FACTORS INFLUENCING CONSUMERS' INTENTION TO ADOPT HYBRID ELECTRIC VEHICLES (HEV) IN MALAYSIA

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DECLARATION

I hereby declare that:

(1) This Research Project is the end result of my own work, and that due acknowledgement has been given in the references to all sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) The word count of this research report is 18,728 words.

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ABSTRACT

The main purpose of this study is to investigate the factors that influence the adoption of hybrid vehicles in Malaysia. This study also aims to contribute to a better understanding of the consumers behaviour that leads to the adoption of hybrid vehicles. A total of 211usable questionnaires were coded and analysed. Statistical techniques such as descriptive analysis, independent samples t-test, one-way ANOVA, factor analysis, and regression analysis were used in this study. The regression analysis results showed that relative advantage, compatibility, pro-environmental, and subjective norms were positively related to the adoption of hybrid cars in Malaysia. However, perceived behavioural control was found not to have a relationship with the adoption of hybrid vehicles. Attitudinal factors and perceived behavioural control are important determinants for the adoption of hybrid vehicles. Marketers can use these results to segment their market. Future study should look into the factors influencing the adoption of hybrid vehicles by early users rather than potential users.

1.0 INTRODUCTION

In this Chapter, the research is about the background of the study, problem statements, research questions, objectives, hypothesis statements, and significant of study.

1.1 BACKGROUND

Human civilization has advanced tremendously with the new quick expansion of the global economy and technology in this decade. However, with the fast pace of advancement, it has also wreaked havoc on the worldwide ecological ecosystem (Tu,2002). Climate change and carbon emission issues has become one of the biggest ordeals on this millennium, thus has also become an important worldwide issue. Because of continual and out-of-control releases of deadly atmospheric pollutants from a range of human activities, the world is also experiencing serious difficulties with energy scarcity, air pollution, and greenhouse gas emissions. (Sang and Bekhet, 2015). Burning of fossil fuels is one of the major causes of this problem. Therefore, throughout the century, mankind is trying to come out with various solutions to the issues on salvaging the environment and its sustainable development.

Since most modes of transportation require burning of fossil fuels, The transportation sector has become a major contributor as a major emitter of carbon dioxide, ranking second only to electric power as the world's greatest source of carbon emissions (IEA, 2006). One of the most significant contributors to increased greenhouse gas emissions has been the transportation industry, as millions of gasoline-powered vehicles travel the roads at all hours of the day and night, emitting carbon dioxide (Larson et al., 2014; Klöckner et al., 2013; White and Sintov, 2017). According to the International Energy Agency (IEA), the transportation sector contributes roughly one-fourth of total global greenhouse gas emissions, which are expected to rise from 23 to 50 percent by 2030 (IEA, 2009). Reducing carbon emissions from the transportation sector can help to alleviate critical environmental issues (Schuitema et al., 2013; Larson et al., 2014). In addition, there is also concern

on the uncertain future of the accessibility of fossil fuels and stricter rulings on carbon emission which has become the world's biggest challenge for the car industry.

To address the issues of oil price volatility and the requirement for a security strategy in many nations that rely on oil imports, an alternate option is required for sustainable mobility (Electrification Coalition, 2009). To impede these issues, for the past years, various facets of the development of environmentally friendly transportation have been investigated through research to promote a more sustainable economy as well as to mitigate the global environment concerns. It has been widely agreed that decarbonizing this sector and switching to electrification is significant in reducing carbon emissions and dependency on fossil fuels. This can be done through the switching of using gasoline-based automobiles to green technology vehicles. In most nations, the development for fuel-efficient and alternative-fuel vehicles has become one of the primary goals of the automobile industry. A variety of viable alternatives replacements to the typical standard diesel or gasoline combustion engine has been available, thanks to the advancement of technologies in this era (IPW, 2014).

The introduction of electric vehicles (EVs) is a significant breakthrough that has the most prominent sustainable responses to enhance fuel efficiency and reduce emissions (Egbue, O., Long, S., 2012). Electric vehicles are an energy-efficient mode of transportation innovation that has been identified as one of the most optimistic strategies to reduce carbon emissions in the transportation industry (Klöckner et al., 2013; Schuitema et al., 2013; Li et al., 2016). EVs have advantages over typical gasoline vehicles in terms of fuel efficiency and carbon emissions reduction. (Lieven et al., 2011; Egbue and Long, 2012). In a research done by Romm in 2006, it is said on average, EVs vehicles is able to reduce carbon emissions by 30–50 percent and enhance fuel efficiency by 40–60 percent as compared to conventional vehicles. Researchers and environmentalists regard EVs as a great substitute and promising solution for a lot of environmental concerns (Graham-Rowe et al., 2012; Wang et al., 2017). EVs registrations worldwide have risen from 6000 in 2010 to 750,000 in 2016, with predictions that the plug-in

passenger light duty vehicle stock will reach 150 million by 2030 (Cazzola et al., 2016).

Electric vehicles (EVs) are cars that rely only on onboard electrical battery packs for motive power and can be charged using a plug in an electric outlet (Egbue and Long, 2012; Wang et al., 2017). Presently, the EVs on the market not only include Battery Electric Vehicles (BEVs), but also Hybrid Electric Vehicles (HEVs), Plug-in Hybrid Electric Vehicles (PHEVs) and Extended-range Electric Vehicles (E-REVs). In comparison to other EVs, BEVs fully employ an electric motor and batteries as the primary power source and are considered to have the largest battery capacity and the longest pure-electric driving range (Wenbo et al., 2017). HEVs is vehicles that uses two different types of power energy sources. The different types of power that they use are either with diesel or petrol engine and battery motor. The battery in HEV is charge by getting the energy from the internal combustion engine and through regenerative braking as it cannot be charge through an outlet. A PHEVs and E-REVs are similar in their functions as it is a new form of HEVs with a larger battery capacity and the ability to charge from both the grid and a plug-in charger (Wenbo et al., 2017).

Governments all across the world are enacting policies and programmes to minimise carbon emissions (Ustun et al., 2011). Malaysia has the world's third-highest automobile ownership rate, with 93 percent of the population owning one vehicle and 54 percent owning several vehicles (Channel News Asia, 2015). Malaysia's total energy consumption is dominated by the transportation sector, which consumes the second most energy behind the industrial sector. This has caused Malaysia to be highly dependent on energy sources. Transportation sector in Malaysia accounts to about 40 percent of Malaysia’s total energy consumption (Ministry of Transport Malaysia, 2010). As a developing country, Malaysia is put into considerable pressured to increase its energy productivity and lower its carbon emissions by adopting and committing to a sustainable development model that protects the environment. (Adnan et al., 2018).

The government of Malaysia has noticed the importance and benefits of adopting EVs and thus has promised and pledged to cut and reduce carbon emissions by as much as 45% by the year 2030 at the United Nations Climate

Change Conference (UNFCCC) in Copenhagen in 2009. Since 2011, the Malaysian government has been aiming to increase and speed up the development of the transportation industry in order to achieve zero-emission mobility. By 2020, they want to see a 10% rise in the number of ecologically friendly automobiles on Malaysian roads (Ministry of Transport 2010). Malaysian also aimed to have 5 million EVs by the year 2020 to be driven on Malaysian roads (The National Council of Malaysia, 2012) and measures and efforts have been made to encourage their use (Adnan et al., 2017).

Electric Vehicles is an emerging technology and in Malaysia's automotive sector, it is relatively new (Hong et al., 2013) and they are still in its growing stage. As such public acceptance and diffusion towards the electric vehicles are relatively fresh in Malaysia and only few studies have been performed on this modern and new technology acceptance (Adnan et al., 2016; Sang and Bekhet, 2015). Among the different types of EVs that are available in the Malaysia market, HEVs variant are more commonly available and accepted as choice of electric car variants. This is due to those fully electrical vehicles requires its consumers to significantly change their usage behaviour and habits which are hard to achieved for country like Malaysia that has just started to familiarize with the technology. With HEVs consumers just need to make minor behavioural and habits changes to get started. As such, HEVs adoption may be more practicable and realistic than a full EVs (Wang et al., 2016). Therefore, for the context of this study, the research is focus on the HEVs market in Malaysia.

Rather than one or the other, HEVs it is powered by a petrol or diesel engine and an electric motor. HEVs is considered the most innovative products in today automobile industry as it configures to provide higher fuel efficient and long-term cost savings (The Star, 2008). The number of consumers purchasing hybrid cars have shown an incremental trend worldwide in recent years as they realized the benefits provided by the hybrid vehicles which are to help the drivers to reduce their carbon footprint as it can help to reduce carbon dioxide emission. The best of HEVs is that, as they employ a system that combines fuel and electricity together, HEVs users can help to make the world a greener place while also saving money on fuel

without sacrificing power or speed while keeping performance comparable to regular automobiles.

Unlike other type of EVs, HEVs do not need to be plugged into an electric grid to refuel which could provide solutions to many factors and problems that cause drawbacks in adopting EVs such as with insufficiency of public electrical charging points, and poor battery life with expensive replacement expenses (Pierre et al., 2011; Axsen & Kurani, 2013). Besides, as price of petroleum is surging in the market as the resource is diminishing, the use of less fuels by HEVs can helps to minimise the country's reliance and dependency on imported oil as well as lowering its price domestically. Thus, automobile manufacturers are putting more effort in producing hybrid automobiles to fulfil the demand.

There is a very big potential on Hybrid vehicles markets development and growth and most countries are looking for its way to expand in this industry. Since 2017, electric automobiles have grown in popularity, with several governments declaring that they will phase out their reliance on fossil fuels and internal combustion engines by 2040 (Ministry of Transport Malaysia, 2018). To achieve this goals, Ministry of Transport (MOT), International Trade Ministry of Industry (MITI) and Department of Energy, Green Technology and Water (MEGTW) are uniting and collaborating on an integrated project to support and enhance the structure and plan for electric cars framework in Malaysia (MITI, 2013). With that, in 2014, Malaysia became a regional automotive centre for electric vehicles, achieving the goals set forth in the 2009 National Automotive Policies. The process of manufacturing safeguards and protects consumers' interests on a long-term, resulting in safer, higher-quality products at more competitive and affordable rates (MITI, 2014).

In addition, as the ringgit falling in value and our economy slowing, everyone is looking for ways to save money. Refuelling one's car is undoubtedly one of the most expensive expenses for Malaysians, especially now that the price of gasoline has risen. As such, automobile manufacturers are now aware of their customers' issue and are working to enhance their vehicles' engines so that drivers may obtain more miles for less money. Continuous EVs technology development is a critical factor in improving EV performance and ensuring its competitiveness.

1.2 PROBLEM STATEMENTS

Although it is reported that the sales of HEV in Malaysia has positive future and hybrid vehicles are one the best alternative to conventional vehicles, however in Malaysia, total hybrid car sales are still very low and limited when compared to non-hybrid vehicle sales in the automotive sector. As compared to China, US, Japan and Europe market, hybrid vehicle in Malaysia is still considered to be relatively new on the markets. As seen on **Figure 1**, Malaysia is nowhere leading in the hybrid vehicle. The position of Malaysia in hybrid vehicles market is still a drop in the bucket compared from the volume in advanced markets. This statistic was gained from an online article in Automotive IT website written by Paul Fisher in 2018.

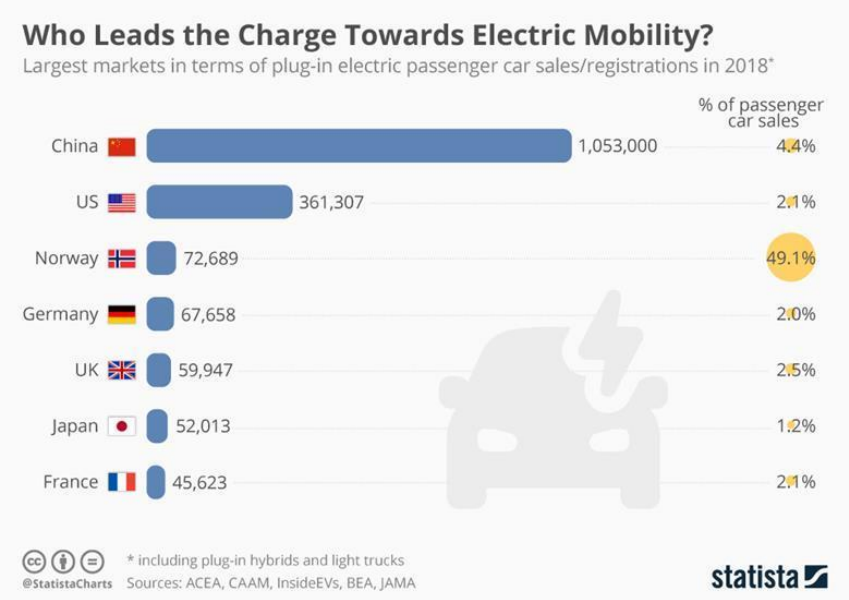


Figure 1: Electric Vehicle Market Percentage of Leading Countries in the World

The market is still in its early stages, and the number of electric vehicles currently on the road is still quite tiny in comparison to conventional automobiles as consumers have yet to fully accept the concept of electric vehicles. According to the Malaysian Automotive Association (MAA), overall hybrid and electric vehicle sales in Malaysia in 2019 amounted for only 2.2 percent of the 604,287 units delivered by automakers. This has shown that the advantages offered by the electric vehicles are not enough to persuade consumers to adopt it. Despite the claimed benefits of electrifying the conventional vehicle for the environment, the number of

hybrid cars in operation is currently still modest and uptake has been lowered than planned (Adnan et al., 2017; Morton et al. 2016). One factor for the low adoption rates is that customers' perceptions and views about hybrid vehicles have a big role in their acceptability. Therefore, it is crucial to learn more about the aspects that are likely to influence a customer's decision purchase a hybrid vehicle.

Despite efforts to reduce pollution and overly usage of fossil fuels, the number of hybrid vehicles on the road is still limited. One key problem is that HEV adoption is heavily reliant on private customer acceptability, and their readiness and willingness to embrace this form of transportation is still not strong (Schuitema et al., 2013). From a business standpoint, poor growth in hybrid car sales could result in losses for hybrid vehicle makers, forcing them to exit the industry. Because they are high-involvement items, they come with a hefty price tag in terms of financial, psychological, and other hazards with adopting it (Barbarossa et al., 2015; Petschnig et al., 2014). Some obstacles and shortcomings that may impede consumers to adopt hybrid car are the high purchasing costs, short driving distance, low resale values and the complicity of the technical operation (Brand et al., 2017). Although the manufacture and use of eco-car endorsements assist to reduce domestic gasoline consumption, eco-car performance is slightly less powerful than that of a conventional car. With these limitations, users may regard hybrid vehicle as inferior.

Previous research has linked it to innovation related perceived risks, such as economic loss and psychological anxiety and concern. Moreover, the high cost of batteries has put EVs at a disadvantage since the cost of an electric vehicle is much higher than that of a regular internal combustion engine vehicle. In addition, there are concerns concerning the battery's life cycle and safety features have been raised. Furthermore, it was also observed that the future of hybrid cars in Malaysia is still uncertain and unknown as electric vehicles sales are struggling to attract customers, particularly due to the weak industry infrastructural development. Malaysians are still warming to the notion of buying hybrid cars, and it will take an amount of time to raise awareness of the benefits of owning one.

Only few studies have been conducted in Malaysia that focuses on the consumers' level of intention, main influencing variables and factors, and

impediment purchasing hybrid vehicles. This has caused a knowledge and information gap between transportation policymakers as well as the automakers and marketers in Malaysia. There is very limited information disclose about how well electric vehicles are received and accepted from the Malaysian customer's perspectives. Public acceptability can act as a major roadblock to market spread and stifle the advancement of technology adoption. Researchers believe that the outcomes have a significant impact in providing visions that will help policymakers and consumers to better understand the importance of bolstering environmental sustainability ingenuities to reclaim the success of such programmes (Schneidereit et al, 2015).

Despite the fact that green marketing initiatives and efforts are increasing and continue to grow, but according to Haytko and Matulich (2008), marketers still lack of effective techniques and do not have adequate tools for measuring green marketing success, determining consumers' environmental views, purchase intent, and consumer behaviour regarding green marketing. Because of the lack of information and knowledge in the Malaysian market, only a few car manufacturers introduced them at small production in Malaysia. Due to a dearth of knowledge on the country's eco purchasing intentions and customer behaviour toward eco automoniles, companies, local and international marketers faced the challenge of devising appropriate and successful marketing strategies to meet those aims. Therefore, it is important and critical to learn more about the factors and aspects that are likely to influence a customer's decision to purchase a hybrid vehicle.

This research is to study whether consumer attitudes towards electric vehicles, subjective norms, and perceived behavioural control, technology acceptance, and environmental awareness have any bearing on consumers adoption intention and decisions for environmentally friendly vehicles. There is a scarcity of empirical research that connects and link these variables together to examine their impact and effects. Furthermore, the conflicting and inconsistent results and outcomes from prior studies on hybrid vehicles purchase prediction has raise the needs to further investigate these variables.

1.3 RESEARCH QUESTIONS

It can be observed that it is difficult to get widespread adoption of HEVs in Malaysia. Therefore, the questions that this study would like to find out through this research is that what could have led to the slow sales in hybrid markets and what are the attribution that contribute to the consumers choices in their transport preferences. A solution must be developed in order to improve hybrid vehicle sales. To come up with a viable answer, automakers must first comprehend the current market situation, as well as the reasons and factors that drove hybrid vehicle acceptance.

As hybrid electric vehicle adoption is essentially associated to customer choice and remaining primarily in the realm of individual decision-making, thus, determining the factors that encourage and prevent their adoption at the individual level is critical (Liu et al., 2019). To move on, firstly, this study will investigate if consumers who want to buy a hybrid automobile are willing to pay a higher price in compared to conventional vehicles, and how do the additional benefits that come with owning a hybrid will pay off? Next, this study would also like to find out is consumer understanding of hybrid cars also a factor in their decision to buy one? Is the evolution of technology influencing customers' purchase intention from a technological standpoint? As better understanding demand for HEVs is critical for designing more effective adoption policies (Sheldon et al., 2017), these efforts would be aided by a better understanding of the consumer decision-making process, including factors that would increase acceptance (Axsen et al. 2015; Barbarossa et al. 2015; Mortan et al., 2016) and perceived risks that might limit uptake (Doorn & Verhoef, 2015; Hüttel et al., 2018).

By posing the following questions, the current study addresses gaps in existing knowledge as well as the difficulties described in the preceding paragraphs:

1. What is the relationship between relative advantage and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?
2. What is the relationship between compatibility and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?

3. What is the relationship between pro-environment and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?
4. What is the relationship between subjective norm and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?
5. What is the relationship between perceived behavioural control and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?

1.4 RESEARCH OBJECTIVES

The purpose of this research is to examine the elements and factors influencing consumers intention and decision to adopt hybrid electric vehicles (HEV) in Malaysia. The intention and motivation for this study is the believe that low penetration rate and low owners of hybrid vehicles in Malaysia are attributable to lack of research into the Malaysian adoption of hybrid electric vehicles. This study also aims to contribute to a better understanding of the consumer behaviour that leads to the adoption of hybrid vehicles.

As such, the objectives for this research are:

1. To examine the relationship between the independent variables (attitude, subjective norm, perceived behavioral control) and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia.
2. To contribute in the understanding of the consumers behaviour that leads to the adoption of hybrid electric vehicles (HEV) in Malaysia.

Hence, the role and integration of attitude, subjective norm, perceived behavioural control, demographic factors, technology acceptance, and environmental knowledge in affecting hybrid vehicles purchase intention will be further explored. Up-to-date research are needed to help companies and marketers identify and understand consumers' wants for environment-friendly vehicles and to assist in developing market solutions. These findings will also be used to provide managerial insights for legislators and manufactures into potential consumers' behaviour of HEVs. Consequently, the focus of this research is on determining ways

to improve customer acceptability of hybrid electric cars and exploring the circumstamces that influence consumer acceptance of hybrid electric vehicles.

1.5 HYPOTHESIS STATEMENTS

H1: There is a significant relationship between **relative advantage** and consumers intention to adopt hybrid electric vehicles in Malaysia.

H2: There is a significant relationship between **compatibility** and consumers intention to adopt hybrid electric vehicles in Malaysia.

H3: There is a significant relationship between **pro-environment** and consumers intention to adopt hybrid electric vehicles in Malaysia.

H4: There is a significant relationship between **subjective norms** and consumers intention to adopt hybrid electric vehicles in Malaysia.

H5: There is a significant relationship between **perceived behavioural control** and consumers intention to adopt hybrid electric vehicles in Malaysia.

1.6 SIGNIFICANT OF STUDY

For more than a decade ago, the International Trade and Industry Ministry has said to revise the National Automotive Policy to encourage domestic automakers to produce and develop Electric vehicles. As Malaysia has yet to make much progress in terms of promoting electric cars, the Malaysian government has stated its strong intention and commitment towards developing, strengthening and improving the transportation system. To promote and encourage the use of EVs in Malaysia, the government has taken a variety of steps and initiating number of policies, including subsidising the purchase of electric vehicles. In addition, the government has made a special effort in its eleventh five-year plan that are taking into account the advancement and manufacture of electric vehicles (Sang and Bekhet, 2015; Zhang et al., 2011). Thus, in this research, the study is to investigate

the factor of perceived behavioural control with customer intention to adopt HEV and determine their effects in consumers adoption intention behaviour. Hence, by getting the result, more evidence can be collected to support how importance government policies and subsidies is towards the adoption rate of HEV in Malaysia.

In 2009, Malaysia government has announced a 10-city-thousand-vehicles effort to encourage the growth of electric vehicles and to promote and stimulate the usage of electric vehicles. Nonetheless, even with these efforts and policy initiatives that have been take on, consumer reaction and support on electric cars adoption are still insufficient and below expectations (Sang and Bekhet, 2015). This indicates that government incentives and rebates to encourage the adoption of HEVs has not been very successful. The lack of enthusiasm for electric vehicles among customers highlights the need to look into the links between policy measures and EV acceptance. This research also assessed other factors like relative advantage, compatibility, pro-environment, and subjective norm separately. Therefore, through this study, it can validate whether how other factor has any contribution towards the consumers' behaviour in HEV adoption.

Automakers are becoming more aware of the residual consequences of automobile production as a result of the technological revolution, and they are attempting to employ technology to reduce greenhouse gas emissions by prioritising the usage of electric automobiles. In line with this target, Malaysia Automotive Institute (MAI) CEO Datuk Madani Sahari announced that Malaysia plans to debut and launch entirely green vehicles by 2025, representing a 100 percent green vehicle penetration rate, up from 42.8 percent in 2016. Datuk Madani also expects that by 2025, all new models marketed in Malaysia would be environmentally friendly (Ee, 2017). Owning a green vehicle contributes to citizens' increased obligation to be more responsible and appreciative of the environment, as well as the future's sustainability. The significant results discovered in this research are beneficial to aid local automakers to build hybrid electric vehicle that can meet the preferences of their consumers. Manufacturers can plan and develop marketing strategies accordingly to result in more green automobiles being delivered to customers. Thus, by encouraging local manufacturers to develop green automobiles on a constant

basis and encouraging customers to choose green cars, Malaysia air pollution can be greatly reduced.

CHAPTER 2 : LITERATURE REVIEW

2.0 INTRODUCTION

Several researchers have strived to study the values, benefits, and hazards that influence the EV market's development by examining data collected from a variety of persons, drivers, and businesses; where they defined consumer adoption of an innovation as a behavioural response that comprises of the purchase and use of the innovation (Schuitema et al., 2013; Huijts et al., 2012; Jansson et al., 2010). This behavioural response has been linked to a variety of antecedents or predictors. The second chapter provides an overview of the Theory of Planned Behavious idea. Following that, previous literature research is examined using the selected factors. In addition, this research shall use the given theoretical framework as the research foundation.

2.1 THEORETICAL DISCUSSION: TECHNOLOGY ACCEPTANCE MODEL

The technology acceptance model (TAM) is a theory that studies how people embrace and accept technology. Because it is widely used in research, the technology acceptance model has been working on studying technology acceptability for a long time. Davis (1986) developed the Technology Acceptance Model, which deals more in depth and specifically with the prediction of the acceptance of an information system, with the goal of assessing or interpreting the usage behaviour of information technology users, based on the theory of reasoned action. Researchers Davis and Venkatesh (2000) also presented expanded technology acceptance model by introducing subjective social variables norms. And as HEV is a new leading-edge technologies, Peters and Dutschke (2014) also utilized the developed and broaden technology acceptance model to interpret and explore further on adoption intention.

The goal of this model is to anticipate a tools or system's acceptance and to indicate the changes that must be made to the system in order for it to be acceptable to users. According to this approach, an information system's acceptability is defined by two key factors which are perceived usefulness and perceived ease of use. Perceived usefulness and perceived ease of use are regarded independent factors in the Technology Acceptance Model, while attitude, behavioural intention, and usage behaviour are considered dependent variables. It promotes the idea that perceived usefulness and perceived ease of use will influence one's attitude toward technology. In addition, the model also takes into account and considers the influence and impact of external variables. As a technique of explaining user behaviour and attitude, external influences will also influence intention, perceived usefulness, and perceived ease of use. According to Legris et al. (2003), the technological acceptance paradigm can basically represent how external influences influence internal "attitude," "belief," and "behavioural intention."

The amount to which a person believes that using a system would improve his performance, such as when the individual believes in the new system's positive and beneficial effects on the task or work, is characterised as perceived usefulness. Perceived ease of use, on the other hand, is the degree to which a person believes that using a system would be simple and easy. Perceived ease of use refers to an individual's perception of how difficult it is to utilise a system. The Technology Acceptance Model suggests that the use of an information system is determined by the behavioural intention, and meanwhile, the behavioural intention is dictated by the person's attitude toward the use of the system and also by their perception of its utility, as demonstrated by the Theory of Reasoned Action. Individual attitude is not the only thing that influences whether or not they employ a system, but rather it also depends on the impact it may have on their performance. The perceived usefulness of new technology influences the user's view of its ease of use, and vice versa. Both have a positive relationship and linked in a favourable way.

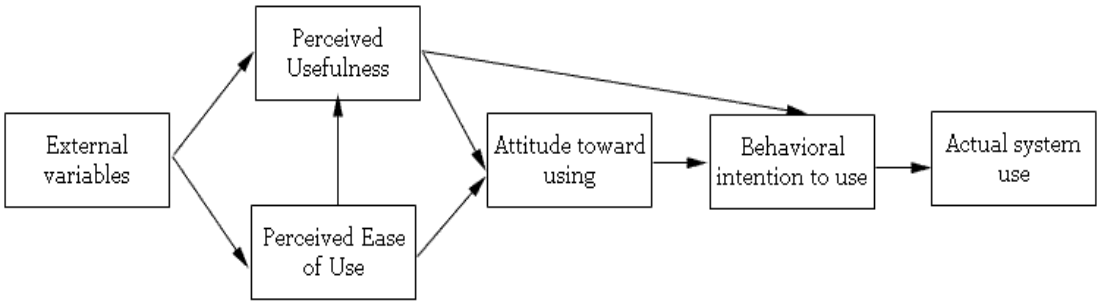


Figure 2: Technology Acceptance Model

2.2 THEORY OF PLANNED BEHAVIOUR (TPB)

Several hypotheses and theories have been proposed to explain human behaviour. The theory of planned behaviour (TPB) is the most commonly mentioned theory on the attitude-behaviour relationship (Ajzen 1991). The Theory of Planned Behaviour (TPB) claims that humans make decisions based on logical appraisals of inputs and the consequences of those actions and decisions (Ajzen, 1991), with intentions predicting this behaviour directly. There are four key elements of the notion of planned behaviour that help to explain human behaviour which are attitudes, subjective norms, perceived behavioural control (PBC) and demographics effects. These variables determine the intention to conduct in the behaviour, as well as the intention to engage in the behaviour, which has direct impact on behaviour (Ajzen,1991). The decomposed theory planned behaviour model also incorporates concepts from the literature on innovation which are relative advantage, as well as compatibility.

According to Theory of Reason Action (TRA) and Theory of Planned Behaviour (TPB), certain behaviours of individuals are determined by their "behavioural intention", which is simultaneously influenced by the "attitude" and "subjective norm" of individuals regarding a given behaviour. Individual willingness to engage in a behaviour is measured by behavioural intention, whereas subjective norm relates to the expected social pressure that an individual would face when engaging in a behaviour. It also offers a thorough understanding of how an individual's attitude, subjective norms, and perceived behavioural control might

influence his or her inclination to embrace or acquire innovative products (Taylor and Todd, 1995b).

According to the TPB, Human action is guided by three types of reflections; beliefs about the likely outcomes of the behaviour (behavioural beliefs), beliefs about the normative expectations of others (normative beliefs), and beliefs about the presence of factors that may help or hinder the behaviour's performance (Ajzen, 1991). Behavioural beliefs, taken as a whole, produce a favourable or unfavourable attitude toward the behaviour; normative beliefs produce a subjective standard; and control beliefs produce the outcome of perceived behavioural control over the behaviour's execution. The formation of a behavioural aim was influenced by the attitude, subjective norm, and perceived behavioural control. The TPB also allows for the inclusion of other factors and extra variables if they are specified that these variables contribute significantly to the explanation of the model's predicted behaviour (Ajzen, 1991).

The subjective norm has a higher impact on behaviour intention when it is more firmly impacted and strongly influenced. Individuals' expected process control when participating in a behaviour, namely the difficulties experienced when participating in a behaviour, is measured by perceived behavioural control. Individuals' resources and opportunities to engage in the behaviour are reflected in this component. Therefore, as shown in Figure 3, TPB contends that in addition to attitude toward behaviour and subjective norm, perceived behavioural control also influences and affects behavioural intention. In the TPB framework, attitudes are also predicted by perceived feasibility of the decision or perceived behavioural control (PBC), as well as perceived expectations of a particular group of individuals or subjective social standards. According to the theory, the more a consumer believes a behaviour is a social norm, the greater the likelihood he or she is to engage in it (Ajzen, 1991).

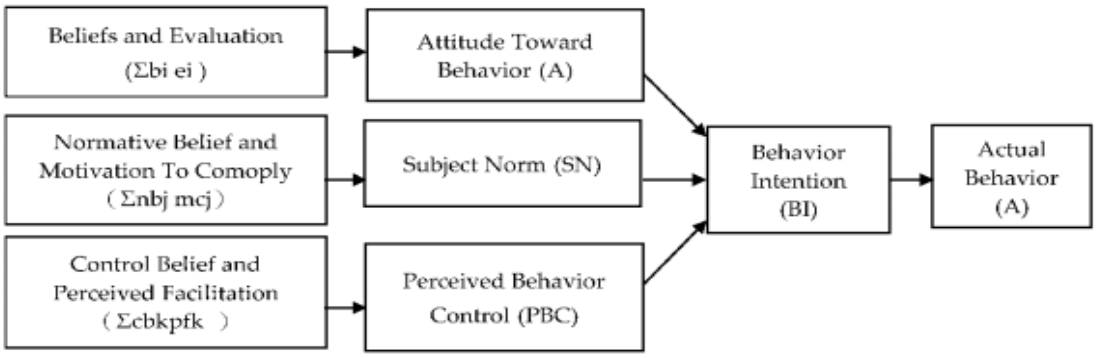


Figure 3: Theory of Planned Behaviour

In a study done by Moons and De Pelsmacker (2012) they also examine the impact of Perceive Behavioural Control (PBC) and subjective societal norms on consumer intentions to buy electric vehicles in addition to attitude. PBC considers if consumers can afford electric vehicles and whether they can use them in their daily lives in their examination. Another important part of the TPB framework is consumer knowledge and experience, which influences attitude and PBC. In consumer EV adoption research, this construct is mostly made up of consumer comprehension of the environmental implications of driving automobiles and experiences with vehicles in general, with EVs in particular.

The decomposed theory of planned behaviour model also uses constructs such as relative advantage, and compatibility as well as exploring and breaking down subjective norms such as social influence and perceived behavioural control into a more concrete dimensions. It also gives a comprehensive framework for determining and understanding how an individual's attitude, subjective norms and perceived behavioural control influences a person willingness to adopt and innovative products (Taylor and Todd, 1995).

2.2.1 THEORY OF PLANNED BEHAVIOUR (TPB) – ATTITUDE (Relative Advantage, Compatibility, Pro-Environment)

Attitudinal factors are one of the most important predictors of whether or not people are willing to adopt eco-innovations (Jansson et al., 2010). The attitude has been identified as a significant prior variable of behavioural intention in a

number of studies (Kang et al. 2006; Dickinger and Kleijnen 2008). Relative advantage, compatibility, and pro-environmental are the three attitudinal elements that are used in this study. Plötz et al. discovered that attitudes are related to many elements and also were the most effective predictors of a variety of factors, such as technological acceptance, the environment and surroundings, comfort, and image. Moore and Benbasat stated that in Technology Acceptance Model (TAM), relative advantage is equivalent to perceived usefulness, and complexity is similar to perceived ease of use.

Relative advantage (IV1) of an invention is the degree to which innovation is perceived as superior as compared to existing product such as hybrid cars that is more fuel efficient (Kotler & Armstrong, 2012). Many prior research has shown that relative advantage is a critical factor in determining whether or not new innovative items are adopted. According to Tornatzky and Klein (1982), relative advantage is a critical element determining innovation uptake. According to Wu et al. (2010), relative advantage is one of the factors that influences consumers' willingness to buy biofuels and hydrogen-powered cars in Taiwan. The relative advantage in terms of financial rewards also has a considerable influence on the buying motivations of consumers. The greater the perceived relative advantage, the more probable it is that the innovation will be adopted. Incentives can be used to stimulate the adoption of innovation by increasing the perceived relative advantage of the innovation, subsidising trials, or lowering the cost of incompatibles.

According to innovation diffusion theory, consumers will adopt new innovations only if they see a relative advantage over traditional way. In innovation diffusion theory, relative advantage is conceptualized as a multidimensional construct that the benefits of an innovation on such dimensions as lower costs, savings in time and effort, social prestige and decreased in discomfort (Rogers 1995). The relative advantage of new innovation adoption, according to researchers, is complex and entails a cumulative assessment of the perceived relative advantages of channels on three dimensions which are convenience, trust, and information acquisition efficacy. Therefore, this research is focusing on whether the relative advantage of electric vehicles such as their cost-effective, convenient, appealing,

and drive satisfaction have any impact on the adoption intention of Malaysia consumers.

Compatibility (IV2) refers to how well an innovation fits their lifestyles, previous experiences, and ideals or values (Kotler & Armstrong, 2012). The new innovation must be compatible with the lives and lifestyles of potential adopters for it to be accepted. The more the adopters must change their current routine and/or the innovation or invention contradicts their beliefs, the less likely they are to accept it (Zaltman & Lin, 1971). Furthermore, the user's prior experience with the adoption of new tools, whether favourable or negative, will have an impact on technology adoption. A bad previous experience with one innovation can lead to innovation negativism, which occurs when a bad past experience with one innovation has a negative impact on the adoption of another innovation. It will be more likely to fail, if a consumer must make a big lifestyle change or requires purchasing more products as a result of a new innovation. A new innovation is most successful, when users can embrace an innovation without hesitation and when it able to replace a current product or idea effectively and also for the better.

Existing abilities and practises, as well as ideas and conventions, are two areas of compatibility to consider. The degree to which an invention matches the current skills, equipment, procedures, and performance criteria of a potential user is crucial and relatively simple to assess. The cost of adoption and use may be influenced by the availability of information about the technology from other users, trained skilled users, technical help and maintenance, and complementary innovations. Like other innovations and eco-innovations, the issue of HEV compatibility with customers' daily lives and routines has been noted as a major contributing feature for potential adopters (Graham-Rowe et al., 2012; Peters and Dütschke, 2014). According to Wu et al. (2010), compatibility is favourably associated with consumers' desire and willingness to purchase biofuels or hydrogen-powered vehicles. Hybrid car adoption may be influenced and affected by their compatibility with green principles and support from personal references (Ozaki and Sevastyanova, 2011).

Customers' perceptions of electric vehicles suiting their travel profiles may differ, since they may not keep track of their exact driving routes or prefer to be

flexible when it comes to lengthier spontaneous travels. Besides individual needs, Values play an essential part in determining whether electric vehicles are seen as compatible. Consumers who are passionate about environmental and resource protection, for example, may see electric vehicles as an enticing and environmentally benign means of transportation that allows them to lessen their car's environmental impact (Skippon and Garwood 2011). Air pollution, climate changes, and environmental issues are causing consumers to become increasingly concerned. Due to this, a growing number of companies are eager and willing to produce green goods. Furthermore, increased knowledge of pollution reduction and care for the environment will indirectly enhance hybrid vehicle sales.

Attitudes are always related as important psychological aspects that will influence the adoption intention. It is characterised as individual mental experiences that reflect attitudes or habit such as likes and dislikes as well as individual positive or negative evaluations of behaviours. For example, in a study done by Hidrue et al. (2011) through a national survey on whether consumers are willing to spend more for green automobiles, it was found that consumers that have a favourable attitude about green automobiles are more likely to adopt them. This demonstrates that the more positive a customer's attitude is, the more likely they are to do a specific task or mannerisms (Beck and Ajzen 1991).

Consumer awareness of climate change issues and willingness to take action to address them is referred to as environmental concern (Bamberg, 2003). HEVs are advocated all around the world as they can save money on gas and reduce pollution level. Several research have reported on these environmental benefits, which have been examined as motivators for consumer adoption intentions. Customer environmental beliefs and understanding of environmental challenges and human consequences has been theorised to impact consumer EV adoption intentions (Lane and Potter, 2007; Carley et al., 2013). According to some study, researchers have found that consumers who display high levels of environmental awareness during their purchase are more likely to acquire HEVs. Consumers who are less concerned about the environment are less likely to purchase HEVs (Heffner, Kurani & Turrentine, 2007; Kahn, 2007). As a result, the promotion of HEVs should

not only emphasise the benefits of energy conservation, but also the importance of environmental protection, which may help to increase the adoption rate.

Environmental (IV3) values are strong predictors of some consumer actions and have a favourable influence on willingness to take environmental action (Oliver & Rosen, 2010). According to Beck et al., environmental protection, which outweighs the impact of energy conservation, has become one of the most important factors in attracting customers. It is widely accepted that some customers examine social and environmental issues when making purchasing decisions in order to assess the social and environmental effects of their purchases and to enhance environmental quality (Follows & Jobber, 2000). With this, the market can anticipate to see a rise in the purchasing of ecologically friendly goods (Follows & Jobber, 2000).

With the next half of the motivational mix, concern for others and the ecology (Bamberg and Möser, 2007), normative theories such as the value-belief-norm theory (Stern, 2000) are used to explain the pro-environmental behaviour. Internal normative beliefs are viewed differently in these theories than they are in TPB where they view internal normative beliefs and values as motivations for pro-environmental action. Consumer environmental behaviour has been studied in many consumer EV adoption research where adoption behaviour and intentions are thought to be influenced by values, beliefs, and norms. Customers' Environmental concern is frequently assessed in EV research by asking if they consider climate change to be a serious problem and if they are willing to contribute individually to the solution, such as reducing traditional gasoline vehicle usage and purchasing electric vehicles (Egbue and Long, 2012; Carley et al., 2013).

Previous study (Asadi et al., 2019; Cai et al., 2019) has identified two primary categories in predicting individual environmentally friendly behaviours: self-interest and pro-social motivations (Han and Hwang, 2016). Based on some perspective, consumers want to display more ecologically friendly behaviours for their own personal interest. For example, greater favourable attitudes toward an environmentally friendly product will increase the likelihood of its purchase. With that being the case, attitudinal theories, like the TPB, can be used to foreseen people's ecologically friendly activities (Asadi and Dahlan, 2017; Huang and Ge,

2019). Considering the environmental benefits and features of electric vehicles, various studies have found that they are eco-innovations with the ability to lessen negative environmental impact (Egbue and Long, 2012). As a result, EV adoption has been viewed as pro-environmental, and environmental concerns are frequently considered in studies of consumers' intentions to embrace EVs (Egbue and Long, 201; Wang et al., 2017).

While the theory of reasoned action (TRA) seeks to explain how the relationship between attitudes and behaviours interact in human action. It is mostly used to forecast how people will act based on their past attitudes and behavioural intentions. It also investigates how values influence attitudes toward purchasing decisions that are environmentally conscious. Furthermore, other research looked at the impact of attitudes based on the theory of planned behaviour (TPB), which states that human behaviour is the outcome of meticulous thought, and that behavioural change is a difficult mental process. Although attitudes cannot directly impact human behaviour, but they can influence individual intentions indirectly. Attitudes are also thought to have a greater impact on a consumer's intention to adopt a HEV than demographic and environmental considerations. Other factors, such as risk, social approbation, and uncertainty, may also influence the rate of adoption, according to Kotler and Armstrong (2012).

2.2.2 THEORY OF PLANNED BEHAVIOUR (TPB) - SUBJECTIVE NORM (IV4)

Based on TRA and TPB, individual behaviours are governed by their behavioural purpose, which is impacted by people's attitudes and subjective norms about a particular behaviour and given conduct. Subjective norm refers to how an important individuals in their lives believe that they should or should not execute the behaviour in question" (Fishbein and Ajzen, 1975). According to Jeon et al. (2012), the higher the consumer's perceived subjective norm, the more likely they are to acquire hybrid electric automobiles. Perceived behavioural control, on the other hand, refers to the circumstances that can delay or prevent a behaviour from being performed. Many HEV adoption studies focus on subjective social norms,

which refer to a person’s sense and feeling of being out of the ordinary or under pressure from certain external sources. These allusions can be figurative or literal.

The willingness to engage in a given conduct is measured by behavioural intention (Fishbein and Ajzen, 1977), whereas the expected social pressure received by an individual when doing a behaviour is measured by subjective norm. The subjective norm has a higher impact on behavioural intention when it is more firmly impacted (Fishbein and Ajzen, 1975). Many researchers discussed human behaviours from the sociological standpoint and perceived that a certain behaviour is both a personal and also a society action. What others do have an impact on how an individual adopts a particular behaviour. Because most people constantly adjust their behaviour in light of public opinion, a behaviour is often thought to be acceptable if others around us do similarly. In other words, the opinions of individuals who are important to them have an impact on an individual's decision to acquire a new product.

The value an individual has to the approval of his or her conduct by others, such as family members and friends, plays a vital impact in a consumer's intents to adopt a HEV. Subjective norm has been demonstrated to have a positive impact on behavioural intention in previous studies (Han et al. 2010; Abou-Zeid and Ben-Akiva 2011; Axsen and Kurani 2012; Castanier et al. 2013). Because of the increased societal pressure, persons who believe they should do a given activity will be more likely to do so. Adopting a certain innovation or technology is one of these activities. Consumers' decisions on whether or not to buy a HEV are influenced not only by themselves, but also by their family members. Involvement in the decision-making process and consideration by family members has a significant impact on customer adoption intentions.

2.2.3 THEORY OF PLANNED BEHAVIOUR (TPB) - PERCEIVED BEHAVIOURAL CONTROL (IV5)

The elements that may obstruct the performance of a behaviour, as well as a person's opinion of how simple or difficult it is to carry out various behaviours, are referred to as perceived behavioural control (Ajzen, 1991). Individuals who

believe they have complete control over their behaviour will be more willing to engage in the behaviour in issue (Ajzen, 1991). The perceived ability to accomplish the behaviour in issue is significantly linked to an individual's behaviour. Individual's behaviours are fuel not only by the appraisal and expectations processes that follow cognition and emotion, but also by the role of control belief.

There are two components of perceived behavioural control. The first component of perceived behavioural control is self-efficacy, often known as an inner force, which is defined as an individual's self-sufficiency or self-confidence in their capacity to accomplish a behaviour. The second component is the outer force, which is in charge of controlling external situations as well as facilitating conditions in which it reflects the availability of resources required to engage in the behaviour (Tan and Teo, 2000). From the existing literatures, most researchers discuss the Perceived Behavioural Control within the context of TPB.

The psychological factors can be linked to the first component. Consumers' psychological aspects play a role in deciding whether or not to adopt a HEV. Psychological factors are significant because they have the ability to directly influence adoption intentions as well as moderate the effects of objective factors. For example, rather than purchasing costs, how consumers feel often influences their vehicle adoption decisions. According to the PBC theory, the more a consumer believes a behaviour is a social norm, the more likely he or she is to engage in it (Ajzen,1991). People, for example, must examine their attitudes once they have established them. By conquering their fears in gaining confidence in their ability to buy or use a HEV, it will reduce the drawbacks of the outcome. Therefore, as PBC is stronger, consumers are more likely to buy and use a HEV.

For the second component, consumer behavioural intentions can be influenced by resources such as time availability, budget, and talent. Normally attribute related to cost and government support are deemed to have effect on the behaviour. According to the study done by Moons and De Pelsmacker in 2012, PBC dimensions include consumers' ability to afford electric vehicles and their ability to use them in their daily lives while considering the limitations in driving range. Currently, technology, pricing, availability, or knowledge of how to use green products, as well as the ability to do behaviours, are all thought to be sources of

perceived behavioural control. The greater the ability of people to alter these parameters, the more likely they are to change their behaviour (Axsen & Kurani, 2013).

Educating consumers about the real benefits of HEVs by discussing the savings as well as the cost of fuel and other costs during the course of life of the vehicle can be very beneficial to induce the adoption of HEVs. Government support and policy also hold a very important attribute in adoption of HEV (Callagher & Muehlegger, 2008). Many prior research have shown that supports in financial subsidies, preferential taxation, free parking, and driving privileges have a favourable impact on customer adoption intentions. And it was discovered that these effects grew stronger when more powerful policies were implemented. According to research, financial incentives are a significant component in encouraging the use of cleaner fuel cars, but they are insufficient to drive behavioural change (Lane & Potter, 2006).

2.3 CONCEPTUAL FRAMEWORK

The theoretical framework for this research is depicts in Figure 4 which was adopted from the decomposed Theory of Planned Behaviour (TPB). This theory tries to understand how a person's belief, embracing attitude (relative advantage, compatibility, pro-environment), subjective norm and perceived behavioural control can influence their intention. Two versions of the model of the theory of planned behaviour (TPB) which is pure and decomposed are examined and compared to the Theory of Reasoned Action (TRA).

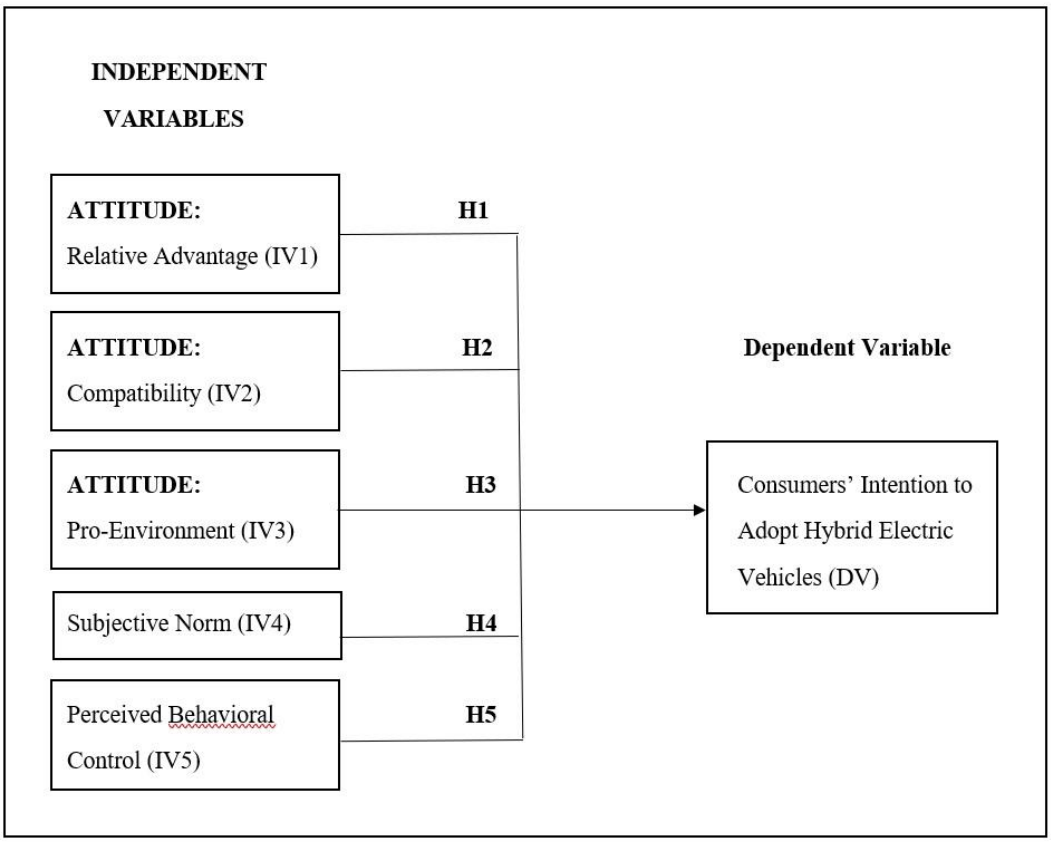


Figure 4: Conceptual Framework

This research applied Theory of Planned Behaviour and discussed on previous literature studies in this Chapter 2. For the association between the five IVs and the DV, as well as the theoretical framework, five hypotheses are suggested.

Dependent Variable (DV): Consumers' Intention to Adopt Hybrid Electric Vehicles

Different forms of deliberate measurements, such as consumer readiness and willingness to accept the innovation, are the most important determinants of adoption behaviour, which are also utilised as a proxy variable in much research (Arts et al., 2011; Schuitema et al., 2013). As a result, our assessment of the literature reveals that consumer EV adoption has primarily been investigated by focusing on adoption intentions rather than actual adoption.

Independent Variables (IVs): Attitude (Relative Advantage, Compatibility, Pro-Environment), Subjective Norm, and Perceived Behavioural Control.

The item in the independent variable is further explained in **Table 1** as below:

Independent Variables	Items (The Driving Forces)
ATTITUDE (Relative Advantage)	• **Better for fuel efficiency** • **Economic driving** • **Lower cost**
ATTITUDE (Compatibility)	• **Compatible with working style / lifestyle**
ATTITUDE (Pro-environmental)	• **Reduce effect of climate change** • **Preserve the environment** • **Reduces the pollution level**
Subjective Norms (person perception)	• **Influence by friends, family, or colleagues**
Perceived Behavioural Control	• **Factors that may impede the performance of the behaviour** • **Government tax/sales incentives** • **Government petrol/diesel policy**

Table 1: Breakdown of Independent Variables

2.4 HYPOTHESES DEVELOPMENT

Hypotheses are developed to discuss on the research topic or to address any phenomenon or problems related to it. They can also help in assisting the researcher to build a specific path as well as better grasp of the study's subject matters. Hypothesis also further aids in the cautious and focused investigation on information gathered. This method can be used to develop multiple hypotheses for a single problem in order to determine its effects and find solutions. The analysis of the literature reveals that there is a substantial amount of research on the EVs elements of the acceptance model. However, there is a scarcity of empirical study on EVs dimensions that have a notable impact on the usage intentions of this innovative product and, as a result, on related acceptance, as far as the researcher is

aware. Several aspects were expected to influence EV usage intentions as part of a larger theoretical framework and based on literature research. As a result, few hypotheses are proposed as below.

Purchase intention refers to a person's proclivity to do specified activities, which can be quantified by the person's ability to take specific acts. The key determinants determining behavioural intentions are defined as attitude toward behaviour, which is highly positively connected with behavioural intention, as mentioned in the research literatures. Therefore, the hypotheses in this study are proposed as below:

H1: There is a significant relationship between **relative advantage** and consumers intention to adopt hybrid electric vehicles in Malaysia.

H2: There is a significant relationship between **compatibility** and consumers intention to adopt hybrid electric vehicles in Malaysia.

According to prior research (Plotz et al. 2014), environmental consciousness can occasionally drive HEV uptake. According to Krupa et al. (2014), environmental benefits were a higher buying motivation than financial benefits for persons worried about the environment. Past researchers also discovered that people who were most concerned about climate change were 44.4 times more likely to purchase HEVs than those who were least concerned. This study implies that using Environmental Concern's effect on TRA components to examine the effect of environmental concern (EC) intention to adopt HEVs could be effective. Mondéjar-Jiménez et al. (2011) also found that customers are more likely to accept green products if the values inherent in the products align with their environmental expectations and awareness. Given that EVs have the potential to reduce the transportation sector's environmental challenges, consumers with a high level of environmental concern are likely to be interested. To meet their environmental standards and knowledge, they are more inclined to choose EVs. Based on the above-mentioned literature, this research hypothesizes that:

H3: There is a significant relationship between **pro-environment** and consumers intention to adopt hybrid electric vehicles in Malaysia.

Because society and government are paying more attention to environmental (climate change) and energy (oil crisis) issues, people's intentions to act environmentally are becoming increasingly influenced by subjective norms. As a result, subjective norms are regarded as a major social influence factor in HEV diffusion in the current study. Based on the literature reviewed above, this study hypothesizes that:

H4: There is a significant relationship between **subjective norms** and consumers intention to adopt hybrid electric vehicles in Malaysia.

The perceived ability to accomplish the behaviour in issue is significantly linked to an individual's behaviour. Consumer behavioural intentions can be influenced by resources such as time availability, budget, and skill. As now, the concept of perceived behavioural control such as technology, pricing, availability, expertise and knowledge of the usage and the ability to employ environmentally products is being debated. The more users who have control over these variables, the better any intention to influence behaviour is highly unlikely (Axsen & Kurani, 2013). Therefore, the study hypothesizes that:

H5: There is a significant relationship between **perceived behavioural control** and consumers intention to adopt hybrid electric vehicles in Malaysia.

Hypotheses formulated in the list above and related aspect will be tested in this research with the assist of suitable methods. These hypotheses could be be right or incorrect when proven through analysis of the study and they can then can be accepted, rejected, or validated after that.

CHAPTER 3 : RESEARCH METHODOLOGY

3.0 INTRODUCTION

In this Chapter 3, a thorough overview and explanation of how research is performed, including the target respondent and sampling technique, is provided. In addition, this chapter will describe how data will be collected, how variables will be evaluated, and the strategies that will be utilised to explore the data at hand.

3.1 RESEARCH METHOD / DESIGN

Research methodology is a systematic approach to solving an issue. It is a science that studies how research should be conducted. Research methodology is essentially the procedures by which researchers go about their business of describing, giving understanding, and predicting occurrences (S.Rajasekar, P.Philominathan, V.Chinathambi, 2013). A researcher's research design is a framework of methodologies and techniques that he or she chooses to combine diverse components of study in a logical manner so that the research problem is methodically addressed. It furnishes a deep understanding about of how to carry on a research by utilising methodology. Every researcher has a list of research questions that must be evaluated which can be accomplish via research design.

The two main types of research design are qualitative and quantitative. Every researcher must have a thorough understanding of the numerous types of research design available to choose and implement the best one for their research. For the purpose of this study, quantitative research design has been chosen to analyse the data. Data collection, measurement, and analysis are the three primary components of research design. The design of a research topic is used to explain and define the type of research whether it is descriptive, experimental, survey, correlation, meta-analytic, semi-experimental, or review and

also its sub-type that are experimental design, research problem and descriptive case-study.

Quantitative Research Design is normally used and applied in cases when a researcher needs statistical results in order to compile an actionable report. In other words, it is a research method that uses statistics and numbers and anything that is measurable to investigate events and their relationships in a systematic manner. Data collection based on a hypothesis or theory is usually the first step in a quantitative technique, which is then typically followed by the use of descriptive or inferential statistics.

Surveys and observations are two instances of statistical association that are commonly utilised. The goal of quantitative research is to establish a link between one independent variable and another dependent variable in the study. As numbers provides a better and more accurate perspective for making important business decisions, thus, quantitative research design is crucial for an organization's success and growth, as most conclusions drawn based on numbers and analysis will most likely prove to be effective and beneficial to the company.

This study employed descriptive research to look at the factors that influence hybrid car adoption in Malaysia. The study method employed was a cross-sectional survey, in which primary data was acquired by asking respondents to fill out questionnaires. A quantitative survey of HEV uptake among Malaysian consumers was undertaken. Aligned with this study, adoption of the HEV construct is measured as a formative construct. The questionnaire was created based on the theory of planned behaviour (TPB) to understand and comprehend the Malaysian consumers.

3.2 MEASUREMENTS / INSTRUMENTS

In this study, primary data and results of the analysis is collected through survey method by giving questionnaires to applicable consumers. A questionnaire is a research tool that consists of a series of questions designed to collect data information from respondents. This questionnaire is shared to respondents through

online link from Google Forms and also through hard copy printed out version. Questionnaires are chosen as the method of measurement as they are relatively cheap to administer while still able to provide a quick and effective manner of obtaining big amounts of data information from a large sample of people. Because the researchers were not required to be physically present when the surveys were completed, data could be obtained fast. This is beneficial in situations where conducting interviews would be unfeasible due to the size of the population.

The aims of this research were to look into the key factors that influence people's willingness and intention to adopt HEV. The questionnaires used in this study was based on a previous instrument created by a number of researchers. The extended TPB model's measures were adapted and modified from prior study scales (Han et al. 2010; Kim and Han 2010; Jakovcevic and Steg 2013). A questionnaire with two sections was created for this purpose and is developed in English.

The first section of the questionnaire covers questions about car users' information which gathered information on the respondents' demographic profile. Previous research has found that demographic variables such as age, gender, educational level, and household income can influence one's desire to buy a hybrid electric vehicle (Adnan et al., 2017). This research employed a dummy construct for gender in the first stage, with 1 representing male and 0 representing female. The questionnaire then employed a separate construct variable for each age group, such as 18-25 years old, 26–30 years old, 31–40 years old, 41–50 years old, and 51 years old and older. In the third stage, the questionnaire isolates the educational level variable and list out the levels Doctorate Ph.D., Master's Degree, Bachelor's Degree, Diploma, Secondary School, and Primary School in order to obtain the educational level. Next, because the household's financial control influences the adoption decision, revenue was used as a control variable. We utilised a distinct variable for the individual's income per month = 1, 2, 3 and 4 for less than RM 2000, RM 2001 – RM 4000, RM 4001 – RM 6000, and RM6001 and above accordingly. Finally, the questionnaires also utilised a variable for the individual's occupation = 1,2,3, and 5 for government sector, private sector, self-employment, and student.

The second section gathered information on their intention to adopt HEVs, which are the factors that influence the adoption towards hybrid vehicle as well as an investigation of the main determinants of their intentions, such as personal norms, subjective norms, awareness of outcomes, perceived consumer effectiveness, and perceived value. To develop metrics for the model's variables, multiples prior existing literature was consulted and adapted from Ozaki and Sevastyanove (2010), Wang et al. (2014), Diamond (2005), and Tan & Teo (2000), Han et al. (2010), Kim and Han (2010), Jakovcevic and Steg (2013), Sweeney & Soutar (2001), Teoh & Noor (2015) and etc. Because of the study's unique context, the majority of the items were produced and slightly adjusted and modified in the context of adopting HEVs rather than being drawn from previous research. This section also provides a series of questions designed to elicit information about respondents' awareness, knowledge, and perceptions about HEVs. A five-point Likert scale was applied at a range of strongly disagree to strongly agree where the middle point is neutral on all items in this section for the measurement. In addition, four other measurement indicators were utilised to assess the level of environmental concern. These measurements were modified from the works of Fujii (2006), Gadenne et al. (2011) and Ramayah et al. (2012).

Dependent Variable	**Definition**	**Measurement**	**Number of Questions**
Intention to Adopt	Key determinant of customer's adoption intention on Hybrid Electric Vehicle (HEV).	Five-Point Likert Scale (with 1 being strongly disagree and 5 being strongly agree)	5

Table 2: Dependent Variable

There are 5 Independent Variables (IVs) which includes Relative Advantage (RA), Compatibility (C) , Environmental Concern (EC), Subjective Norms (SN) and Perceived Behavioural Control (PBC).

Independent Variables	Definition	Measurement	Number of Questions
Relative Advantage (RA)	Consumers' perception on the value and advantages of using a Hybrid Electric Vehicle (HEV).	Five-Point Likert Scale (With 1 being strongly disagree and 5 being strongly agree)	5
Compatibility (C)	Consumers' perception on the value that reflects them for using a Hybrid Electric Vehicle (HEV).	Five-Point Likert Scale (With 1 being strongly disagree and 5 being strongly agree)	4
Environmental Concern (EC)	Consumers' perception on the value of using a Hybrid Electric Vehicle (HEV) in regard to their environmental concerns.	Five-Point Likert Scale (With 1 being strongly disagree and 5 being strongly agree)	6
Subjective Norms (SN)	Consumers' perception on the value of using a Hybrid Electric Vehicle (HEV) in regard to their social status.	Five-Point Likert Scale (With 1 being strongly disagree and 5 being strongly agree)	6
Perceived Behavioural Concern (PBC)	Consumers' perception on the behavioural concern for them to own a	Five-Point Likert Scale (With 1 being strongly disagree and 5 being strongly agree)	7

	Hybrid Electric Vehicle (HEV).		

Table 3: Independent Variables

Variables	Question Items	Measurement	Sources
Relative Advantage (RA)	i. HEV better for fuel efficiency. ii. HEV offers value for money. iii. HEV can save a lot of money. iv. HEV would be economical. v. HEV have excellent acceleration.	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Sweeney & Soutar (2001)
Compatibility (C)	i. Adopting HEV will have positive effect on my image. ii. Adopting HEV is ideals for my working style. iii. Adopting HEV is ideals with my lifestyle. iv. Adopting HEV is ideals with my lifestyle. v. Adopting HEV is favourable for me.	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Ozaki and Sevastyanove (2010), Wang et al. (2014), Diamond (2005)
Environmental Concern (EC)	i. I think environmental problems are becoming more and more serious in recent years. ii. I think human beings should live in harmony with nature in order to achieve sustainable development. iii. I think we are not doing enough to	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Ramayah et al. (2012), Gadenne et al. (2011), Kim and Choi (2005), Fujii (2006)

	save scarce natural resource from being used up. iv. I think individuals have the responsibility to protect the environment. v. I think adopting HEV can reduce the pollution level. vi. I think adopting HEV can reduce environmental harm.		
Subjective Norms (SN)	i. Most people who are important to me think I should adopt a HEV when adopting a vehicle in the near future. ii. When considering adopting a HEV, I wish to do what people who are important to me want me to do. iii. If I buy a HEV, then most people who are important to me would also buy a HEV. iv. People whose opinions I value would prefer that I adopt a HEV when adopting a vehicle in the near future. v. I learned so much about green car from my friends and family. vi. I will follow the advice of my family that I should buy green car.	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Teoh & Noor (2015), Bagozzi et al. (2003), Nordlund and Garvill (2003), Han et al. (2010), Kim and Han (2010), Jakovcevic and Steg (2013)

Perceived Behavioural Concern (PBC)	i. The price of a HEV is important to me and I can afford it when I decide to adopt. ii. The maintenance and repair of a HEV is important to me when I decide to adopt. iii. I can find where to buy a HEV if I wanted to. iv. I would adopt HEV instead of conventional car under worsening environmental conditions. v. I would adopt HEV instead of conventional car when there is a subsidy for HEV. vi. I would adopt HEV instead of conventional car when there are discount rates for HEV or promotional activity. vii. I would adopt HEV instead of conventional car when HEV is available.	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Teoh & Noor (2015), Bagozzi et al. (2003), Nordlund and Garvill (2003), Han et al. (2010), Kim and Han (2010), Jakovcevic and Steg (2013)
Intention to Adopt a HEV (IA)	i. I intend to adopt HEV because it is less polluting. ii. I will adopt HEV even if it is more expensive than non-electric car. iii. I am willing to adopt a HEV when adopting a vehicle in the near future.	Five-Point Likert Scale (1-Strongy Disagree to 5-Strongly Agree)	Rehman & Dost (2013), Teoh & Noor (2015), Bagozzi et al. (2003), Nordlund and Garvill

	iv. I intend to adopt a HEV when adopting a vehicle in the near future. v. I plan to adopt a HEV when adopting a vehicle in the near future.		(2003), Han et al. (2010), Kim and Han (2010), Jakovcevic and Steg (2013)

Table 4: Variables and Measurements

3.3 SAMPLING PROCEDURES

For this research study, the primary data needed to generate the analysis is collected using a simple random sampling technique. Simple random sampling, also often known as random sampling is one of the most straightforward and simplest probability sampling strategies (Tadayon & Torabi, 2022). It is also the most widely used approach and for selecting a sample from a population for a wide variety of objectives and purposes. This research used convenient and straightforward sampling strategy to obtain the data because the population is too huge and with an uncertain population size where it is hard to include everyone. In simple random sampling every member of the population has an equal chance of being chosen as part of the sample.

To properly perform simple random sampling appropriately, an ideally sample size at least a few hundred people is required. For this research, 200-300 individual adults with age ranging above 18 years old residing in Peninsular Malaysia (13 states) are targeted. The reason that this research limits the age to 18 years and above is because that is the minimum age for an individual in Malaysia to have a driving licence.

3.4 DATA COLLECTION METHOD

For this study, primary data was acquired utilising a quantitative manner. A self-administered online questionnaire was used to collect the data via Google Forms and combination of hard copy printed distribution to poll Peninsular Malaysia population feedback. For online media, links were shared through email lists, social media (Facebook) and messaging (Whatsapp). Printed distribution in hard copy questionnaires are distributed in multiple automotive dealerships in Perak and Kuala Lumpur areas. A few automotive dealerships were chosen because customers participate in cognitive processes during their visits. These processes attempt to assess consumers' intentions regarding their purchase intention, as people who came to visits auto showroom have a significant desire to purchase vehicles.

Customers were asked to complete the questionnaires voluntarily and on their own time. The questionnaires were to be filled out and returned by the target respondents. The data was collected between September 2021 and December 2021. 284 questionnaires were distributed and shared over the course of the time, but only 253 were returned, resulting in an 89 percent response rate. However, incomplete questionnaires with missing values on the key variables were also eliminated, resulting in 42 questionnaires have been deemed unusable. As a result, in the final test, only 211 questionnaires were usable and qualified.

3.5 METHODS OF ANALYSIS

For the data analysis procedure, the software use for analysing the data is the SPSS system which is the short term for Statistical Package of Social Science. The data analysis design discusses the procedures that were utilised to examine the data collected from the questionnaire. Descriptive data such as mean, median, mode, frequencies, and percentages were used to analyse the data. The statistical analysis use is descriptive, factor and regression analysis. The factors that influence the adoption of hybrid electric vehicles in Malaysia are investigated using descriptive research. The study objectives, concept/construct, measurement, and scale are used to build the data analysis. In order to complete the data, this software

supplied a powerful statistical analysis and data management system in a graphical interface, employing informative menus and easy dialogue boxes. It will also enable researchers to establish and obtain precise data (Ong, 2011).

Next is doing the reliability test, T-Test, Anova and Multiple Linear Regression. Descriptive Analysis, T-Test and Anova is use for analysing the demographic factors. While Factor Analysis and Regression Analysis is to test for attitudes, subjective norms and perceived behavioural control factor. For factor analysis, the Kaiser-Meyer-Olkin (KMO) is used to measure. To evaluate the hypotheses and meet the study's goals, a descriptive analysis, reliability test, inter-correlation test, and linear regression-stepwise test were utilised. The preliminary analysis was carried out to check that the normality, homogeneity, linearity, multicollinearity, and heteroscedasticity assumptions were not violated. The data was broken down into three steps for examination. To begin, a variety of descriptive and frequency statistics were used to assess the data's state. Second, tests for normalcy and reliability were carried out. The data was checked for normalcy using the mean value, standard deviation, skewness, and KolmogoroveSmirnov tests.

As Cronbach's Alpha is the most widely used measure of dependability, it will be utilised to conduct reliability tests to determine the reliability coefficient for all dependent and independent variables (Tavakol & Dennick, 2011). When Cronbach's alpha values above 0.70, the survey items are considered reliable and consistent (Cronbach & Shavelson, 2004). If there are a restricted number of questions, a poor link between items, and diverse constructions, the Alpha value will be low (Tavakol & Dennick, 2011).

To guarantee that the data sets are properly and normally distributed, a normality test is performed using skewness and kurtosis (Saunders et al., 2012). To perform parametric tests such as Multiple Linear Regression Analysis (MLR) or Pearson Correlation Analysis, the normality test must be fulfilled (Saunders et. al., 2012). The results of the skewness test should be within +/-3, while the results of the kurtosis test should be within +/-10. (Hair et al., 2010; Kline, 2005). The Pearson Correlation Analysis is used to determine the relationship between two numerical variables (Saunders et al., 2012). The multicollinearity problem is tested using multicollinearity. If the Pearson Correlation coefficient is greater than 0.90, there is

a problem of multicollinearity (Hair et al., 2005). Furthermore, when the tolerance values are less than 0.10 or the variance inflation factor (VIF) values are greater than 10, there will be a high multicollinearity problem (Hair et al., 2005). If the results suggest an issue with multicollinearity, one of the related or relevant independent variables must be removed.

Furthermore, prior to entering the data into SPSS, coding will be done. This programme is crucial in data processing, especially when it comes to connecting the data to the findings. This is due to the fact that the data will be examined and presented in a readable and understandable manner. The findings were given in the form of a table with frequency and percentages. Finally, the degree and direction of the linear relationship between the independent factors and the dependent variable were determined using intercorrelation and multiple regressions. The direct effects of social influences, performance attributes, financial rewards, environmental concerns, demographics, and government initiatives on HEVs usage intentions were tested using the linear regressionstepwise technique.

CHAPTER 4: RESEARCH RESULTS

4.0 INTRODUCTION

As hybrid electric vehicle adoption (HEV) is essentially associated to customer choice and remaining primarily in the realm of individual decision-making, thus, determining the factors that encourage and prevent their adoption at the individual level is critical. The current study was conducted to find the relationship of relative advantage, compatibility, pro-environment, subjective norms, and perceived behavioral control with the consumers intention to adopt hybrid electric vehicles in Malaysia. For the correlational study was designed with survey approach of data collection. As the aims of this research were to look into the key factors that influence people's willingness and intention to adopt HEV, questionnaires were used that were designed based on a previous instrument. The data collected was analyzed through SPSS and the results with details are described below.

4.1 DEMOGRAPHIC PROFILE

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	98	46.4	46.4	46.4
	Male	113	53.6	53.6	100.0
	Total	211	100.0	100.0	

Table 5: Gender Distribution

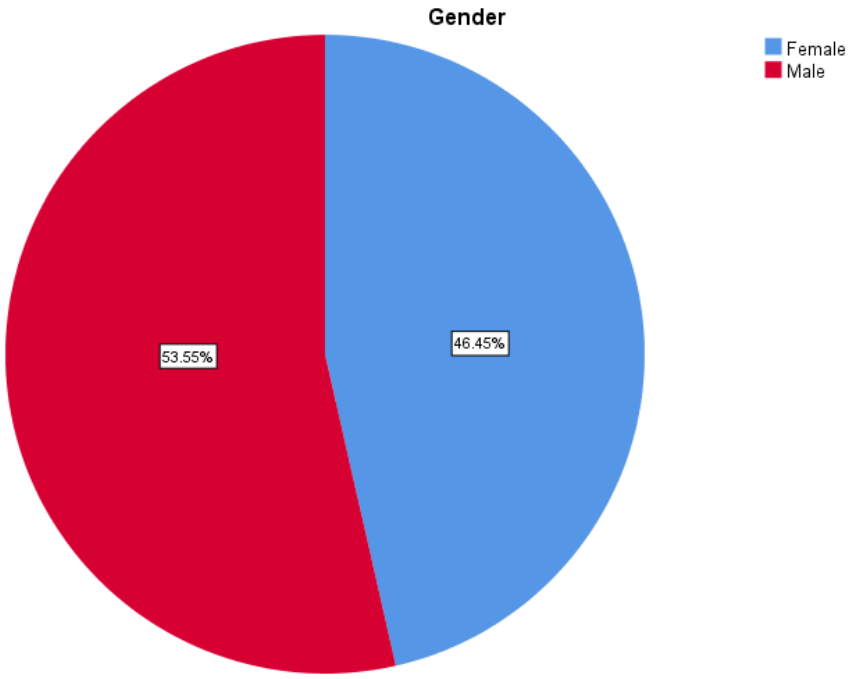


Figure 5: Pie Chart of Gender Distribution

The table above shows the distribution of gender in the sample. The table depicts the frequency and percentage of each gender present in the sample. From the table, it is shown that the males were higher than females, making 53% of the sample, followed by females who were 46% out of the total sample. The pie chart graphically represents the same results.

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 to 25 years old	34	16.1	16.1	16.1
	26 to 30 years old	48	22.7	22.7	38.9
	31 to 40 years old	60	28.4	28.4	67.3
	41 to 50 years old	40	19.0	19.0	86.3
	51 and above	29	13.7	13.7	100.0
	Total	211	100.0	100.0	

Table 6: Age Distribution

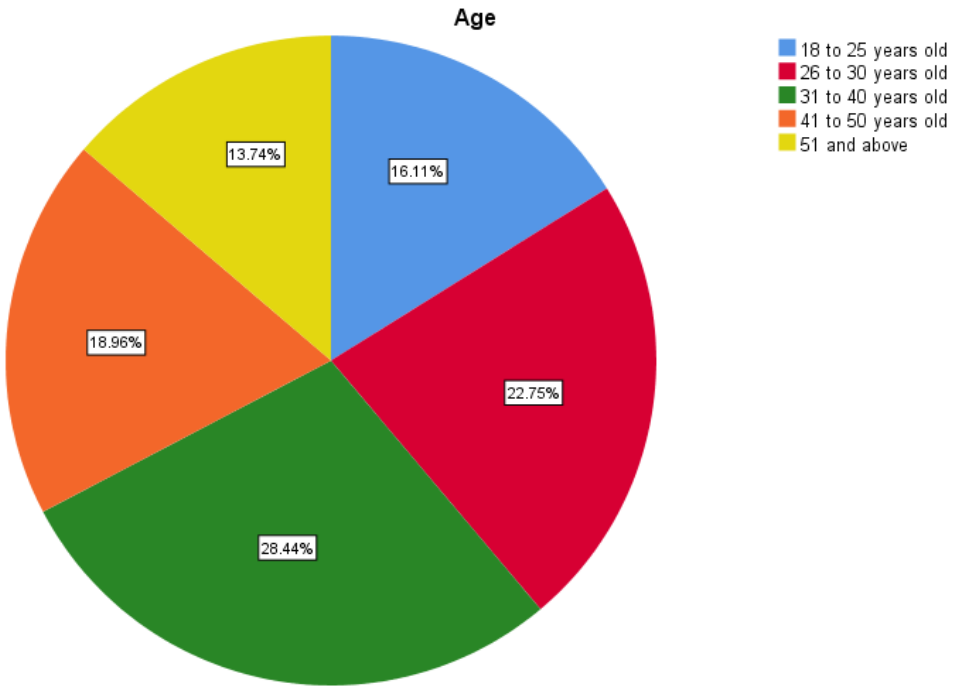


Figure 6: Pie Chart of Age Distribution

The table above shows the distribution of the sample across five age groups. The table depicts the frequency and percentage of each age group present in the sample. From the table, it is shown that the highest percentage was for the age group 31 to 40 years old, making 28% of the total sample, followed by 22% who were from age group 26 to 30 years old. The rest of them were 19 percent of age 41 to 50 years, 16 percent from 18 to 25 years and 13 percent from 51 and above years. The pie chart graphically represents the same results

Educational Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelors' Degree	74	35.1	35.1	35.1
	Diploma	48	22.7	22.7	57.8
	Master's Degree	17	8.1	8.1	65.9
	Ph.D	5	2.4	2.4	68.2
	Primary School	1	.5	.5	68.7
	Secondary School	66	31.3	31.3	100.0
	Total	211	100.0	100.0	

Table 7: Educational Level Distribution

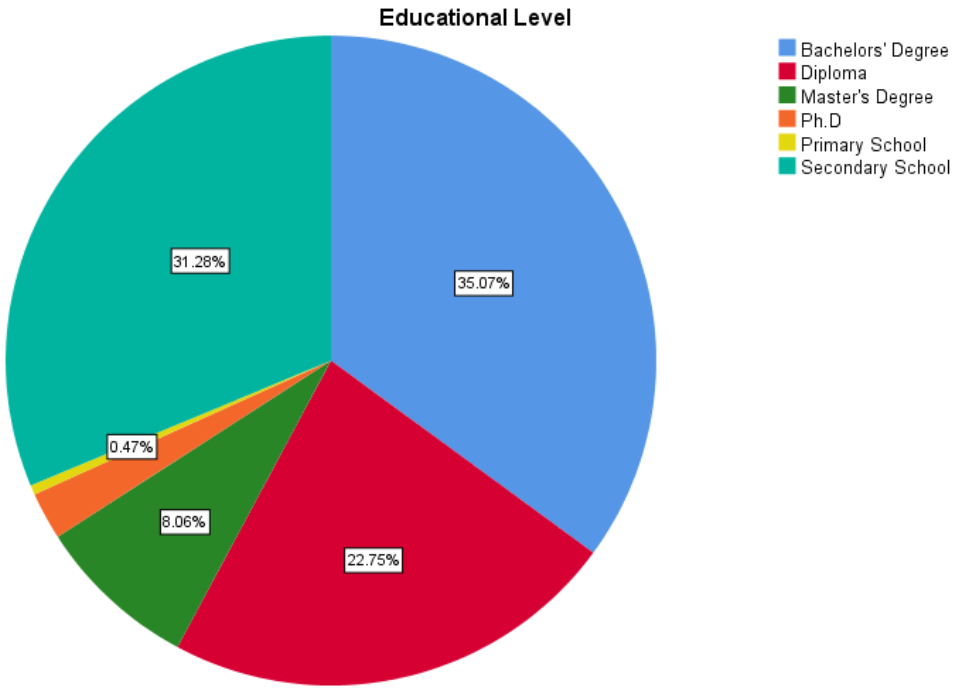


Figure 7: Pie Chart of Educational Level Distribution

The table above shows the distribution of the sample across education levels. The table depicts the frequency and percentage of each education level present in the sample. From the table, it is shown that the highest percentage was 35% who had the bachelor's degree, followed by 31% who had secondary level of education and then 22% who were doing diploma. Rest of 8% were having master's degree and 2.4% having PhD degree. The pie chart graphically represents the same results

Monthly Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than RM2000	40	19.0	19.0	19.0
	RM2001-RM4000	78	37.0	37.0	55.9
	RM4001-RM6000	56	26.5	26.5	82.5
	RM6001 and above	37	17.5	17.5	100.0
	Total	211	100.0	100.0	

Table 8: Monthly Income Distribution

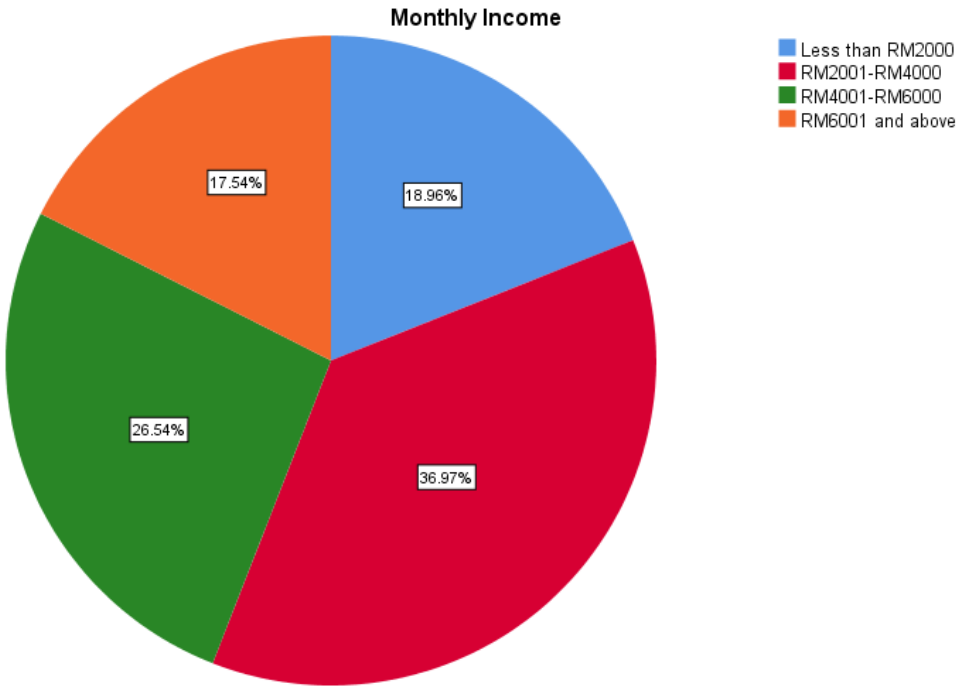


Figure 8: Pie Chart of Monthly Income Distribution

The table above shows the distribution of the sample across monthly income. The table depicts the frequency and percentage of each income group present in the sample. From the table, it is shown that the highest percentage was 37% who were earning RM 2001 to RM 4000, followed by 26% who had monthly income of RM4001-RM6000. Only 19% had income less than RM2000, and 17% had the income between RM6001 and above. The pie chart graphically represents the same results

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government Sector	26	12.3	12.3	12.3
	Private Sector	135	64.0	64.0	76.3
	Self-Employement	36	17.1	17.1	93.4
	Student	14	6.6	6.6	100.0
	Total	211	100.0	100.0	

Table 9: Occupation Distribution

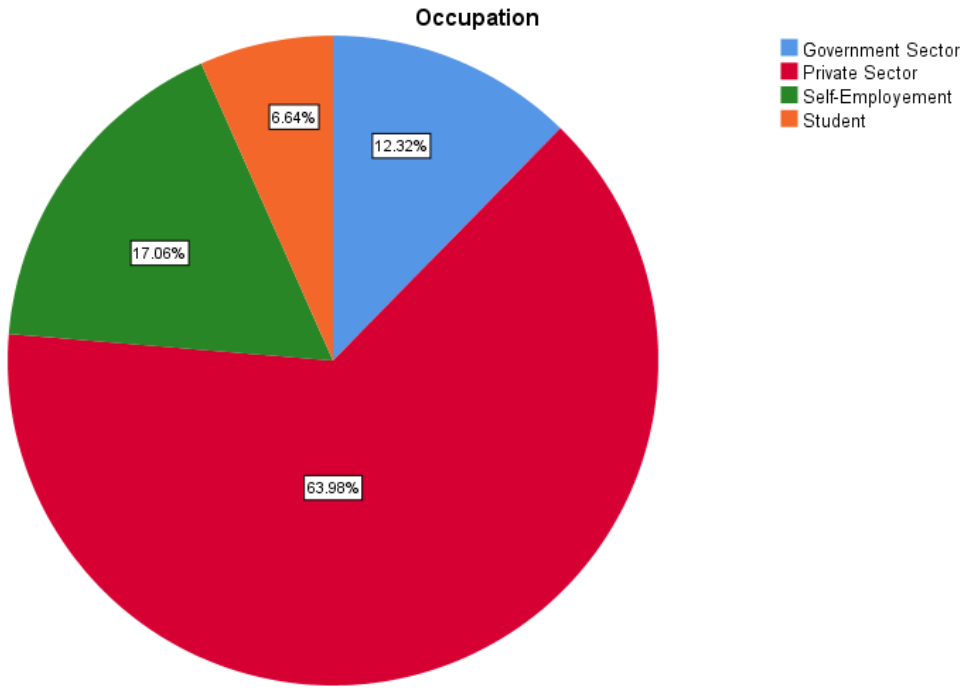


Figure 9: Pie Chart of Occupation Distribution

The table above shows the distribution of the sample across occupation. The table depicts the frequency and percentage of each occupation present in the sample. From the table, it is shown that the highest percentage was 64% who were working in private sector, followed by 12% who were working in Government sector. 17% were self-employed and only 6% were students. The pie chart graphically represents the same results

4.2 DESCRIPTIVE STATISTICS

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
HEV better for fuel efficiency.	211	2	5	3.80	.576
HEV offers value for money.	211	1	5	3.55	.669
HEV can save a lot of money.	211	1	5	3.33	.656

HEV would be economical.	211	2	5	3.67	.612
HEV have excellent acceleration.	211	1	5	3.26	.677
Valid N (listwise)	211				

Table 10: Descriptive Statistics of Relative Advantage

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for all items of the independent variable relative advantage. The highest mean was for first item, which was 3.80 with SD = 0.576, and lowest mean was for the last item, which was 3.26 with SD = 0.677. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Adopting HEV will have positive effect on my image.	211	2	5	3.53	.706
Adopting HEV is ideals for my working style.	211	2	5	3.57	.780
Adopting HEV is ideals with my lifestyle.	211	1	5	3.55	.793
Adopting HEV is favourable for me.	211	1	5	3.46	.857
Valid N (listwise)	211				

Table 11: Descriptive Statistics of Compatibility

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for the independent variable compatibility. The highest mean was for second item, which was 3.57 with SD = 0.780, and lowest mean was for the last item, which was 3.46 with SD = 0.857. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I think environmental problems are becoming more and more serious in recent years.	211	3	5	4.02	.569
I think human beings should live in harmony with nature in order to achieve sustainable development.	211	3	5	4.01	.561
I think we are not doing enough to save scarce natural resource from being used up.	211	3	5	3.86	.608
I think individuals have the responsibility to protect the environment.	211	3	5	3.97	.609
I think adopting HEV can reduce the pollution level.	211	2	5	3.65	.682
I think adopting HEV can reduce environmental harm.	211	2	5	3.62	.689
Valid N (listwise)	211				

Table 12: Descriptive Statistics of Environmental Concerns

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for the independent variable environmental concerns. The highest mean was for first item, which was 4.02 with SD = 0.569, and lowest mean was for the last item, which was 3.62 with SD = 0.689. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Most people who are important to me think I should adopt a HEV when adopting a vehicle in the near future.	211	1	5	3.03	.783

When considering adopting a HEV, I wish to do what people who are important to me want me to do.	211	2	5	3.50	.783
If I buy a HEV, then most people who are important to me would also buy a HEV.	211	1	5	3.00	.825
People whose opinions I value would prefer that I adopt a HEV when adopting a vehicle in the near future.	211	1	5	3.12	.842
I learned so much about green car from my friends and family.	211	1	5	3.17	.652
I will follow the advice of my family that I should buy green car.	211	1	5	3.50	.739
Valid N (listwise)	211				

Table 13: Descriptive Statistics of Subjective Norms

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for the independent variable subjective norms. The highest mean was for second and last item, which was 3.50 for both with SD = 0.576 and 0.739 respectively, and lowest mean was for the third item, which was 3.00 with SD = 0.825. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
The price of a HEV is important to me and I can afford it when I decide to adopt.	211	2	5	3.91	.671
The maintenance and repair of a HEV is important to me when I decide to adopt.	211	2	5	3.89	.705
I can find where to buy a HEV if I wanted to.	211	3	5	4.09	.764
I would adopt HEV instead of conventional car under worsening environmental conditions.	211	1	5	3.49	.746

I would adopt HEV instead of conventional car when there is a subsidy for HEV.	211	2	5	3.93	.762
I would adopt HEV instead of conventional car when there are discount rates for HEV or promotional activity.	211	2	5	3.95	.797
I would adopt HEV instead of conventional car when HEV is available.	211	2	5	3.49	.765
Valid N (listwise)	211				

Table 14: Descriptive Statistics of Perceived Behavioral Control

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for the independent variable perceived behavioral control. The highest mean was for third item, which was 4.09 with SD = 0.764, and lowest mean was for the last item and fourth item, which was 3.49 for both with SD = 0.765 and 0.746. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
I intend to adopt HEV because it is less polluting.	211	2	5	3.51	.789
I will adopt HEV even if it is more expensive than non-electric car.	211	1	5	2.96	.982
I am willing to adopt a HEV when adopting a vehicle in the near future.	211	2	5	3.71	.816
I intend to adopt a HEV when adopting a vehicle in the near future.	211	2	5	3.40	.880
I plan to adopt a HEV when adopting a vehicle in the near future.	211	1	5	3.25	.974
Valid N (listwise)	211				

Table 15: Descriptive Statistics of Dependent Variable (Consumer Intention)

The table above shows the descriptive statistics, maximum, minimum, mean, and standard deviation for the dependent variable consumer intention to adopt HEV. The highest mean was for third item, which was 3.71 with SD = 0.816, and lowest mean was for the second item, which was 2.96 with SD = 0.982. As the values of standard deviation was small with reference to mean, the deviation or variance in the data is small.

4.3 NORMALITY TESTING

Descriptive Statistics							
	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Relative_Advantage_IV1	211	3.5213	.51720	.289	.167	.888	.333
Compability_IV2	211	3.5296	.70964	-.080	.167	-.419	.333
Environmental_Concern_IV3	211	3.8555	.54242	.051	.167	-.083	.333
Subjective_Norms_IV4	211	3.2204	.65304	.270	.167	.090	.333
Perceived_Behavioural_control_IV5	211	3.8226	.55123	-.220	.167	-.262	.333
Intention_to_adopt_DV	211	3.3640	.80299	-.280	.167	-.711	.333
Valid N (listwise)	211						

Table 16: Normality Test

The normality test was conducted to find whether or not the data is symmetrical and normally distributed. Skewness and kurtosis were used for the normality testing. The skewness represents the symmetricity of the data and to interpret the value of skewness value, the values within the range of +1 to -1 indicates that the data distribution is symmetric. If the value goes beyond the given

range, the data is said to be unsymmetrical, either it is rightly skewed in case of value above positive 1 and can be left skewed in case of value below negative 1. For the current data set, the values of skewness were between -0.080 to 0.280, which lies within the given range.

Thus, the data distribution is considered symmetric. The kurtosis represents the heaviness of tails, and for the interpretation of the kurtosis values, the acceptable range is +3 to -3 and if the values are within this range, the distribution of data is considered to be normally distributed. The current data, the values were within the given range, the values below or above this range indicates the distribution is either leptokurtic or mesokurtic. Thus, the data is concluded as normally distributed.

4.4 RELIABILTY TESTING

	Reliability Statistics		
Variables	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Relative_Advantage_IV1	.868	.869	5
Compability_IV2	.925	.925	4
Environmental_Concern_IV3	.937	.939	6
Subjective_Norms_IV4	.920	.920	6
Perceived_Behavioural_control_IV5	.862	.860	7
Intention_to_adopt_DV	.942	.944	5

Table 17: Reliability Test

For the reliability testing, the Cronbach alpha was used which represents the internal consistency of the items in the scale. For each variable, the Cronbach alpha as the measure of reliability was calculate. For the interpretation of reliability values, the value that is the closer the value is to 1, the higher is the internal consistency of the scale. The values between 0.0 to 0.5 suggest that there is weak reliability, 0.6 to 0.7 suggest that there is good consistency, and values above 0.8 shows substantially high degree of internally consistency of scale. If the value crosses 0.95, it indicates that the data is unrealistically high in internal consistency,

which indicates the redundancy of the data or items. For the current data set, the value of Cronbach alpha for relative advantage was 0.86, compatibility was 0.925, environmental concern was 0.939, subjective norms were 0.920, perceived behavioral control was 0.860 and finally for intention to adopt was 0.944. Thus, all variables show substantially high level of internal consistency.

4.5 HYPOTHESIS TESTING

4.5.1. Pearson Correlation

Correlations

		Relative_Advantage_IV1	Compatibility_IV2	Environmental_Concern_IV3	Subjective_Norms_IV4	Perceived_Behavioural_control_IV5	Intention_to_adopt_DV
Relative_Advantage_IV1	Pearson Correlation	1	.721**	.614**	.692**	.647**	.756**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	211	211	211	211	211	211
Compatibility_IV2	Pearson Correlation	.721**	1	.637**	.706**	.722**	.826**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	211	211	211	211	211	211
Environmental_Concern_IV3	Pearson Correlation	.614**	.637**	1	.608**	.709**	.759**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	211	211	211	211	211	211
Subjective_Norms_IV4	Pearson Correlation	.692**	.706**	.608**	1	.631**	.816**

	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	211	211	211	211	211	211
Perceived_Behavioural_control_IV5	Pearson Correlation	.647**	.722**	.709**	.631**	1	.748**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	211	211	211	211	211	211
Intention_to_adopt_DV	Pearson Correlation	.756**	.826**	.759**	.816**	.748**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	211	211	211	211	211	211
**. Correlation is significant at the 0.01 level (2-tailed).							

Table 18: Pearson Correlation

For testing the relationship between the continuous variables, Pearson correlation was used, which indicates the strength direction and significance of relationships. The tables shows that the relative advantage has significant and positive correlation with the intention to adopt HEV, with r= 0.756 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant. The compatibility has significant and positive correlation with the intention to adopt HEV, with r= 0.826 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant. The environmental concern has significant and positive correlation with the intention to adopt HEV, with r= 0.759 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant.

The subjective norms have significant and positive correlation with the intention to adopt HEV, with r= 0.816 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant. Finally, the perceived behavioral control has significant and positive correlation with the intention to adopt HEV, with r= 0.756 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant.

4.5.2 Regression Analysis

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.919[a]	.845	.842	.31951
a. Predictors: (Constant), Perceived_Behavioural_control_IV5, Subjective_Norms_IV4, Environmental_Concern_IV3, Relative_Advantage_IV1, Compability_IV2				
b. Dependent Variable: Intention_to_adopt_DV				

Table 19: Model Summary

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	114.478	5	22.896	224.271	.000[b]
	Residual	20.928	205	.102		
	Total	135.406	210			
a. Dependent Variable: Intention_to_adopt_DV						
b. Predictors: (Constant), Perceived_Behavioural_control_IV5, Subjective_Norms_IV4, Environmental_Concern_IV3, Relative_Advantage_IV1, Compability_IV2						

Table 20: Anova

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.573	.183		-8.612	.000
	Relative_Advantage_IV1	.170	.068	.109	2.487	.014
	Compability_IV2	.345	.054	.305	6.384	.000
	Environmental_Concern_IV3	.361	.061	.244	5.877	.000
	Subjective_Norms_IV4	.404	.053	.329	7.667	.000
	Perceived_Behavioural_control_IV5	.112	.066	.077	1.689	.093
a. Dependent Variable: Intention_to_adopt_DV						

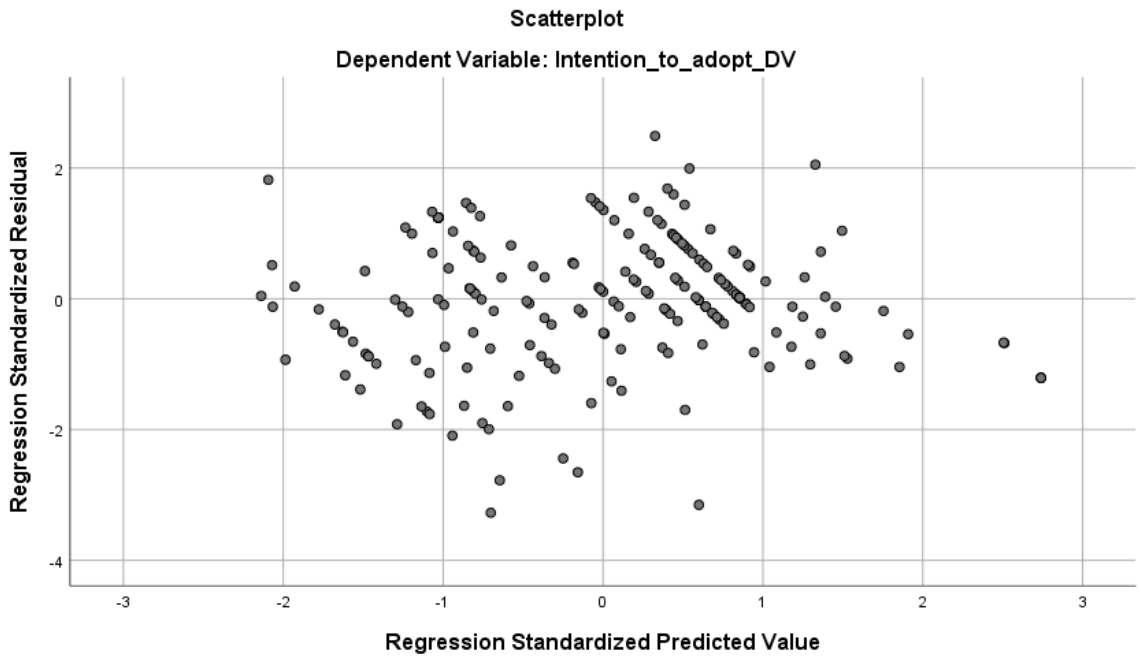
Table 21: Coefficients

To predict the variance in the dependent variable consumer intention to adopt HEV, Multiple Linear regression was used. All the independent variables of the study relative advantage, compatibility, environmental concern, subjective norms and perceived behavioral control entered into the model. The value of R that is shown in the table represents the quality of prediction and entails the existence of linear relationship between the variables IVs and DV, which in this case is 0.919, which is regarded as good. The R square, which represents the coefficient of determination which is equals to 0.84 in this case. This implies that 84% if the variance DV can be attributed to the variances in the independent variables enlisted.

The ANOVA table of regression in our results have shown that that the dependent variables significantly predict the consumer intention to adopt HEV, with F (5, 205) = 224.271, where the p value is 0.000, and the results is statistically significant. The coefficient table represents the variance caused by the independent variables individually, and the significance of that. All of the variables are listed, and the relative advantage positively predicts the intention to adopt HEV, B= 0.109, and the result is statistically significant with p=0.014 ($p < 0.05$), thus H1 is accepted. Second IV compatibility also positively predicts the intention to adopt HEV, B= .305, yet the result is statistically significant with p=0.000 ($p < 0.05$), thus H2 is accepted.

The environmental concern positively predicts the intention to adopt HEV, B= 0.244, and the result is statistically significant with p=0.000 ($p < 0.05$), thus H3 is accepted. The subjective norms positively predict the intention to adopt HEV, B= 0.329, and the result is statistically significant with p=0.000, thus H4 is accepted. Finally, the perceived behavioral control is the only independent variable that has no significant relationship with the intention to adopt HEV, considering that its results from regression test is B = 0.077, P-value = 0.093, as its p-value is higher than 0.05.

In conclusion, it can be analyzed that H1 to H4 are accepted because their p-value is less than 0.05 in the regression test, while H5 is rejected as its p-value is higher than 0.05. This indicates that relative advantage, compatibility, environmental concern, subjective norm has significant and positive influence towards the intention to adopt HEV, except for perceived behavioral control.



4.6 SUMMARY OF HYPOTHESIS

H1: There is a significant relationship between relative advantage and consumers intention to adopt hybrid electric vehicles in Malaysia. Accepted (p-value = 0.014)

H2: There is a significant relationship between compatibility and consumers intention to adopt hybrid electric vehicles in Malaysia. Accepted (p-value = 0.000)

H3: There is a significant relationship between pro-environment and consumers intention to adopt hybrid electric vehicles in Malaysia. Accepted (p-value = 0.000)

H4: There is a significant relationship between subjective norms and consumers intention to adopt hybrid electric vehicles in Malaysia. Accepted (p-value = 0.000)

H5: There is no significant relationship between perceived behavioral control and consumers intention to adopt hybrid electric vehicles in Malaysia. Rejected (p-value= 0.093)

CHAPTER 5 : DISCUSSION AND CONCLUSION

5.0 INTRODUCION

The current study was conducted on hybrid electric vehicle (HEV) adoption. The research intended to find whether the consumer attitudes towards electric vehicles, subjective norms, and perceived behavioural control, technology acceptance, and environmental awareness have any bearing on consumers adoption intention and decisions for environmentally friendly vehicles. For that, quantitative analysis was conducted, and as the aims of this research were to look into the key factors that influence people's willingness and intention to adopt HEV, questionnaires were used that were designed based on a previous instrument. The results have been described in previous chapter.

Among the sample, 53% were males and 46% were females. For age, 31 to 40 years old were 28% of the total sample, followed by 22% who were from age group 26 to 30 years old. The normality testing was conducted, and results showed that the values of skewness and kurtosis were within the given range, and the data was normally distributed. Further, the reliability was confirmed and them the correlational and regression analysis was conducted.

5.1 DISCUSSION OF RESEARCH QUESTIONS AND HYPOTHESES

5.1.1 Research Question 1 and Hypothesis 1

First research question was "*What is the relationship between relative advantage and consumer's intention to adopt hybrid electric vehicle (HEV) in Malaysia?*" and based on this, H1 *"There is a significant relationship between* ***relative advantage*** *and consumers intention to adopt hybrid electric vehicles in Malaysia*" was developed. To determine the relationship, correlational analysis was conducted, and the results showed that the relative advantage has significant and

positive correlation with the intention to adopt HEV, with r= 0.756 and p=0.000. As the value of p is smaller than 0.05, the relationship is significant.

The regression was conducted to test the hypothesis, and results have shown that the relative advantage positively predicts the intention to adopt HEV, and the result is statistically significant with p=0.000, thus H1 is accepted. Similar results were found previous research which have stated that the relative advantage is a critical factor in determining whether or not new innovative items are adopted. In line to our research results, the study by Tornatzky and Klein (1982) have also found out that the relative advantage is considered as the critical element determining innovation uptake. As stated by Rogers (1995), aligned to this result, the innovation diffusion theory also has established that the relative advantage can be conceptualized as a multidimensional construct and the relative advantage of new innovation adoption determines the convenience, trust, and efficacy of information acquisition, and thus impact the adoption of technology.

Further, the research by Wu et al. (2010) also found out same results that both of the variables are linked. The research has stated that the relative advantage is one of the factors that influences consumers' willingness to buy biofuels and hydrogen-powered cars in Taiwan. Thus, the results of previous studies are similar to current results.

5.1.2 Research Question 2 and Hypothesis 2

Based on the second research question, “What is the relationship between c***ompatibility*** *and consumers intention to adopt hybrid electric vehicles in Malaysia* was asked in the early phase before, while ”H2 *“There is a significant relationship between* ***compatibility*** *and consumers intention to adopt hybrid electric vehicles in Malaysia*” was also developed. To determine the relationship, correlational analysis was conducted, and the results showed that the compatibility has significant and positive correlation with the intention to adopt HEV. As the value of p is smaller than 0.05, p=0.000, the relationship is significant.

The regression was conducted to test the hypothesis, and results have shown that the compatibility positively predicts the intention to adopt HEV, and the result is statistically significant with p=0.000, thus H2 is accepted. Similar results were found by many studies such as the research of Kotler & Armstrong, (2012) who stated that in order to adopt new technology, it must be compatible with the lives. Further, similarly, Zaltman & Lin, (1971) when the technology is not compatible, the innovation or invention contradicts their beliefs, the less likely they are to accept it.

Similar results were found out by Graham-Rowe et al., (2012) that the issue of HEV compatibility with customers' daily lives and habits, like other innovations and eco-innovations, has been identified as a major contributing element for potential adopters, and study by Peters and Dütschke, (2014) have stated that it significant predicts the consumer adoption. As per the current study, aligned to the research, results by Wu et al. (2010) indicated that the compatibility is positively associated to consumers' willingness to purchase biofuels or hydrogen-powered vehicles.

Furthermore, another research has also found relevant results that the adoption of hybrid cars may be influenced by their compatibility with green principles and support from personal references (Ozaki and Sevastyanova, 2011). Thus, the results of previous studies are similar to current results.

5.1.3 Research Question 3 and Hypothesis 3

Based on the third research question, "*what is the relationship between environmental concern and consumers intention to adopt hybrid electric vehicles in Malaysia*" and the hypothesis, H3 *"There is a significant relationship between environmental concern and consumers intention to adopt hybrid electric vehicles in Malaysia*" was developed as well. To determine the relationship, correlational analysis was conducted, and the results showed that the environmental concern has significant and positive correlation with the intention to adopt HEV. As the value of p is smaller than 0.05, p=0.000, the relationship is significant.

The regression was conducted to test the hypothesis, and results have shown that the environmental concern positively predicts the intention to adopt HEV, and the result is statistically significant with p=0.000, thus H3 is accepted. In line with this, consumers are drawn to HEVs by environmental protection, which outweighs the impact of energy savings, according to Beck et al.

Further, the research by Follows & Jobber, (2000) have similarly, discovered that some customers consider social and environmental issues while making purchasing decisions because they wish to improve the environmental quality, thus their adoption to environmentally friendly products such as HEV in increased. Similar to this, our study found out that the increased environmental concern predicts high degree of acceptance and adoption of HEV, and as stated by Bamberg and Möser, (2007) the motivational mix, concern for others and the ecology and normative theories can all be utilised to explain the pro-environmental behaviour, and they shape the consumer adoption of HEV.

Furthermore, the research by Egbue and Long, (2012) have also discovered that the environmental concern is frequently assessed in EV research by asking whether customers regard climate change as a serious problem and whether they are prepared to individually contribute to the solution, such as reducing traditional gasoline vehicle usage and purchasing electric vehicles, and it has been seen that they predict the HEV adoption. The research by Carley et al., (2013) also found similar results and thus, previous literature conforms with the current results.

5.1.4 Research Question 4 and Hypothesis 4

Based on the fourth research question, "*what is the relationship between subjective norms and consumers intention to adopt hybrid electric vehicles in Malaysia*" and the hypothesis H4 *"There is a significant relationship between subjective norms and consumers intention to adopt hybrid electric vehicles in Malaysia*" was developed. To determine the relationship, correlational analysis was conducted, and the results showed that the subjective norms has significant and positive correlation with the intention to adopt HEV. As the value of p is smaller than 0.05, p=0.000, the relationship is significant.

The regression was conducted to test the hypothesis, and results have shown that the subjective norms positively predict the intention to adopt HEV, and the result is statistically significant with p=0.000, thus H4 is accepted. In line with this, theory of planned behavior has indicated that the normative influence play significant role on predicting the adoption of any behavior, which in this case is HEV adoption. Similar to this, according to the research done by Jeon et al. (2012), the higher the consumers' perceived subjective norm, the more likely they are to acquire hybrid electric automobiles. Which lead to higher intention to purchase the hybrid electric vehicles by consumers.

In line with the results of the current study, Han et al. (2010) have also found out that the value an individual has to the approval of his or her conduct by others, such as family members and friends, plays a vital impact in a consumer's intents to adopt a HEV. As the current study found that the normative influence affects the adoption of HEV significantly, the research by Abou-Zeid and Ben-Akiva (2011) have also shown that subjective norm has a favorable impact on behavioural intention. The study by Axsen and Kurani (2012) and Castanier et al. (2013) have also found similar results that the due to increased societal pressure, persons who believe they should do a given activity will be more likely to do so. These activities include adopting a certain technologies or innovations. Consumers' decisions on whether or not to buy a HEV are influenced not only by themselves, but also by their family members and friends.

5.1.5 Research Question 5 and Hypothesis 5

Based on the fifth research question, "*what is the relationship between perceived behavioral control and consumers intention to adopt hybrid electric vehicles in Malaysia*" and hypothesis H5 *"There is a significant relationship between perceived behavioral control and consumers intention to adopt hybrid electric vehicles in Malaysia*" was developed. To determine the relationship, correlational analysis was conducted, and the results showed that the perceived behavioral control has significant and positive correlation with the intention to

adopt HEV. As the value of p is smaller than 0.05, p=0.000, the relationship is significant.

The regression was conducted to test the hypothesis, and results have shown that the perceived behavioral control positively predict the intention to adopt HEV, and the result is statistically insignificant, thus H5 is rejected. Although the previous studies have found significant results such as the study by Moons and De Pelsmacker in 2012, PBC dimensions include consumers' ability to afford electric vehicles and their ability to use them in their daily lives and it effects the knowledge of how to use green products, as well as the ability to do behaviours. The greater the ability of people to alter these parameters, the more likely they are to change their behaviour (Axsen & Kurani, 2013). The current study results could be different mainly due to any distortion in data, or in the design of questionnaire. Furthermore, the insignificant results can also be attributed to small sample size.

5.2 IMPLICATIONS

5.2.1 Theoretical Implications

As there were many literature gaps such as limited literature on the adoption of HEV, even if there were studies, most of them lacked the focus on developing the empirical relationship. The current study is significant as it finds out the factors which impact the adoption of HEV, by developing a comprehensive framework. Although there is very limited information disclose about the public acceptance of electric vehicles from the Malaysian customer's perspectives.

Furthermore, the conflicting and inconsistent results and outcomes of previous studies on predicting hybrid vehicles purchase has raise the needs to further investigate these variables. The current study has been designed based on all these literature gaps and thus can be considered significant as it provides the strong theoretical understanding of the construct and found out factors which affect the consumer adoption. Further, the study is based on more two theories, and thus by combining the theories, the study put forth the good theoretical picture of adoption of HEV.

5.2.2 Practical Implications

As the current study has found what factors can influence the adoption of HEV among the Malaysian consumers, the study practically guides the automakers about what aspects they need to focus in order to enhance their consumer base. As the manufacturers of HEV, seek to employ technology to reduce greenhouse gas emissions by prioritizing the usage of electric automobiles, the current study would enhance adoption of HEV, and in turn would be beneficial for the society and environment overall. By the implementation of current results, the adoption of environmentally friendly products can be increased, and the results thus can practically provide ways to achieve goal of 2025, that all new models marketed in Malaysia would be environmentally friendly (Ee, 2017).

The current study by putting forth the factors which influence the adoption of HEV, current study significantly contributes the green environment, and thus can be helpful in citizens' increased obligation to be more responsible and appreciative of the environment, as well as the future's sustainability. The current study thus has many practical implications, by discovered factors effecting the consumer behavior and shaping their degree of adoption, and thus are useful for local automobile manufacturers to build hybrid electric vehicle that can meet the preferences of their consumers. Manufacturers can plan and develop marketing strategies accordingly to result in more green automobiles being delivered to customers. Thus, current study has major practical implication that it encourages the local manufacturers to develop green automobiles on a constant basis and encouraging customers to choose green cars can significantly reduce air pollution in Malaysia.

Furthermore, as the study has found that the normative influence has significant affect, the study results suggests that the people when surrounded by environmentally concerned people, and with those who adopt HEV, tend to have higher likelihood of adopting the HEV. Thus, the manufacturers can design the marketing more effectively such as by using celebrity endorsement. Further, as environmental concern plays significant role in adoption of HEV, the manufacturers can also enhance their marketing by promoting the environmental awareness campaigns, in order to enhance their sales. Thus, the current study results can be implied in many ways, which would be beneficial for not only the seller but also for

the user. Further, by getting the result, more evidence can be collected to support how importance government policies and subsidies is towards the adoption rate of HEV in Malaysia.

5.3 LIMITATION

First or foremost limitation of the current study is methodological in nature, which is, the current study results are based on smaller sample. As the results are to be generalized on consumers of Malaysia, which means the population of whole country is included, the sample size is not limited for the investigation and the results generated from one to two areas based on the convenient sampling cannot be considered generable to the whole country.

Second limitation also links with the sampling, that the current study is based on the homogenous sample, as the convenient sampling was done based on the ease of researcher. The systematic sampling such as systematic random sampling or quota sampling which is based on specific proportion from each group. Due to this, the homogenous sample was included in the study as sample, and thus the results cannot be considered effective and generalizable to population from all ethnicities and states, because each individual with different background has different viewpoint.

Third limitation is lack of causality between the variables. As the design was correlation, that only shows the relationship between the variables, and regression can also show the prediction of one variable due to another, however, the results cannot sufficiently describe that all these independent variables actually cause the dependent variable. Thus, this is one of the major methodological limitations of current study which future researchers can address.

Finally, the theoretical understanding of the construct is although based on sound and string theories, yet the current study lacks many controls and confounding variables, which might have interfered with the outcomes of the study. These variables are the variables which might affect the outcome variable, and the variance is wrongly attributed to the independent variables. Such as the education

level, performance expectancy, or expected financial resources needed to adopt to the HEV can significantly impact the HEV adoption which current study has apparently ignored.

5.4 FUTURE RECOMMENDATIONS

Based on the above-mentioned limitation, the future researchers can go for larger sample, which includes the sample entities from different areas. Future researchers can use the quota sampling to include sample form different states or ethnicities of Malaysia in equal proportion, so that the results come out from people of different background and can be generalizable to whole population. Or alternatively, the studies can individually target areas or states one by one to understand the individuals from different background.

Furthermore, as the correlational design opted in the current study only shows the relationship between the variables, and regression can also show the prediction of one variable due to another, the future researchers can design the experimental or quasi experimental study design to understand the causal relationship between the variables. Such as the researcher can develop quasi experimental research design and finds out whether the environmental concern causes the HEV adoption by giving intervention of environment awareness classes. The researcher can compare the intention to adopt HEV after and before environmental awareness classes/ workshops to make inferences.

Finally, based on the last limitation, the future researchers can design more comprehensive and detailed framework which includes the control variables such as education level, living conditions and mediators such as performance expectancy which might interfere with the results. These variables are the variables which might affect the outcome variable, and the variance is wrongly attributed to the independent variables, thus future studies need to focus on them.

5.5 CONCLUSION

All in all, the climate change and carbon emission issues has become one of the biggest ordeals on this millennium, thus has also become an important worldwide issue. Since most modes of transportation require burning of fossil fuels, the transport sector has become one of the key contributors as the main emitter of carbon dioxide and ranks second after electric power as the largest source of carbon emissions in the world. As a solution, Electric vehicles (EVs) are recommended, which derive motive power exclusively from onboard electrical battery packs that can be charged with a plug through an electric outlet.

Presently, the EVs on the market not only include Battery Electric Vehicles (BEVs), but also Hybrid Electric Vehicles (HEVs), are also widely promoted as eco-friendly vehicles. The current study was conducted on hybrid electric vehicle (HEV) adoption. The research has hypothesized that the consumer attitudes towards electric vehicles (relative advantage and compatibility), subjective norms, and perceived behavioral control, and environmental awareness have significant relationship with the consumers adoption intention and decisions for environmentally friendly vehicles (HEVs). The quantitative method was opted, and the data was collected using the questionnaires. The results of the correlational analysis found out that all variables are significantly correlation.

For hypothesis testing, regression was performed, which shows that H1 to H4 are accepted because their p-value is less than 0.05 in the regression test, while H5 is rejected as its p-value is higher than 0.05. This indicates that relative advantage, compatibility, environmental concern, subjective norm has significant and positive influence towards the intention to adopt HEV, except for perceived behavioral control.

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APPENDIX

Factors Influencing Consumers' Intention to Adopt Hybrid Electric Vehicles (HEV) in Malaysia

Dear Respondents

Greeting To All!

I am conducting a quantitative research study on the topic of "Factors Influencing Consumers' Intention to Adopt Hybrid Electric Vehicles (HEV) in Malaysia".

I would like you to PARTICIPATE in this Online Survey which will take only (20) twenty minutes to complete it and your answers are very important for me to ensure the validity and reliability of the results of the study.

Kindly TAKE NOTE, there is no right or wrong answers to the questions. Your participation will be treated as highly confidential and anonymous under the Personal Data Protection Act 2010 and all information's will be used only for academic purposes in the University.

Lastly, I would like to thank you for your valuable time on my Online Survey participation and would appreciate if you could share this with others too.

I am looking forward to receiving your responses with your honest answers as it is essential for me to complete the research successfully.

Thank you in anticipation.

Section A:

In this section, we would like you to fill in some of your personal details. Please tick your answer and your answers will be kept strictly confidential.

QA 1: GENDER

- Female
- Male

QA 2: Age

- 18 to 25 years old
- 26 to 30 years old
- 31 to 40 years old
- 41 to 50 years old
- 51 and above

QA 3: Educational Level

- Primary School
- Secondary School
- Diploma
- Bachelors' Degree
- Master's Degree
- Ph.D

QA 4: Monthly Income

- Less than RM2000
- RM 2001 – RM 4000
- RM 4001 – RM 6000
- RM6001 and above

QA 5: Occupation

- Government Sector
- Private Sector
- Self-Employment
- Student

Section B:

This questionnaires is seeking your opinion regarding the importance of different types of consumption values and purchase intention. Respondents are asked to indicate the extent to which they agreed or disagreed with each statement using 5-Point Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree] response framework. Please circle one number per line to indicate the extent to which you agree or disagree with the following statements.

NO	QUESTIONS	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
IV1	**Relative Advantage (RA)** Based on your perception, what is the value / advantages for using a Hybrid Electric Vehicles (HEV) as per below statements:					
RA1	HEV better for fuel efficiency.	1	2	3	4	5
RA2	HEV offers value for money.	1	2	3	4	5
RA3	HEV can save a lot of money.	1	2	3	4	5
RA4	HEV would be economical.	1	2	3	4	5
RA5	HEV have excellent acceleration.	1	2	3	4	5

NO	QUESTIONS	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
IV2	**Compability (C)** Based on your perception, what is the value that reflect you for using a Hybrid Electric Vehicles (HEV) as per below statements:					
C1	Adopting HEV will have positive effect on my image.	1	2	3	4	5

C2	Adopting HEV is ideals for my working style.	1	2	3	4	5
C3	Adopting HEV is ideals with my lifestyle.	1	2	3	4	5
C4	Adopting HEV is favourable for me.	1	2	3	4	5

NO	**QUESTIONS**	**STRONGLY DISAGREE**	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
IV3	**Environmental Concern (EC)** Based on your perception, what is the value using a Hybrid Electric Vehicles (HEV) that reflect your environmental concerns:					
EC1	I think environmental problems are becoming more and more serious in recent years.	1	2	3	4	5
EC2	I think human beings should live in harmony with nature in order to achieve sustainable development.	1	2	3	4	5
EC3	I think we are not doing enough to save scarce natural resource from being used up.	1	2	3	4	5
EC4	I think individuals have the responsibility to protect the environment.	1	2	3	4	5
EC5	I think adopting HEV can reduce the pollution level.	1	2	3	4	5
EC6	I think adopting HEV can reduce environmental harm.	1	2	3	4	5

NO	QUESTIONS	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
IV4	**Subjective Norms (SN)** Based on your perception, what is the value for you to own a Hybrid Electric Vehicles (HEV) that reflect your social status:					
SN1	Most people who are important to me think I should adopt a HEV when adopting a vehicle in the near future.	1	2	3	4	5
SN2	When considering adopting a HEV, I wish to do what people who are important to me want me to do.	1	2	3	4	5
SN3	If I buy a HEV, then most people who are important to me would also buy a HEV.	1	2	3	4	5
SN4	People whose opinions I value would prefer that I adopt a HEV when adopting a vehicle in the near future.	1	2	3	4	5
SN5	I learned so much about green car from my friends and family.	1	2	3	4	5
SN6	I will follow the advice of my family that I should buy green car.	1	2	3	4	5

NO	QUESTIONS	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE
IV5	**Perceived Behavioural Control (PBC)** Based on your perception, what is your behavioural concern for you to own a Hybrid Electric Vehicles (HEV):					

PBC1	The price of a HEV is important to me and I can afford it when I decide to adopt.	1	2	3	4	5
PBC2	The maintenance and repair of a HEV is important to me when I decide to adopt.	1	2	3	4	5
PBC3	I can find where to buy a HEV if I wanted to.	1	2	3	4	5
PBC4	I would adopt HEV instead of conventional car under worsening environmental conditions.	1	2	3	4	5
PBC5	I would adopt HEV instead of conventional car when there is a subsidy for HEV.	1	2	3	4	5
PBC6	I would adopt HEV instead of conventional car when there are discount rates for HEV or promotional activity.	1	2	3	4	5
PBC7	I would adopt HEV instead of conventional car when HEV is available.	1	2	3	4	5

NO	**QUESTIONS**	**STRONGLY DISAGREE**	**DISAGREE**	**NEUTRAL**	**AGREE**	**STRONGLY AGREE**
DV	**Intention to adopt a HEV (IA)**					
IA1	I intend to adopt HEV because it is less polluting.	1	2	3	4	5
IA2	I will adopt HEV even if it is more expensive than non-electric car.	1	2	3	4	5
IA3	I am willing to adopt a HEV when adopting a vehicle in the near future.	1	2	3	4	5

IA4	I intend to adopt a HEV when adopting a vehicle in the near future.	1	2	3	4	5
IA5	I plan to adopt a HEV when adopting a vehicle in the near future.	1	2	3	4	5