.0% |
| | | % within Q1 | 27.4% | 24.5% | 27.0% |
| | | % of Total | 23.8% | 3.3% | 27.0% |
| | 50,001-70,000 per month | Count | 82 | 5 | 87 |
| | | % within income | 94.3% | 5.7% | 100.0% |
| | | % within Q1 | 23.6% | 9.4% | 21.8% |
| | | % of Total | 20.5% | 1.3% | 21.8% |
| | 70,001-90,000 per month | Count | 16 | 2 | 18 |
| | | % within income | 88.9% | 11.1% | 100.0% |
| | | % within Q1 | 4.6% | 3.8% | 4.5% |
| | | % of Total | 4.0% | 0.5% | 4.5% |
| | Above 90,000 per month | Count | 24 | 16 | 40 |
| | | % within income | 60.0% | 40.0% | 100.0% |
| | | % within Q1 | 6.9% | 30.2% | 10.0% |
| | | % of Total | 6.0% | 4.0% | 10.0% |
| Total | | Count | 347 | 53 | 400 |
| | | % within income | 86.8% | 13.3% | 100.0% |
| | | % within Q1 | 100.0% | 100.0% | 100.0% |
| | | % of Total | 86.8% | 13.3% | 100.0% |

In the demographic factor for the income, the highest respondent that interesting to purchase electric vehicle is the group that earn income less than 30,000 Baht per month. It not surprises result, if we compare with the previous profile that the highest range of age, education level, and occupation it can related with these income range because they are still young and being a student so they did not earn much per month but in the future this generation will have the important roll to purchasing the electric vehicle. For the other range of income 30,001 – 50,000 Baht per month and 50,001 – 70,000 Baht per month get 27.4% and 23.6% respectively to purchase electric vehicle. This related with occupation of employee at private company and entrepreneur.

**Discussion**

Factors influencing the decision to purchase the electric vehicle of the Bangkok metropolis are discussed as follows;

1. **Main Factors influencing the decision to buy an electric vehicle** were found at a very high level. Most of them focus on the technology of electric vehicle, followed by information and after sales service, government support policy (tax), promotion of electric vehicle market, research and development of electric vehicles, electric vehicle dealer, the price of electric vehicles, the appearance of electric vehicles.

**2. Significant testing in each dimension**

**The marketing mix factor** was found to be at the highest level. The majority of people are interested in receiving information and after-sales service, about the

opinions of customers, followed by the research and development of electric vehicles, the existence of 24 hours service center, physical environment factor(oil price), image of electric vehicle, the promotion of electric vehicle market, the importance of promotional activities, the appearance of electric vehicles, the focus of production of quality materials, electric vehicle dealerships, many service centers that cover areas. Finally, the price of electric vehicles which must be worth to buy.

**In terms of technological factors**, the overall level is at the highest level. Most people concerned about safety in battery charging, followed by the automatic driving system with easy-to-set up system, and the risk of not being able to charge the battery. The hypothesis test showed that the overall marketing mix had an influence on the decision to buy the electric vehicle in Bangkok because the samples focus on technology factors related to battery charging in terms of safety, the place where providing charging service, fast charging, the distance to travel with full battery, battery safety. As a result, technological factors have influenced the decision to buy electric vehicles in Bangkok.

**In terms of consumer behavior**, the overall level was the highest. Most people value energy saving to reduce the use of natural resources, followed by the, creativity when driving electric vehicles on the road. In case of environmental concerns, people focus on reducing noise pollution. In terms of conservatism, they focus on the traditional engine system. Modernity was the most concerned in part of social class. In part of driving behavior, people pay their attention on driving skills. In terms of traveling habits, the result showed that people love driving by themselves, and lastly in terms of lifestyle, they give priority in cutting-edge design. The

hypothesis test showed that the overall marketing mix had an influence on the decision to buy the electric vehicle in Bangkok because the sample was sensitive to the consumer's personal energy consumption in terms of reducing the use of natural resources, energy conservation, and reduction of fuel cost. Consequently, personal factors influence consumers' decision to purchase electric vehicles in Bangkok.

**The policy support from the government** showed that the overall level was very high. Most people focus on supporting electric vehicle manufacturers to set up domestic production plants. Second was the reduction of personal income tax on electric vehicle users and the reduction of importing tax, respectively. The hypothesis test found that the market mix in terms of price of electric vehicle, promotion of electric vehicle market, information and after sales service, the physical environment (oil price) influenced the purchase decision of the electric vehicle of Bangkok population. This was since electric vehicles are cost-effective to buy from neutral pricing, so consumers can buy electric vehicles.

## Recommendation

**Researchers have the following ideas.**

1. The marketing mix factor was found to be at the highest level. The majority of people are interested in receiving information and after-sales service, about the opinions of customers, followed by the research and development of electric vehicles, the existence of 24 hours service center, physical environment factor(oil price), image of electric vehicle, the promotion of electric vehicle market, the importance of promotional activities, the appearance of electric vehicles, the focus of production of quality materials, electric vehicle dealerships, many service centers that cover areas

and finally, the price of electric vehicles which must be worth to buy. Therefore, those involved in the distribution of electric vehicles should provide a way to listen to customer feedback that affects information about electric vehicles. There should be a warranty of all parts in the 100,000 km should have a 24-hour problem-free service center. The image of the electric vehicle should be more prominent and should promote the sales activities to help customers understand the characteristics of electric vehicles more. Materials should be made of lightweight materials to save energy, and price should be reasonable, worth buying.

**2. Factors affecting decision to buy electric vehicle**

**2.1 In terms of technological factors**, the overall level is at the highest level. Most people concerned about safety in battery charging, followed by the automatic driving system with easy-to-set up system, and the risk of not being able to charge the battery. Therefore, manufacturers of electric vehicles or related persons should ensure that there will be harmless while charging batteries. There should be a place to charge battery at all areas and the charging should be fast. Also, it should be easy to set up the system and be stable, safe to work. There should have an automated problem notification system and battery should last for at least 5 years.

**2.2 In terms of consumer behavior**, the overall level was the highest. Most people value energy saving as a way to reduce the use of natural resources, followed by the, creativity when driving electric vehicles on the road. In case of environmental concerns, people focus on reducing noise pollution. In terms of conservatism, they focus on the traditional engine system. Modernity was the most concerned in part of social class. In part of driving behavior, people pay their attention on driving skills. In

terms of traveling habits, the result showed that people love driving by themselves, and lastly in terms of lifestyle, they give priority in cutting-edge design. Therefore, those involved in the production of electric vehicles should use materials to produce light-weight electric vehicles to reduce the problem of using natural resources. Should design the vehicle to be outstanding modern cutting-edge innovation. Driving electric vehicle on the road should be interesting as most people love driving by themselves and the engine should be durable without noise.

**2.3 The policy support from the government** showed that the overall level was very high. Most people focus on supporting electric vehicle manufacturers to set up domestic production plants. Second were the reduction of personal income tax on electric vehicle users and the reduction of importing tax, respectively. Therefore, the government or related parties should encourage the establishment of a national electric vehicle production factory. They should reduce the personal income tax of electric vehicle and should reduce import tax if the user introduced electric vehicles in the country.

### 5.5 Suggestions for future research

1. There should be a study about the price of electric vehicle to purchase electric vehicles in Bangkok.

2. There should be a study to analyze the efficiency of electric battery in decision to buy electric vehicle in Bangkok.

3. The study should be conducted to study the problems and the incentives to reduce the use of natural resources that influence the decision to buy electric vehicles in Bangkok.

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# APPENDIX

**Factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok**

Direction: This questionnaire is designed to collect data on Factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok. This questionnaire will be utilized by a student of the Master of Business Administration Program (M.B.A.) Program of Bangkok University Graduate School of Business (International Program) as of part of the Independent Study course.

Questionnaire: The questionnaire composes of demographic Information and Factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok.

**Please make a (√) for the entire questionnaire.**

**Q1: 1. Would you consider buying Electric Vehicles?** *(Choose only one by marking (√)*

☐ 1.) Yes ☐ 2.) No

**Q4. Technology Factor**

Which factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok by marking (√) in the box that corresponds to your opinion?

1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, 5 = Strongly Agree

| **Technologies** (Answer every question by marking √) | Opinion Level | | | | |
|---|---|---|---|---|---|
| | 1 Strongly Disagree | 2 Somewhat Disagree | 3 Neutral | 4 Somewhat Agree | 5 Strongly Agree |
| **Battery** | | | | | |
| 33.) Distance travelling per full charging | | | | | |
| 34.) Safety | | | | | |
| 35.) Useful life | | | | | |
| **Complexity** | | | | | |
| 36.) Friendly interface commmand monitor | | | | | |
| 37.) Automatic Notification System | | | | | |
| 38.) Easy to Self Preliminary repair | | | | | |
| **Auto Pilot System** | | | | | |
| 39.) Safe to used | | | | | |
| 40.) Easy to set up | | | | | |
| 41.) Stability System | | | | | |
| **Battery Charger** | | | | | |
| 42.) Quick Charge | | | | | |
| 43.) Various of charging station | | | | | |
| 44.) Safe and Stability | | | | | |
| **Risk** | | | | | |
| 45.) Running out of Battery | | | | | |
| 46.) Blackout | | | | | |
| 47.) Conflict System | | | | | |

**Q4. Consumer Behavior**

Which factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok by marking (√) in the box that corresponds to your opinion?

1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, 5 = Strongly Agree

| **Consumer Behavior** (Answer every question by marking √) | **Opinion Level** | | | | |
|---|---|---|---|---|---|
| | 1 Strongly Disagree | 2 Somewhat Disagree | 3 Neutral | 4 Somewhat Agree | 5 Strongly Agree |
| **Travelling Habit** | | | | | |
| 48.) Self Driving | | | | | |
| 49.) Have personal Driver | | | | | |
| 50.) Travelling by public transport | | | | | |
| **Driving Behavior** | | | | | |
| 51.) Fast Driving | | | | | |
| 52.) Safe Driving | | | | | |
| 53.) Professional Driver | | | | | |
| **Life Style** | | | | | |
| 54.) Love Travelling | | | | | |
| 55.) Innovative Design | | | | | |
| 56.) Economical Person | | | | | |
| **Social Class** | | | | | |
| 57.) Improve Self Image | | | | | |
| 58.) Trendy | | | | | |
| 59.) Social acceptance | | | | | |
| **Environmental Concern** | | | | | |
| 60.) Reduce Greenhouse Effect | | | | | |
| 61.) Reduce CO2 emission | | | | | |
| 62.) Reduce noise pollution | | | | | |
| **Enegy Saving** | | | | | |
| 63.) Reduce Nature Resource | | | | | |
| 64.) Energy Conservation | | | | | |
| 65.) Reduce monthly spending compare with gasoline | | | | | |
| **Creativity** | | | | | |
| 66.) Love to try new thing | | | | | |
| 67.) Appreciate to learn new technology | | | | | |
| 68.) Get attention on the street | | | | | |
| **Conservative** | | | | | |
| 69.) Sound of the car's engine | | | | | |
| 70.) Love to modigying car | | | | | |
| 71.) Engine is more durable | | | | | |

Which factors affecting the decision to purchasing Electric Vehicles (EVs) of the consumers in Bangkok by marking (√) in the box that corresponds to your opinion?

1 = Strongly Disagree, 2 = Somewhat Disagree, 3 = Neutral, 4 = Somewhat Agree, 5 = Strongly Agree

| **Other** (Answer every question by marking √) | **Opinion Level** | | | | |
|---|---|---|---|---|---|
| | 1<br>Strongly Disagree | 2<br>Somewhat Disagree | 3<br>Neutral | 4<br>Somewhat Agree | 5<br>Strongly Agree |
| **Government Support** | | | | | |
| 72.) Reduce Tax for import EVS | | | | | |
| 73.) Deduct personal Income Tax | | | | | |
| 74.) Support Evs brand to manufacture in Thailand | | | | | |

**Q5. Demographic** (Please mark only one (√) per question)

**75.** Ages

☐ 1. 20 – 30 years old ☐ 2. 31-40 years old ☐ 3. 41-50 years old ☐ 4. Over than 50 years old

**76.** Gender

☐ 1. Male ☐ 2. Female

**77.** Education

☐ 1. High School ☐ 2. Bachelor Degree ☐ 3. Master Degree ☐ 4. Doctoral Degree

☐ 5. Other (Please mention).....

**78.** Occupation

☐ 1. Employee of public company ☐ 2. Employee of private company ☐ 3. Entrepreneur ☐ 4. Student

☐ 5. (Others) .....

**79.** Income

☐ 1. Less than 30,000 Baht per month ☐ 2. 30,001 – 50,000 Baht per month ☐ 3. 50,001 – 70,000 Baht per month

☐ 4. 70,001 – 90,000 Baht per month ☐ 5. Above 90,000 Baht per month

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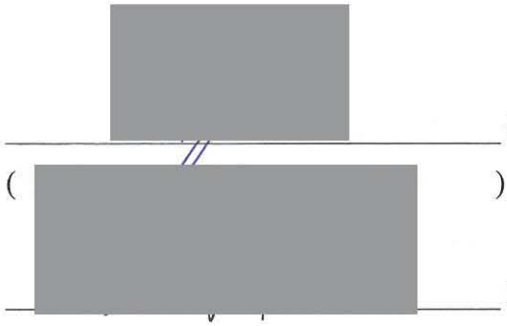

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