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The Factor That Influences Consumers' Buying Intention of Electric Vehicle (EV) in Malaysia

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Abstract: With growing attention to global warming and the concern of potential future raises in gas and petroleum costs, few automobile manufacturers have started producing electric vehicles (EVs) and have gradually entered the market in recent years. These had raised the buying intention of EVs among the people. This study aims to determine the most influential factor and to evaluate the level of consumers' acceptance of electric vehicles (EVs) which affects consumers' buying intention toward electric vehicles (EVs) in Malaysia. In this research, the non-random sampling technique was used. The questionnaires were distributed to 100 respondents who are 18 years old and above 60 years old who have jobs and salary payments in Malaysia through an online Google form and IBM Statistical Package Social Science (SPSS) software was used to analyze the data. The results of this study revealed that social media, celebrity, facilitating condition, feature and design, price value, and environmental concern have a positive influence on consumers' buying intention of electric vehicles (EV). To conclude, among all the IVs, feature, and design (FD) has the most significant and strongest influence on consumers' buying intention of EV; whereas facilitating condition (FC) is the weakest.

Keywords: Electric vehicle, Buying intention, Green technology

1. Introduction

This study aims to determine the most influential factor that affects consumers' buying intention toward electric vehicles (EVs) in Malaysia and evaluate the level of consumers' acceptance of electric vehicles (EVs) which will affect the buying intention toward EVs in Malaysia. The Electric Power Research Institute reported in year 2001 that gasoline prices did influenced the purchase intention of hybrid electric vehicles The global warming issues and continues spike in energy prices also contributed to the expansion of electric vehicles (Graham, 2001). Other factors that influenced customer preferences for hybrid electric vehicles are reduced maintenance, better handling, and reduced air pollution. It is

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already proven that the quality of life in cities is affected by particles, noise, and other pollutants produced by private cars and other motorized transport modes (Thomas, 2009).

According to Thomas (2009), currently, there are two main options for powering all-electric vehicles: fuel cells or batteries. Both generate electricity to drive electric motors, reduce the efficiency of the venerable internal combustion engine (ICE) and eliminate pollution. Fuel cells derive energy from hydrogen stored in the vehicle, whereas batteries obtain all energy from batteries that are charged by the electrical grid. Both hydrogen and electricity can be made from low- or zero-carbon sources including renewable energy (solar, wind, and biomass), nuclear energy, and coal with carbon capture and storage (CCS).

Based on a study from Chapman (2007) stated private transportation is the major driver of carbon emissions which has led to climate change. Many authorities believe that increasing the share of battery electric vehicles (BEVs) in the entire vehicle fleet is a more realistic way to achieve their environmental goals than reducing personal car usage (Haustein & Jensen, 2018). Contrary to internal combustion engine vehicles (ICE), BEVs are almost silent at low speeds, have better comfort, driving range, and options for recharging the batteries which almost no local air emissions and a higher proportion of renewable energy in electricity production, yet contribute to reducing global emissions (Odeh *et al.*, 2013).

Rapid development of Malaysian economy that shifted from an agricultural-based economy to a manufacturing-based economy contributed to the acceleration of urbanization (Afroz *et al.*, 2015). These contributed to increase in greenhouse gas emissions since Malaysia's transportation sector relies heavily on oil. Therefore, the transformation on the use of energy in the transportation sector is imperative if Malaysia want to reduce air pollution, greenhouse gas emission, and dependency on fossil fuels (Afroz *et al.*, 2015). Currently, automobile exhibitions actively display new electric vehicles (EV) models such as Nissan Leaf and Tesla S (Khazaei & Khazaei, 2016).

Since late 2011, the Malaysian government already expressed a strong commitment to the transport sector by accelerating developments in zero-emission mobility to achieve a 10 % rise in the number of environmentally friendly vehicles (EFVs) on Malaysian roads by 2020 (Ministry of Transport 2010). For the infrastructure, the government developed regulations and standards for encouraging private firms to plan to set up charging stations for EFVs which can generate public interest for the use of EFVs. Furthermore, the Malaysia-based vehicle producer including Proton, and Japan-based vehicle producers, Mitsubishi, and Nissan are actively running trials of EFVs in Malaysia since year 2015, to raise public awareness of the vehicle's plug-in option and to test the cars' viability for generate industry interest and public acceptance (Afroz *et al.*, 2015).

The introduction of electric vehicles (EVs) as environmentally conscious alternatives is expected to grow worldwide (Yamada *et al.*, 2018). The recent improvements in vehicle technology and infrastructure, the uptake of EVs has grown a very encouraging rate. This can be seen in Denmar where the public charging locations have increased all parts of the country with 540 charging locations of which 235 are fast charging locations (Autobranchen, 2017). Even the charging infrastructure and available and affordable car models are relevant necessary conditions for adopting EVs, but they are still not sufficient to convince consumer to adopt an EV. To determine the ways to increase EV uptake, there is need for better understanding on the factors that affect the buying intention of existing conventional vehicle users to adopt EVs and it also needs to maintain that sustainability of EVs user (Haustein & Jensen, 2018).

According to The Malaysian Reserve (TMR) (2020), UMW Toyota Motor Sdn Bhd (UMWT) president K Ravindran said the awareness among consumers of the benefits of EV still low, and EV owners facing inconveniences as charging facilities are still limited which hindered the growth of Malaysian hybrid and electric vehicle (EV) market. According to the Malaysian Automobile

Association, sales of hybrid vehicles declined from 20,744 in 2018 to 13,049 in 2019. This has raised the curiosity of the researcher to understand the reasons for the decline in EV sales and study the factors that influence the buying intention of conventional vehicle consumers toward electric vehicles in Malaysia.

In Malaysia, so far, little research has focused on the level of consumer intention, the main influencing factors, and barriers to buying EFV. This created an information gap between Malaysian researchers and transportation policymakers (Afroz *et al.*, 2015). This question inspired current research. Therefore, this study attempts to study how value affects Malaysia's attitude towards EFV's environmentally responsible purchase intention (PIN) from the perspective of rational action theory (TRA).

Hence, this research was conducted from the perspective of the theory of reasoned action (TRA), how values influence attitudes towards an environmentally responsible purchase intention (PIN) of EFVs in Malaysia. Therefore, the research objectives of this study are: (i) to determine the most influential factor that affects consumers' buying intention toward electric vehicles (EVs) in Malaysia, and (ii) to evaluate the level of consumers' acceptance toward electric vehicles (EVs) which will affect the buying intention toward EVs in Malaysia.

There are various types of vehicles such as electric vehicles (EV), hybrid EV(HEV), plug-in HEV(PHEV), and battery EV(BEV). The type of vehicle in this study only focuses on private electric vehicles. The scope of this study was limited only to consumers who live in Malaysia. Four main states were selected for the study. The states are Selangor, FT (Kuala Lumpur & Putrajaya), Johor, and Penang, since these states have high number of vehicles, private vehicle drivers, and high number of EV charging stations which is more than 20 stations as illustrated in Figure 1.

Figure 1: Charging EV stations as of August 2019 (Green Tech Malaysia, 2019)

2. Literature Review

2.1 Characteristics of Electric Vehicles (EVs)

Electric Vehicle (EV) is not a modern invention. The first rechargeable battery vehicles were developed in the 19th century (Schuitema *et al.*, 2013). There were two main competitive methods for engine-driven vehicles which were the internal combustion engine (ICE) and the electric drivetrain (Helmers & Marx, 2012). Since oil was widely available and cheap have led conventional internal

combustion engine (ICE) powertrain vehicles dominated the market. There is a variety of electric vehicles including HEVs, EVs, and plug-in HEVs (PHEVs) (Yamada *et al.*, 2018).

According to (Helmers & Marx, 2012) definition, a hybrid electric drive system consists of at least two different energy converters including ICE and an electric motor with the combination of using two different energy stores including fuel such as petrol or diesel and battery. This enables high-efficiency urban driving because the energy lost while braking can be recovered for charging the battery. The battery is fully charged through this regenerative braking or by the ICE powertrain directly. In another word, HEV's energy initially comes from liquid fuel. Therefore, these can simply be seen as more efficient, conventionally fueled cars (Schuitema *et al.*, 2013).

Plug-in hybrid electric vehicle (PHEV) was developed from hybrid electric vehicles (HEV) which have bigger batteries than HEVs similarly can be recharged from the electric source through ICE which is driven from petrol or diesel and regenerative braking, but the full electric range is shorter (Thomas, 2009). The combination of biofuels and PHEV will reduce oil consumption and depending on the type of fuel used at power plants to generate electricity in any region may help to reduce greenhouse gas emissions significantly. Eventually, all-electric vehicles powered either by fuel cells or by batteries could make a major significant contribution to achieving long-term societal goals.

Fully electric drives and hybrid electric drives are different. For all-electric vehicles, the electric motor is the only energy converter that drives by a rechargeable battery from an electricity source. According to Helmers & Marx (2012), the main components of BEV can be divided into the electric battery, electric motors, and motor controllers (Figure 2). Compared with ICEV, BEV's technical structure is simpler because it does not require a start-up, lubrication, or exhaust system, all without a gearbox, and sometimes does not require a cooling system.

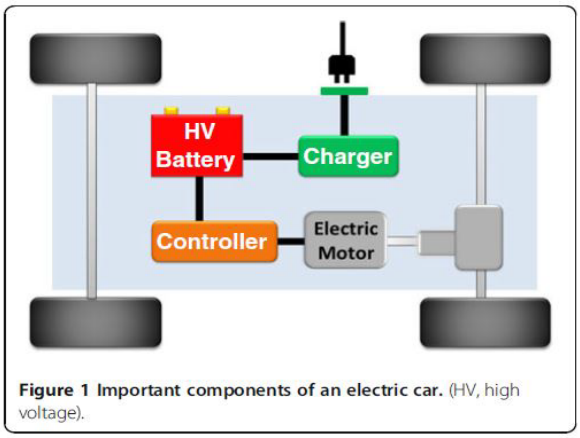

Figure 1 Important components of an electric car. (HV, high voltage).

Figure 2: Important components of electric vehicle (HV, high voltage) (Helmers & Marx, 2012)

On-board inverters used pulse width modulation (PWM) control to convert direct current (DC) power stored in the on-board battery to alternating current (AC) power to drive the motor when drive power is needed and apply energy regenerating operation to the battery when power regeneration is needed (Yamada *et al.*, 2018).

The battery can be charged when plugged into the power grid through a charging device or when braking. The charger is a critical component as today its efficiency may modify between 60% and 97%, wasting 3% to 40% of the grid energy as heat. The motor controller provides variable power to the motor according to the load. Electric motors convert electrical energy into mechanical energy and torque. So far, the central engine has been used in the BEV series.

2.2 Fuel Cell and Battery Comparison

Subheadings are generally limited to two (2) level of numbering (i.e 2.1, 2.2, etc). Contents should be concise; more comprehensive information should be given in the respective section. The subheadings should not go beyond the second level.

The advantages of electric vehicles and certain reasons to be popular include zero direct emissions, reduced dependence on oil, and quiet operation (Sang & Bekhet, 2015). If Malaysia's ambitious target is zero-emission mobility, it will need to act quickly to generate industry interest and acceptance of the new products among the public. Limited or uncertain battery range, long time charging, and insufficiency of charging stations, price, and maintenance may be barriers to widespread EV adoption (Khazaei & Khazaei, 2016).

In the next few years, electric vehicles will be small and medium-sized cars, for two main reasons. First, the weight limits the operating range which is a factor of daily use. Second, battery cost develops another major regulating factor which large cars require larger and more expensive batteries as the size of BEV batteries must increase in parallel with the weight of the vehicle (Helmers & Marx, 2012). The HEV combines the ICE along with an electric motor to achieve a higher fuel economy compared to similar-sized vehicles using conventional fuel (Afroz *et al.*, 2015).

An article by Gustavo (2020) revealed the concern about the decline in EV adoption. Making fast charging cheaper than applying for a fuel tank from a charging company is still unknown. Engineers revealed that 51% of the cost of electric vehicles is concentrated on the powertrain, while the cost of internal combustion engine vehicles is even higher (Figure 3). In contrast, the powertrain of ICE cars only accounts for 18% of the cost while most are concentrated on the body exterior accounting for 25%, and the interior accounting for 24% of the cost.

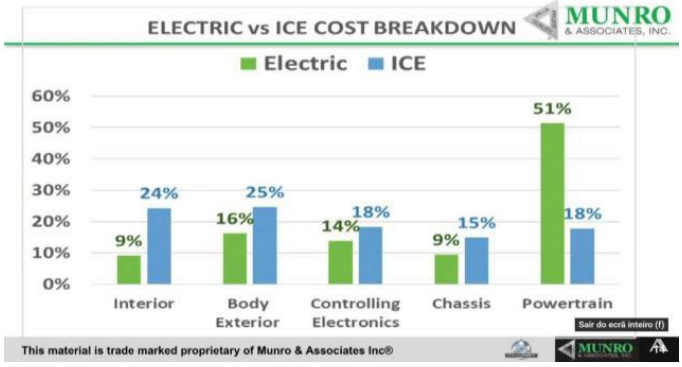

Figure 3: Electric vs ICE cost breakdown (Munro & Associates. Inc., 2020)

2.3 Measurement of Conventional (CV) consumers' buying intention of Electric vehicles (EV) in Malaysia: Independent Variables

(a) Demographics

Many researchers believe that demographic characteristics will affect the willingness to buy products. It has been found that age, gender, education level, income, and family size are significantly related to environmental behavior (Martinsons *et al.*, 1997), Roberts & Bacon (1997), Sang & Bekhet, (2015). It is believed that individuals with higher income levels can afford the marginal increase in costs associated with the preference for green products. Segmentation variables (gender, age, and education level) are important for the preference for adopting green vehicles (Potoglou & Kanaroglou, 2007). In a study of German consumers, it was important to find that young people prefer low-emission vehicles compared to older people (Achtnicht, 2012).

H1: There is a positive correlation between demographics and buying intention toward EVs.

(b) Social Media

The questionnaire was adopted and modified from several studies to assess the material validity of the objects. Social media influence means that a person acquired information about EVs from the media (Moons & De Pelsmacker, 2015). People will consider buying EVs after evaluating information from the media (Khazaei & Khazaei, 2016). The following hypothesis is proposed:

H2: There is a positive correlation between social media and buying intention toward EVs.

(c) Celebrity

Celebrity influence means that a person believes that his or her ideas are important to him or her and that other people have the same view of new technologies (Miao *et al.*, 2014). Tan *et al.* (2017) believed that social standard is a dominant influence on consumer buying behavior as customers could rely heavily on the opinion of the expert to mitigate their risk perceptions. People's behavior is affected by people's belief that society will treat it as a way of using technology (Khazaei & Khazaei, 2016). The following hypothesis is proposed:

H3: There is a positive correlation between celebrity and buying intention toward EVs.

(d) Facilitating Conditions

The facilitating condition is someone's view on the infrastructure or technical support using the technology or system (Venkatesh, Thong, & Xu, 2012). Regarding EVs included the availability of batteries, charging infrastructure, maintenance, or after-sales services for homes and roads (Khazaei & Khazaei, 2016). This relationship was adopted from the expansion of unified acceptance theory and the use of technical theory (Venkatesh *et al.*, 2012). The following hypothesis is proposed:

H4: There is a significant positive correlation between facilitating conditions and buying intention toward EVs.

(e) Feature and Design

In a hybrid vehicle report, efficiency factors such as convenience, quietness, driveability, and automatic transmission were found to be among the most significant factors affecting market acceptance (Razak *et al.*, 2014; Sang & Bekhet, 2015). Meanwhile, performance characteristics, such as riding comfort, stability, ease of use, and operability, were found to have an effect on the adoption of a new energy vehicle in a study among Chinese consumers (Zhang *et al.*, 2013). This research found that the feature and design of EVs have a clear positive effect on buying intention:

H5: There is a positive significant relationship between feature and design and buying intention toward EVs.

(f) Price Value

In a study carried out among Malaysian consumers, it was found that the position of the government plays a significant predictor of green buying activity which would improve the purchasing intentions of EVs in Malaysia, such as subsidies the purchase price (Razak *et al.*, 2014). Based on a study conducted by Frost and Sullivan, it was found that most Malaysians had a clear preference for greener cars, given they were economically feasible which shows that financial incentives play a vital role in shaping Malaysian intentions to use EVs (The Star Online, 2014). The following hypothesis was proposed:

H6: There is a significant positive correlation between price value and buying intention toward EVs.

(g) Environmental Concern

Regarding global warming related to carbon dioxide emissions from automobiles, public debate has affected the purchasing decisions of automobile consumers (Razak *et al.*, 2014). It is believed that certain consumers will consider social and environmental issues when making purchase decisions because they want to assess the impact of their consumption on society and hope to improve environmental quality (Follows & Jobber, 2000). Based on research by Khazaei & Khazaei in Malaysia, there is a significant relationship between environmental issues and buying intention.

H6: There is a positive significant relationship between environmental concern and buying intention toward EVs.

2.3 Measurement of Conventional (CV) consumers' buying intention of Electric vehicles (EV) in Malaysia: Dependent Variables

(a) Buying Intention

According to Bagozzi (1992), Warshaw (1980), and Khazaei & Khazaei (2016), the behavior of buying intention on technology is defined as a degree to which individuals have consciously planned to take or not take certain actions in the future. This research hypothesis can determine consumers' positive or negative feelings about the use of electric vehicles. The potential customer's buying intention toward EV technology and the association with the independent variables of the study are the main interests of this particular study.

2.4 Conceptual Framework

The conceptual framework shown in Figure 4 describes variables and their relationships based on the research discussed in the literature review. The framework explored the relationship between independent variables such as demographics, social media, celebrity, facilitating condition, feature and design, price value, and environmental concern, and the dependent variable which is buying intention. The following hypothesis was proposed:

H1: There is a positive correlation between demographics and buying intention toward EVs.
H2: There is a positive correlation between social media and buying intention toward EVs.
H3: There is a significant positive correlation between celebrity and buying intention toward EVs.
H4: There is a positive significant relationship between facilitating conditions and buying intention toward EVs.
H5: There is a positive significant relationship between feature and design and buying intention toward EVs.
H6: There is a significant positive correlation between price value and buying intention toward EVs.
H7: There is a positive significant relationship between environmental concern and buying intention toward EVs.

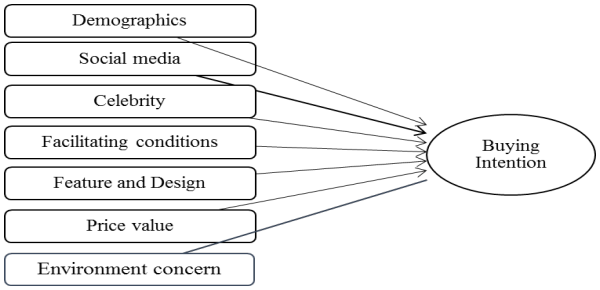

Figure 4: Conceptual Framework of buying intention toward EVs

3. Research Methodology

3.1 Research Design

In this study, the quantitative method was used to collect data from the respondents. The main objective of quantitative methods is going to describe and explain the phenomena that those observations reflect with a mathematical representation and manipulation of observation. Some methods can be used to collect data from a sample of consumers such as online surveys, questionnaires, and direct paper surveys. This research only involves participants who are between 18 years old and 60 years old and resident of Malaysia who has a driving license and earned salaries payment. Besides, respondents from the four declared states were targeted, as the areas obtained a higher number of private vehicle drivers and vehicles and a high number of EV charging stations. Design research is an initial plan, the researcher must follow every step required to complete the research.

3.2 Research Process

There is a total of 6 steps used to conduct this study. The 6 steps were followed to identify the factor that influences conventional vehicle (CV) consumers' buying intention for electric vehicles (EV) in Malaysia. The first step followed by the following steps to the last step is from identifying research problems, searching, and analyzing the literature review, designing research, collecting data, analyzing data, and lastly producing results and discussion. To carry on the study, this research began with finding the issue related to EV. It has been determined which subject areas are related to conducting research. Second, the researcher identified the factors that influence consumers' buying intention of EVs. The researcher then selected the best approach for conducting the study. Next, the researcher applied the procedure and finally present the result.

3.3 Data Collection

In this research, primary data was collected using the quantitative method for this study. A self-administered and descriptive questionnaire was developed. The questionnaires were distributed online using Google Forms. The questionnaires were distributed to groups and individuals through various online platforms such as "WhatsApp, WeChat, and Messenger" during the time, and only 100 questionnaires were received.

3.4 Population and Sampling Techniques

In this study, the target population was the residents of Malaysia from 18 years old and above 60 years old that adopted from the research by Afroz *et al.* (2015), and especially the residents in the declared states. This age range is reasonable due to the considerable number of residents in Malaysia in this age range who obtained a driving license and have the possibility and ability to buy a new vehicle. Other researchers consider that the size of the family and the number of driving license family members (Zhang *et al.*, 2011) can affect the approval of NEVs by consumers. Besides that, the targeted respondents will be concentrated on the people who have jobs and salaries payment. Moreover, as shown in the scope of this study, a higher number of respondents were expected from the declared states (Selangor, FT (Kuala Lumpur / Putrajaya), Johor, and Penang), which relied on the high number of private vehicle drivers and vehicles and a high number of EV charging stations in the respective areas. In this research, a non-random sampling technique was used which was adopted from research done by Afroz *et al.* (2015). Convenient sampling was selected because the population is too large, and the population size is unknown which is impossible to include everyone. It is also simpler, inexpensive, and easy to conduct.

3.5 Data Analysis

In this study, 100 respondents answered the survey questionnaire, and the data were analyzed using IBM Statistical Package Social Science (SPSS) software. SPPS is a set of software programs that can analyze and manage a large amount of data with comprehensive statistical analysis. This software can help to convert the result into a table and graphical chart that show the analysis data in a simple form. Descriptive statistics tabulated and analyzed the basic features of respondents in the form of mean, percentage, and standard deviation. A Likert 5-point scale was implemented for evaluation of the responses rating from strongly agree to strongly disagree. The evaluation was based on the ranges illustrated in Table 1. Next correlation analysis is used as an inferential statistic to identify the relationship between both variables.

Table 1: Five-point Likert scale response level

Level	Arithmetic Average
Low	≤2.33
Moderate	≥2.33 and ≤3.66
High	≥3.66

4. Results and Discussion

4.1 Results

(a) Section A: Demographic of Respondents

Results can be presented in the form of tables, figures, charts, diagrams or other suitable formats. If required, raw data that is too lengthy to be put in this section can be moved to the appendix.

Table 2: Demographic of respondents

Demographic	Items	Frequency	Percentage (%)
Gender	Male	58	58.0
	Female	42	42.0
Race	Malay	35	35.0
	Chinese	49	49.0
	Indian	15	15.0
	Others	1	1.0
Age group	18-30 years old	75	75.0
	31-45 years old	18	18.0
	46-59 years old	7	7.0
	60 years old and above	0	0
Education level	Lower Secondary school	5	5.0
	Higher secondary school	3	3.0
	Diploma	4	4.0
	Bachelor's degree	83	83.0
	Master	4	4.0
	PhD	1	1.0
	Others	5	5.0
Marital status	Single	79	79.0
	Married	19	19.0
	Others	2	2.0
Household monthly income	Less than RM2000	39	39.0
	RM2001 to RM4000	38	38.0
	RM4001 to RM6000	15	15.0
	RM6001 to RM8000	4	4.0
	RM8001 and above	4	4.0
Current locality	Selangor	27	27.0
	FT (K. Lumpur / Putrajaya)	14	14.0
	Johor	35	35.0
	Penang	11	11.0
	Others	13	13.0
Car ownership	No car	24	24.0
	One car	63	63.0
	Two or more cars	13	13.0

(b) Section B: Factors That Influence Consumers' Buying Intention of EV

Table 3: Mean and standard deviation of influence of social media factor

	Item	N	Std. Deviation	Mean
SM1	I acquired information about EVs from the media.	100	.896	3.84
SM2	EVs have a positive reflection on society.	100	.771	3.97
SM3	I will consider buying an EV after evaluating information from the media.	100	.775	3.69
	Average of Mean			3.8333

Table 4: Mean and standard deviation of influence of celebrity factor

	Item	N	Std. Deviation	Mean
C1	I will use the EVs if my friends or peer are using them.	100	.820	3.56
C2	People who are important to me think EVs are good.	100	.833	3.56
C3	People usually influence my purchasing intention.	100	.943	3.60
C4	An EV would be a status symbol that represents one's success for me.	100	.997	3.42
	Average of Mean			3.5350

Table 5: Mean and standard deviation of influence of facilitating condition factor

	Item	N	Std. Deviation	Mean
FC1	Charging stations for EVs are available in my local surroundings.	100	1.002	3.63
FC2	Charging stations for EVs are available within my driving range.	100	.999	3.45
FC3	I am constrained by the lack of charging stations needed to use EVs.	100	1.145	3.32
FC4	I can get help from others when I have difficulties using EVs.	100	.990	3.30
	Average of Mean			3.4600

Table 6: Mean and standard deviation of influence of feature and design factor

	Item	N	Std. Deviation	Mean
FD1	EVs have better-advanced technology compared to traditional vehicles.	100	.583	4.06
FD2	EVs have an innovation, compare to traditional vehicles.	100	.795	4.07
FD3	I will buy an EV because it has a smaller engine compared to a traditional vehicle.	100	.790	3.77
FD4	I will buy an EV because it has a wider speed range compared to traditional vehicles.	100	.959	3.52
FD5	I will buy an EV because it has a lower noise level compared to traditional vehicles.	100	.724	4.04
FD6	EV has interesting car exterior and interior design.	100	.726	3.91
	Average of Mean			3.8950

Table 7: Mean and standard deviation of influence of price value factor

	Item	N	Std. Deviation	Mean
PV1	I want to save on fuel consumption.	100	.622	4.24
PV2	EVs are very economical for maintenance.	100	.940	3.62
PV3	At the current price, EVs provide a good value.	100	.989	3.35
PV4	EV costs less than a traditional vehicle.	100	1.041	3.37
PV5	I get a 50% reduction in road tax if I buy an EV.	100	.720	3.63
	Average of Mean			3.4925

Table 8: Mean and standard deviation of influence of environment concern factor

	Item	N	Std. Deviation	Mean
EC1	I want to preserve the environment.	100	.656	4.12
EC2	EV contributes to saving the environment.	100	.816	4.02
EC3	I am aware that EVs create less pollution.	100	.737	4.11
EC4	I intend to buy an EV because of the air pollution crisis in Malaysia.	100	.859	4.01
	Average of Mean			4.0650

(c) Section C: Consumers' Buying Intention of EV

Table 9: Mean and standard deviation of buying intention of EV

	Item	N	Std. Deviation	Mean
BI1	If I had an EV, I would favor driving it rather than driving my non-EV vehicle.	100	.627	3.97
BI2	I will likely use an electric vehicle.	100	.634	3.89
BI3	I expect to purchase an electric vehicle in the future.	100	.695	3.96
BI4	I would recommend others to purchase an EV.	100	.719	3.78
BI5	There Is a high probability that my next vehicle will be an EV.	100	1.044	3.40
	Average of Mean			3.8000

(d) Reliability Test

Table 10: Cronbach's Alpha for independent variables and dependent variables

	Cronbach's Alpha	No. of Item	Delete Item
Social Media (SM)	0.582	3	0
Celebrity (C)	0.758	4	0
Facilitating Conditions (FC)	0.862	3	1(FC3)
Feature and Design (FD)	0.775	6	0
Price Value (PV)	0.715	4	1(PV1)
Environment Concern (EC)	0.850	4	0
Buying Intention of Electric Vehicle (BI)	0.683	5	0

(e) Normality Test

Table 11: Normality test for independent variables and dependent variables

	Kolmogorov-Smirnova		
	Statistic	df	Sig.
Social Media (SM)	.209	100	.000
Celebrity (C)	.170	100	.000
Facilitating Conditions (FC)	.193	100	.000
Feature and Design (FD)	.119	100	.001
Price Value (PV)	.124	100	.001
Environment Concern (EC)	.140	100	.000
Buying Intention of Electric Vehicle (BI)	.144	100	.000

(f) Spearman Test

Table 12: Spearman correlation for the relationship between influential factors and buying intention of EV

Correlations								
		SM	C	FC	FD	PV	EC	BI
Spearman's rho	SM	1.000						
	C	.474**	1.000					
	FC	.305**	.363**	1.000				
	FD	.375**	.296**	.420**	1.000			
	PV	.421**	.386**	.519**	.467**	1.000		
	EC	.283**	.269**	.218*	.616**	.159	1.000	
	BI	.528**	.362**	.306**	.576**	.490**	.373**	1.000
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

(g) Multiple Regression Model Analysis

Results can be presented in the form of tables, figures, charts, diagrams or other suitable formats. If required, raw data that is too lengthy to be put in this section can be moved to the appendix.

Table 13: Model Summary and Durbin-Watson Test for Autocorrelation

Model Summary					
Model	R	R Square	Adjusted R Square	Std. The error in the Estimate	Durbin-Watson
1	.615a	.378	.371	.40001	1.838
a. Predictors: (Constant), avIv					
b. Dependent Variable: avBI					

4.2 Discussions

(a) Section A: Demographic of Respondents

According to the questionnaire, section A is the respondent's demographic which consists of 8 items which include gender, race, age group, education level, marital status, household monthly income, current locality, and car ownership. Based on the respondents, most of the respondents who responded to the questionnaire were male which involved 58% (58 people) and female 42% (42 people). Almost half of the workers there are Chinese which involved 49% (49 people). Most 75% (75 people) of respondents were in the age group of 18 to 30 years old. Almost all the respondents have bachelor's degree backgrounds which are about 83% (83 people). Most accounted for 79% (79 people) of the respondents who are single. 39% (39 people) of respondents whose household monthly income is less than RM 2000 were more in comparison. 100 respondents came from various states, among the majority, Johor involved 35% (35 people). The majority of respondents owned one car involving 63% (63 people). Therefore, the person who owned one car will be more likely to seek a second car which involved a higher probability to have buying intention for EVs.

(b) Section B: Factors That Influence Consumers' Buying Intention of EV

This research revealed how automotive engineers or manufacturers could devise strategies to implement EV sales among Malaysian consumers in terms of social media, celebrity, facilitating condition, feature, and design, price value, and environmental concern, as the major predictors of consumers' buying intentions of EVs.

Most of the respondents noticed that EVs have a positive reflection on society and had a good impression of EVs which could lead to a higher probability of buying intention of EVs (Sang & Bekhet,

2015). Therefore, the government should coordinate green car campaigns and teach the younger generation online by using social media as one of the channels to expose the younger generation to green practices in an effective way (Tan *et al.*, 2017). The average mean score of 3.833 is considered high meaning that the media or the press played an important part in drawing exposure to electric cars for marketing effects.

The buying intention of EVs for most respondents can be influenced by other people related to self-image and social needs. If other people around them are using EVs or people who are important to them think EVs are good, it would affect their buying intention of buying EVs. Khazaei (2019) claimed that the younger generation prefers to imitate the group of tech-savvy peers or celebrities with whom they socialized and, consequently, media and celebrity influence could play an important impact in this study since the majority of respondents of this study are young students. However, the average mean score of 3.535 is considered moderate but the average mean is very close to the upper limit of moderate level which is 3.66. Therefore, it can be said that celebrities or surrounding peers play moderate tools in influencing consumers to buy EVs.

The facilitating factor's average mean score is 3.46 which considers average. The most common issues with EVs are restricted coverage, charger availability, and higher vehicle buying prices (Axsen & Kurani, 2013). Only four states have more than 20 charging stations in Malaysia which show that there is still a lack of infrastructure available in Malaysia especially EV charging stations and after-sale service facilities (Khazaei, 2019). The respondent selected is all from these four states which again that the facilitating factors is not a major issue to the respondent from these states.

The mean average for feature and design factors is 3.895 which is considered high. A consumer who is enriched with product knowledge will demonstrate their interest in the style and design nature of the product (Tan *et al.*, 2017). Therefore, these feature and design factors stimulate interest among buyers to test out new vehicle models, and car manufacturers might continually update consumers on the progress of innovations in electric vehicle features such as battery longevity, charging time, and speed range.

The buying intention of EVs is mostly due to cost savings. If the respondents considered the long-term advantages and found that the EVs had a strong cost-saving value relative to traditional vehicles, this could lead to a greater possibility of buying intention of EVs. This is because most of the respondents are from the category of lower household income which might lead to the concern about saving costs on fuel consumption. The average mean for the price value factor is 3.4925. which is considered moderate. Respondents moderately consider the price value could be cost-effective, therefore a smart approach to encourage more consumers' buying intention of EVs by providing government incentives for buyers which will reduce the price and give more value to consumers.

The environmental concern factor average mean is 4,065, which is considered high. The buying intention of the respondents could be influenced by environmental concerns. This can be said that, if they noticed that EVs emit zero emissions relative to the traditional car and contribute to saving the environment, most of the respondents could have greater buying intention toward EVs. Public awareness and information on climate change and energy conservation will undoubtedly continue to increase the level of consumers' knowledge, which in turn will have an impact on the level of green vehicle adoption (Sang & Bekhet, 2015).

(c) Section C: Consumers' Buying Intention of EV

Buying intention means the evaluation of the degree to which individuals have consciously planned to take or not take certain actions in the future. The majority of respondents proved that their buying intention is encouraged, except for one aspect, namely BI5 (There is a high probability that my next vehicle will be an EV). This may be due to certain factors or conditions that do not allow certain respondents to buy them, resulting in weaker buying intentions for EVs. For example, the most

influential factor in this study that caused low consumers' buying intention of EVs is the lack of facilitating conditions which is similar to the result from the research by Khazaei (2019). Organizing workshops and road shows to explain the advantages of EVs would cause the value of converting to EVs to be tested by people. More pilot and demonstration projects would help raise the share of EVs, such as the installation of charging stations to offer free charging. At the same time, rewards should be created by the appropriate organizations to offer good financial benefits for consumers who desire to move to EVs.

4.3 Discussion in Reliability Test, Normality Test, Spearman Correlation, and Multiple Regression Model

The six factors that influence consumers' buying intention of EVs are evaluated in a reliability test. If the reliability test is low, consumers' buying intention of EVs is low while the reliability test is high, and consumers' buying intention of EVs is high as well. In the reliability test, Cronbach alpha is an assessment and test to analyze trust. All of the factors are trustworthy and acceptable since the Cronbach alpha test had exceeded the 0.5 limits which shows that all the factors have a positive and significant correlation to buying intention of EV. Next, six influential factors of consumers' buying intention of EV undergo normality tests and are found to be not normal. This is because, the probabilities of all factor's variables data are significantly different from normal ($p < 0.005$), which indicated that the data are not normal in the Kolmogorov-Smirnov test. The test rejects the null hypothesis of normal testing under the large sample size. Spearman correlation test is a statistical test that shows the relationship between two or more Ordinal scale variables. While the most influential factor that affects the consumers' buying intention of EVs is feature and design (FD) and facilitating condition (FC) is the weakest influential factor. Based on the normality test, all the factors show a positive result and had the symbol "**", which shows that all the factors have a significant relationship. Whereas, based on the multiple regression model analysis shows that the independent variables (IV are significant predictors of buying intention (BI) as the p-value is 0.000 which <0.05. 05. While the VIF results show that 1.000 which is less than 10, means that the value is acceptable. In conclusion, all the influential factors declared in this study have a positive and significant relationship with the consumers' buying intention for EVs.

5. Conclusion

In conclusion, the sole purpose of this research was to determine whether the six IVs were significant to influence the DV (consumers' buying intention of EVs). In this study, the researcher found that the data in the Kolmogorov Smirnov is not normal since the significant value of all IVs was below 0.005. Spearman's Correlation was used to identify the most influential factor that influences consumers' buying intention of EVs in objective 1 and split data using Spearman's Correlation was used to identify the most influential factor that affects consumers' buying intention of EVs.

Multiple regression model analysis was used to evaluate the level of consumers' acceptance of electric vehicles (EVs) which will affect the buying intention toward EVs in Malaysia in objective 2. By referring to the results of the analysis, all of the six IVs (social media, celebrity, facilitating condition, feature and design, price value, and environment concern) have a positive relationship with the consumers' buying intention of EV since the value for all IV is $p < 0.000$.

Based on the result, we can conclude that among all the IVs, feature, and design (FD) has the most significant and strongest relationship with the consumers' buying intention of EV; buying intention of EV, whereas facilitating condition (FC) is the weakest. The researcher also found that feature and design (FD is the main factor that affects the consumers in buying EVs. Besides, facilitating conditions (FC) should be improved cause of the low correlation with consumers' buying intention of EVs. This finding is also in line with the average mean score whereas among all the factors, environmental concern, social

media and design, and features scored on the high side among the respondent while the celebrity, price value, and facilitating condition factors are considered moderate.

Since the facilitating conditions have the weakest relationship with buying intention and the average mean is at a moderate level it shows that the respondents are not concerned with these issues since they are from states that have more than 20 EV charging stations. Therefore, the government and private firms should provide more charging stations in the states that have fewer EV charging stations which in return will ease consumers on these issues and will encourage more people to use EVs in Malaysia. This study also has implications to increase the awareness of Malaysian of the importance of purchasing green products and raising the awareness of the EV engineer, domestic or foreign manufacturers, and the government to improve and maintain the transportation systems in Malaysia.

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