# The Influences of Malaysian Intention to Adopt Electric Vehicles (EVs)

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**DOI: https://dx.doi.org/10.47772/IJRISS.2025.92800047**

**Received: 12 November 2025; Accepted: 20 November 2025; Published: 29 December 2025**

## ABSTRACT

The study overview of the current automotive market in Malaysia, emphasizing the need for a transition to electric mobility to reduce carbon emissions and dependency on fossil fuels. The problem statement stresses the necessity of identifying the factors influencing Malaysian consumers' intention to adopt EVs, noting the potential economic and environmental benefits of widespread EV adoption. The research questions focus on the consumers' intention to adopt EVs and aim to evaluate the key determinants of EV adoption among Malaysian consumers. The scope and limitations of the study specify that it concentrates on consumers in South zone of Malaysia and employs the final version of the Technology Acceptance Model (TAM 1.0) by Venkatesh and Davis (1996). The study will distribute questionnaires to a representative sample of 345 respondents, and the findings will be generalized to the regional context. Limitations include the regional focus and potential variations in consumer behaviour across different areas. The significance of the study lies in providing insights into the factors driving EV adoption, which can inform policymakers, automakers, and stakeholders in developing effective strategies for promoting EV usage. This research serves as a valuable reference for understanding consumer behaviour towards EVs and supporting the transition to sustainable mobility in south zone of Malaysia.

**Keywords**: electric vehicles, purchase intention, adopt and Malaysia

## INTRODUCTION

In order to prevent environmental degradation considering the rising global carbon emissions, it is imperative that further environmental protection measures be implemented. One effective way to do this is to encourage the use of electric vehicles. According to Alanazi (2023), the use of fossil fuels is a primary cause of global warming and, if unchecked, might lead to catastrophic climate change. The emission of carbon dioxide and temperature by traditional fuel-powered engine vehicles adversely impacts the environment and society, it significantly contributing to greenhouse gas emissions (Broadbent et al., 2017).

93% of cars in Malaysia are internal combustion engines, which is almost the highest percentage in the world (Malaysian Automotive Association, 2023). One of the causes for the low percentage of electric vehicles is also the low level of public awareness of these vehicles. First, there isn't enough demand. The Malaysian Automobile Association (MAA) projects that just 2,631 electric vehicles would be sold in Malaysia in 2022. By contrast, the nation sells roughly 720,000 vehicles overall, of which the former makes up a pitiful 0.4%. Furthermore, by the end of 2022, there will be over 30 million registered cars in the country, compared to about 100,000 domestic electric vehicles.

Therefore, sales and the overall quantity of electric vehicles are still negligible when compared to fuel-powered automobiles. It is certain that foreign producers of electric vehicles will be hesitant to establish production facilities in Malaysia. Since 2022, around 18 million cars have been registered in Malaysia, with one car owned by every two individuals. There is a very high automobile density. The Malaysian electric vehicle market is fresh compared to other. Thus, by better knowing Malaysian consumers' choices, local automakers and dealers can gain from studies on their intentions to buy electric vehicles.

During the United Nations Climate Change Conference (UNFCCC) in 2009, the Malaysian government vowed to reduce its annual carbon emissions by 40% by 2020. It is noteworthy, however, that non-renewable practices and policies are absent from the green industry (Muzir et al., 2022). Since fuel-powered vehicles with inadequate emission standards are the main contributors to annual greenhouse gas emissions, new solutions must be developed. The integration of electric vehicle culture into Malaysian economics serves as an example of a feasible approach. Getting people to adopt and use EVs on a broad scale is the issue, the factors like infrastructure, after sales services, regulatory legislation, and maintenance costs that will become the key concerns when Malaysian consumers switch from fuel-powered vehicles to electric vehicles.

The government has announced initiatives including the quick construction of fast charging infrastructure, even though it still urges people to buy electric cars. These steps may be essential for swiftly reducing the amount of oil used in the transportation industry. The Malaysian government has, however, taken very few steps thus far to encourage the switch to electric vehicles. Additionally, this has made consumers less inclined to switch to EVs.

Despite the rapid growth in sales, electric vehicles still account for a relatively tiny percentage of all vehicles. In Malaysia, about 720,000 automobiles will be sold in 2022. Customers still appear to favour fuel-powered cars. It is evident that major players in the electric car industry, including Tesla and BYD, recognize the potential of the Malaysian market for electric vehicles. Furthermore, as of January 1, 2022, the Malaysian government will be offering several tax exemptions for both locally assembled EVs and imported complete EVs.

Customers should expect fewer moving parts in electric automobiles than in traditional ones. Throughout the course of the vehicle's life, this minimizes maintenance requirements and expenses. The advantages electric cars have for the environment inspire some buyers. Air pollution and greenhouse gas emissions can be decreased by driving electric automobiles. Market employment in manufacturing, research and development, and infrastructure development has been spurred by the expanding electric vehicle industry. In these fields, skilled labour is in greater demand as the demand for electric vehicles rises. Lastly, the Malaysian government believes that electric cars achieve public health and environmental objectives. Reducing emissions contributes to better air quality, cheaper medical expenses for illnesses brought on by pollution, and a smaller total environmental effect. Governments might also spend money on infrastructure related to electric vehicles, such charging stations, which can temporarily boost the economy and add jobs.

## LITERATURE REVIEW

This chapter delve deep into understand Malaysian consumer beliefs in influencing the choice for sustainable mobility through the uptake of electric vehicles (EVs). Generally, as the world shifts to adopting sustainable means of transport in a bid to curb environmental degradation as well as use more environmentally friendly means instead of fossil fuels, is it important to know the factors that are influential in EV adoption. Introducing and gradually implementing the use of EVs into this rapidly growing economic environment is Malaysia; it is crucial to gain a working understanding of its consumers. The review being undertaken here seeks to provide an analysis and integration of studies that link perceived usefulness, perceived ease of use, attitude towards EVs, and consumers' intention towards the adoption of EVs. This is done by evaluating previous studies to establish lesions, contradiction and eagerly needed study area. In totality, this review aims at enriching the knowledge of policy makers, industry players, and academicians with imperative findings that relate to sustainable mobility context in Malaysia.

The concept of sustainable mobility encompasses various dimensions and is closely linked to social issues like sustainable development and the Sustainable Development Goals (SDG). Sustainable mobility involves topics such as smart mobility, smart cities, micro-mobility, shared mobility, and Mobility as a Service (MaaS) (Daniela et al., 2023). It is essential to understand the multidimensional nature of sustainable mobility and its connection to broader social issues to effectively address challenges in this field (Manuel et al., 2022).

When defining sustainable mobility, it is crucial to consider its implications for marketing strategies like ecological or green marketing, as well as its alignment with the principles of marketing 3.0 and 4.0.

Additionally, the adoption models of information systems related to sustainable mobility play a significant role in shaping consumer behaviours and preferences towards sustainable urban mobility (Gallo et al., 2020). Understanding these adoption models is vital for promoting the adoption of technological products that support sustainable mobility goals. In the context of sustainable mobility, it is important to address research questions such as the topics frequently discussed in the scientific literature on sustainable mobility and the theoretical frameworks useful for studying adoption models of technological products in this field. By exploring these research questions, gaps in the literature can be identified and filled, leading to a better understanding of sustainable mobility and the factors influencing its adoption. Therefore, when defining sustainable mobility, it is essential to consider its multidimensional nature, its connection to broader social issues, its implications for marketing strategies, and the adoption models that influence consumer behaviours in the context of sustainable urban mobility.

Meanwhile, a vehicle that runs on electricity and is pushed by one or more electric motors utilizing energy stored in rechargeable batteries is known as an electric vehicle (EV). Internal combustion engines (ICEs) in conventional vehicles generate emissions; in contrast, electric vehicles (EVs) are quieter, more responsive, and have a higher energy conversion efficiency (McKinsey, 2023). Due to their ability to reduce greenhouse gas emissions and promote environmentally friendly transportation options, EVs are essential in the shift to sustainable mobility. In Malaysia, where transportation significantly contributes to national greenhouse gas emissions, the adoption of EVs is seen as a key strategy to address environmental concerns and promote sustainable urban mobility (Kalhoro, et al., 2021).

**Factor Influencing Customers' Intention**

The factors influencing customers' intention encompass a range of psychological, social, and environmental elements that impact a customer's decision-making process. It can be convenient factors like the capability of the website and availability of the product, psychological-some aspects put into usefulness and satisfaction, promotional-some elements like discounts and offers, technical with reference to the website and the product, and consumer motivation that involves the values and beliefs. For example, research findings show that attributes like satisfaction and perceived usefulness are crucial factors that affect users' continuing purchase intentions which underlines the significance of other variables into marketing initiatives. It is significant for businesses to consider these aspects since they explain the variances that ought to be managed to improve customer shopping experience.

**Perceived Usefulness**

Perceived Usefulness (PU) is a basic idea to comprehend consumer actions, especially in the field of technology acceptance. It comes from Davis's Technology Acceptance Model (TAM) that was suggested in 1989. The term "perceived utility" focuses on how much one person thinks using a specific system or technology would boost their work output or, more generally, make better his/her everyday tasks and actions. For electric vehicles (EVs), this concept includes advantages people link with switching to EVs such as saving money, helping environment and improving driving experience.

In Malaysia, the major issue regarding supply of electric vehicles is that electricity price doesn't compete well with gasoline price and lack in construction for charging infrastructure. When we talk about EVs (Electric Vehicles), they have less mileage on single charge compared to ICEVs (Internal Combustion Engine Vehicles). Thus, how to charge quickly becomes a pressing problem which needs solving by electric vehicles (Thean, Hon & Sade, 2023).

Government incentives, according to some researchers, might promote the usage of electric vehicles more often. EV adoption may also be aided by their cheaper operating and maintenance expenses. In the end, the initial greater cost of buying electric cars is offset by a drop in total ownership expenses. Government financial policies play a crucial role in promoting the use of electric vehicles. Studies have shown that purchase tax reductions have a significant impact on consumers' purchase intentions. European customers are particularly concerned about maintenance costs and import taxes for electric vehicles, as evidenced by research conducted by Plötz et al (2014) and Hidrue et al (2011). These findings suggest that these regulations could incentivize people to buy electric vehicles.

The rise of technology continues to enhance the capabilities, safety features, and driving range of electric vehicles (EVs). Consumers place significant importance on these characteristics. Practical studies indicate that, in addition to environmental and social factors, vehicle performance is crucial (Amin et al., 2020). In a study by Egbue and Long (2012), potential buyers identified EV performance aspects such as safety, reliability, and driving range as barriers to adoption. While the environmental and sustainability benefits of EVs are recognized, vehicle performance factors often have a greater influence on adoption decisions.

The findings suggest that, even though EV owners are responsive to environmental considerations, the primary factors influencing their decision to purchase another EV include safety, reliability, cost, and driving range. Consumers prioritize performance and convenience in their purchasing decisions. Dutta and Hwang (2021) demonstrated that performance attributes significantly impact consumers' intentions to buy, with individual decisions being shaped by perceptions and beliefs about vehicle performance.

The driving experience is another crucial factor influencing the decision to purchase electric vehicles (EVs). While its impact may not be as immediate as cost and financial incentives, it still plays a significant role in consumer considerations. Research by Kihm and Trommer (2014) suggests that consumers who purchase EVs often view their performance, quietness, and safety as being superior compare to those of traditional fuel powered vehicles.

**Perceived Ease of Use**

Perceived ease of use deals with how easy or hard users consider a particular technology to be as identified by (Venkatesh & Davis, 1996). It takes an interest in matters concerning usability in terms of whether users consider the technology simple to use or is considered complex. Regarding the purchase intention, users with the inclination to adopt new technology accommodation, these users have a better appreciation of the new technology that would enable them to use them and their intention to purchase the new technology altogether.

In recent years, there has been a noticeable increase in the popularity of EVs, which may pose challenges for some older and less tech-savvy consumers. Transitioning from a traditional wired phone to a smartphone also requires a learning curve. This highlights the importance of public relations efforts to raise awareness and promote social acceptance of electric vehicles, as well as educate consumers on their convenient use.

Consumers' views on the ease of using electric vehicles are influenced by various factors such as awareness, education, government policies, technology, and personal experience. As the EV market expands and technology advances, it is crucial for companies in this industry to address these factors to make EVs more accessible and accepted by a wider population. A key factor that directly impacts perceived ease of use is consumers' confidence in operating electric vehicles (Müller, 2019). If EVs are seen as user-friendly and convenient, this positive perception can significantly influence purchasing decisions and improve overall awareness and acceptance of EV technology.

Additionally, manufacturers and policymakers need to focus on simplifying the user interface and improving the charging infrastructure to further reduce barriers to adoption. Providing comprehensive education and information about the benefits and functionalities of EVs can also play a crucial role in shaping positive consumer perceptions. Effective communication strategies and hands-on experiences, such as test drives and demonstrations, can help potential buyers feel more confident in their ability to use and benefit from electric vehicles.

All of these research studies showed significant evidence supporting the moderating effect, as seen in the strong correlation between how easy people perceive new technologies to be and their intended use. As discussed in the literature review of this study, previous research has produced conflicting results about the connection between perceived ease of use and the intention to purchase electronic vehicles. Therefore, it is crucial for this study to explore this relationship.

**Social Influence**

The incorporated variable, Social influence (SI) for this study, is defined as an individual’s perception influenced by their surroundings of people such as family, friends, colleagues, etc., and their belief they should

use a particular technology or system (Venkatesh et al., 2003). Social influence is not confined to certain groups; it can be found in a variety of social contexts and shapes people's beliefs and actions through compliance, acknowledgment, and acceptance of norms and expectations (Qourrichi, 2023). In these circumstances of EV usage, social influences like subjective norms and image are the factors that impact urban areas' working adults' perception of intention to use EVs from social pressure or support from their social networks.

Previous studies have shown that social influence is a major factor in determining a person's intention to use an electric vehicle. Based on the study on intention to use electric vehicles in the Himalayan region by using the UTAUT model, founds no impact in regards to social influence towards influencing EV intention (Singh et al., 2023). On the other hand, a study carried out to determine the impact of social influence and image towards initial technology usage, the result shows that social influence does not have a substantial impact on first-hand usage of technology while image could be a strong predicator on behavioral intention to use EV (Lampo & Silva, 2022). Although, certain studies emphasis that social influence does not show strong influence in the context, there are still studies that show intention to use EVs is positively affected by social influence as a critical factor in UTAUT which subjective norm and image are essential for EV owners (Silva et al., 2022).

**Facilitating Conditions**

Facilitating conditions is the extent to which a person believes that an organisational and technological infrastructure is in place to support the deployment of a system or technology (Venkatesh et al., 2003). Facilitating conditions under EV usage, supportive policies, incentives, and infrastructure are the aspects that are possible to achieve and encourage working adults in urban areas to use EVs.

Previous studies stated that facilitating conditions have a significant influence on the intention to use electric vehicles (Singh et al., 2023; Jain et al., 2022). Facilitating conditions like the accessibility of charging stations and government initiatives are the key players to drive the intention to use electric vehicles. In Malaysia, the limited coverage of public charging stations is frequently cited as a key obstacle hindering greater EV uptake (Shakir et al., 2021; Yong et al., 2021), and therefore followed by (Muzir et al. (2022), concluded that perceived accessibility of public charging stations played a significant role in shaping Malaysian' specifically working adults' intentions to use EVs. Aside from infrastructure, government efforts such as tax exemption, financial subsidies, etc. are also significant in affecting working adults in urban areas. For example, stimulus plans launched by European governments and financial incentives such as tax reductions have significantly increased the number of electric vehicle registrations in Europe (Ajanovic, 2022). Purchasing data on electric vehicles from multiple nations that provide infrastructure and support policies such as rebates and tax reductions for EV owners has shown a positive influence on electric vehicle usage (Randmaa et al. 2017 as cited Ramachandran et al, 2023).

Despite that, a study conducted in Malaysia regarding EV usage indicates that the intention to use electric vehicles is negatively impacted by facilitating conditions, their respondent included lecturers, postgraduate students, and employees in Kuala Lumpur (Khazaei, 2019). Hence, it is essential to further study the relations of facilitating conditions whether it is significance or positive and negative influence on consumers' intention to use EVs in South Malaysia.

**Changing Effect of Attitude toward EVs**

Attitudes represent an individual's subjective experience concerning their intentions and inclinations, making consumer attitudes towards electric vehicles (EVs) diverse and non-uniform. Attitudes encapsulate evaluations and judgments about a product or service, reflecting an individual's assessment of a firm, product, or service. According to past research, attitudes consist of three components: behavioural, affective, and cognitive. The cognitive component relates to a person's beliefs, thoughts, and perceptions regarding an object or cause (Dasharathraj et al., 2020). In the context of electric vehicles, cognitive aspects of attitudes may include beliefs about the environmental benefits or drawbacks of EVs, and the level of trust or distrust in the new technologies used in these vehicles. For instance, some individuals might perceive electric vehicles as environmentally friendly and technologically advanced, while others might have reservations about their reliability or environmental impact.

Research on the preferences of electric vehicle consumers in China and found that consumers' environmental attitudes indirectly impact their intention to adopt electric vehicles. The study revealed a positive association between pro-environmental attitudes and the acceptance of hybrid electric vehicles, indicating that positive environmental beliefs can positively influence consumer attitudes towards EVs (Wang et al. 2017). The intention to adopt electric vehicles (EVs) is influenced by cognitive and subjective norms. Participants with a stronger inclination towards EVs also showed higher levels of acceptance for the new technologies integrated into these vehicles and a better understanding of environmental protection in daily life (Kim & Park, 2011).

According to Trivedi and Kishore (2020), attitudes play a crucial role in determining purchase intentions, and marketers shouldn't undervalue this influence. Sheth and colleagues (2011) noted, however, that while Indian customers indicate a propensity to buy eco-friendly products, this willingness hasn't always converted into actual purchases. Rendering to research by Kim & Park (2012) and Julian (2019), consumer acceptance of automobiles is strongly impacted by views towards technology and environmental protection. As a result, views of consumers towards electric vehicles can be divided into two primary groups: attitudes towards technology and attitudes towards the environment.

### Attitude towards Environment

Concern for the environment has been listed as major relevant factor affecting consumer takeaway decision in electric vehicles. While analysing consumers' choices to determine the factors that influence the decision of an individual to embrace the use of electric cars, studies have revealed that consumers with a higher attitude towards conservation are more likely to adapt to the use of electric cars to mitigate their carbon footprint. This is because electric vehicles are environmentally friendly and provide a sustainable solution compared to the Internal Combustion Engine vehicles, which are known to contribute significantly to the greenhouse gases emission (Bryła et al., 2022).

In the same time, it has also been established that the consumers who are concerned with environmental issues are in a better position to be persuaded by environmental advantages that have come with the products or environmental disadvantages of not patronizing the product for instance, reduction of air and noise pollution (Higueras Castillo et al. 2023). Also, one can identify that postconsumer environmental awareness increases a willingness to pay a premium for electrical cars which are one of the most influential factors influencing the adoption of new technologies.

### Attitude towards Technology

Understanding the attitudes toward technology has emerged as a core way of understanding consumer adoption of electric vehicles. According to (Chan et at, 2015) the degree of perceived innovation influences the level of technology acceptance which in this case is the propensity for individuals to purchase electric vehicles since they consider them to be technologically advanced. This is due to the fact that electric vehicles have some enhanced features like regenerative braking, enhanced safety, and enhanced performance as is always related to the improvement in technology (Bennett & Vijaygopal, 2018). It has also been discovered that there is an increase of consumers changing their decision making on the technological qualities of electric cars due to technological fluency like; home charging or use of public terminals (Bryła et al., 2022). Furthermore, the analysis has indicated that consumers, who are tech-savvy, are more inclined to purchase electric cars and can afford the upgraded technologies that are incorporated in the car industry (Tiwari et al., 2020).

## METHODOLOGY

According to Nayak and Singh (2015), research design is a process that aims to establish a plan of activities to respond satisfactorily to research questions identified in the exploratory phase, including selecting research methods, operating structures of interest, and developing appropriate sampling strategies. In this context, research design serves as a strategy that utilizes empirical data to address research questions. Furthermore, Saunders, et al. (2019) identified three types of research design that is exploratory research, this kind of study is used by analysts to identify phenomena and comprehend a subject more thoroughly. study that is descriptive seeks to accurately describe people, places, or things that are pertinent to the study questions. Explanatory study

is carried out to examine a situation or problem with the aim of elucidating the link between factors. A descriptive research design to understand consumer intentions to adopt electric vehicles (EVs) in Southern Malaysia. This approach was chosen because descriptive research can be effectively conducted using specific data collection methods such as surveys. This design will allow the researcher to collect detailed information on consumer perceptions, attitudes, and intentions towards EV adoption.

**Research Choices**

This research adopts a mono-method quantitative approach, where data is collected and analysed using a quantitative method. This choice is suitable to test the hypotheses derived from the TAM model, as its ability to measure in numerical and analyse the relationships between the independent and dependent variables.

**Quantitative Study**

The quantitative study will be employed to conduct the research methodology, the results are able to provide researcher the with assistance in identifying data in a scientific manner. The reason for applying this method by collecting quantitative data is to determine the correlations between the independent and dependent variables. Numerical form will be gathered through quantitative data for data analysis (Noyes et al., 2019).

Hence, the data obtained should be aligned with objective, measurable, and statistical data.

**Source of Data**

The data for this study will be collected from two main sources: primary data and secondary data. The choice of data sources is crucial in ensuring the validity and reliability of the findings. Primary data will be collected through a survey of South Malaysian consumers to gather original data specific to the research questions and objectives. Secondary data, on the other hand, will be sourced from existing literature, reports, and analyses to provide context and background information for the study (Data Types and Sources, n.d.).

**Primary Data**

For this research, primary data will be collected from working adults in Johor, Malaysia, using standardized questionnaires. The questionnaire will gauge several variables, including perceived usefulness (PU), perceived ease of use (PEOU), attitudes towards electric vehicles (EVs), and the intention to adopt EVs. Additionally, the questionnaire will assess social influence (the effect of friends and peers on the intention to use EVs), facilitating conditions (availability of infrastructure and support for EVs), and environmental concern (awareness and attitudes toward environmental issues and the perceived impact of EVs on environmental protection). This approach aims to provide comprehensive insights into the factors influencing the adoption of electric vehicles in Johor.

**Secondary Data**

Secondary data sources will be used to provide context and background information for the study. These may include existing literature on consumer adoption of EVs and the factors influencing purchase decisions, government reports and statistics related to the Malaysian automotive market and EV adoption, and industry reports and analyses on the EV market in Malaysia and Southeast Asia. While primary data is essential for addressing the specific research questions, secondary data can provide valuable insights and help contextualize the findings (Busayo.Longe, 2020).

**Research Location**

This study will be conducted in Southern zone Malaysia, an ideal location for this research due to its dynamic economic growth and significant automotive market, which mirrors the broader trends in South Malaysia (Institusi Kerajaan, R&D). The study will select participants from various parts of south zone to ensure a comprehensive sample that reflects the diverse demographics of the state. By recruiting participants from

different urban and rural areas within Johor, the research aims to capture a wide range of consumer perspectives on EV adoption. This approach will help in understanding the key determinants influencing the uptake of EVs in this specific region.

Survey participants will be chosen to represent a variety of regional, ethnic, income, and urban-rural backgrounds. This diversity is crucial for generalizing the study's findings and ensuring their applicability to the broader Malaysian consumer market. The research will be conducted in compliance with the regulations and guidelines set forth by the Malaysian government for conducting research in the country. This includes obtaining necessary approvals, adhering to ethical standards, and collaborating with local institutions and organizations as required (Official Portal of Ministry of Economy, n.d.).

**Sampling Design and Population**

The research will use a basic random sampling design to choose participants from the Malaysian consumer community. With simple random sampling, every member of the population has an equal chance of being chosen for the sample. This is a probability sampling technique. Given that the current study is to explore the factors influencing customers' intentions to use electric vehicles (EVs) this sample strategy is appropriate. The study can ensure that the sample is representative of the larger population of Malaysian consumers by employing simple random sampling, enabling more broadly applicable conclusions within this particular area.

The goal of the study is to gather information that appropriately depicts the variables influencing Malaysian customers' decision to purchase electric automobiles. All members of the public can participate equally in this method, which makes it possible to identify any patterns or differences in the responses of consumers from various Johor demographics. Every individual in this population will be given a unique identifier, and the number of survey participants will be chosen at random using a random number generator.

The study plans to collect responses from 300 participants respondents to ensure a robust and statistically significant sample size. This approach will help ensure that the findings are reflective of the diverse consumer base in Johor and provide valuable insights into the regional factors affecting EV adoption, which can then inform broader national strategies and policies.

**Data Collection**

This research will employ a survey method for data collection. Questionnaires will be distributed to participants through various channels. Primarily, a digital version of the questionnaire, accessible via a Google Form link, will be shared with respondents through social media and other online platforms. This approach ensures rapid distribution, reduces research costs, and facilitates quick responses. To enhance the accuracy of the responses, the questionnaires will be distributed in locations such as car dealerships and shopping malls where vehicles are displayed. Respondents will be invited to scan a QR code to access the Google Form questionnaire. However, due to concerns about privacy and data security associated with QR codes, paper versions of the questionnaire will also be provided upon request.

To maximize the response rate, efforts will be made to distribute questionnaires in person whenever possible, in addition to online distribution. Before respondents complete the questionnaire, the purpose of the study will be clearly explained, emphasizing that the collected data will be used solely for academic research. This clarification is intended to encourage greater participation in the survey.

**Data Analysis**

After collecting data through the online survey, the researcher will use the Statistical Package for Social Science (SPSS) to examine the data. The comprehensive statistical program SPSS can perform efficient data analysis. The researcher's interpretation of the findings is also rather straightforward. Several techniques, including descriptive analysis, reliability analysis, and regression analysis, will be used by the researcher to assess the data in this study.

## RESULTS AND DISCUSSION

The first objective of this study was to propose a model for understanding the factors influencing customers' intention to use electric vehicles among consumers in the south zone of Malaysia. The selected independent variables—Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Social Influence (SI), Facilitating Conditions (FC), and Consumers' Attitude (AT)—were included based on their theoretical and practical relevance to EV adoption.

The framework aligns with established technology acceptance theories (e.g., TAM and UTAUT) and the unique attributes of EVs as an emerging technology. Here's the rationale for including each element:

Perceived Usefulness (PU), introduced in the Technology Acceptance Model (TAM) by Davis (1989), examines whether consumers perceive EVs as beneficial, such as by reducing costs or improving environmental outcomes. This factor is critical in shaping consumer intention, as shown in studies like Kumar and Alok (2020), where the perceived benefits of EVs, such as lower operational costs, were major drivers for adoption.

Perceived Ease of Use (PEOU) reflects the simplicity or complexity of using EVs. Davis (1989) emphasized its role in reducing the cognitive effort required for technology adoption. In the EV context, Rezvani et al. (2015) found that concerns about the complexity of charging and operating EVs negatively impacted their acceptance, highlighting the importance of user-friendly technology to encourage adoption.

Social Influence (SI) evaluates how social pressures or recommendations affect decisions. Venkatesh et al. (2003), in the Unified Theory of Acceptance and Use of Technology (UTAUT), identified SI as a key determinant of behavioral intention. In Malaysia, cultural and social norms significantly influence consumer behavior. Studies like Noppers et al. (2015) demonstrated that societal trends and peer recommendations play a crucial role in the adoption of sustainable innovations like EVs.

Facilitating Conditions (FC) refer to the availability of resources and support systems necessary for adoption, such as charging infrastructure and government incentives. Venkatesh et al. (2003) noted that adequate facilitating conditions reduce barriers to technology usage. Sovacool et al. (2018) emphasized that a lack of infrastructure often deters consumers, even if they have a positive attitude toward EVs.

Finally, Consumers' Attitude (AT), based on the Theory of Reasoned Action by Fishbein and Ajzen (1975), assesses consumers' overall evaluation of EVs. Zhang et al. (2014) found that positive attitudes, such as environmental awareness or interest in innovative technology, are strong predictors of adoption. These elements were chosen for their robust theoretical foundation, practical relevance, and contextual applicability. Drawing from established models like TAM and UTAUT, the model reflects specific challenges in Malaysia, such as limited infrastructure and evolving social norms. By integrating individual perceptions, external influences, and practical enablers, the model provides a comprehensive framework for understanding the factors influencing EV adoption.

Second objective is to investigate the factors influence consumers' intention to adopt electric vehicles in South zone of Malaysia. The first objective of this study was to explore how perceived usefulness (PU), perceived ease of use (PEOU), social influence (SI), facilitating conditions (FC), and attitude (AT) impact consumers' intention to adopt electric vehicles (EVs) in the South Zone of Malaysia. Multiple regression analysis was employed to test the relationships between these independent variables and the dependent variable, intention to adopt electric vehicles (DV).

The findings revealed that perceived usefulness (PU) was found to have a significant positive influence on consumers' intention to adopt EVs ($p = 0.007$). This indicates that when consumers perceive EVs as beneficial and capable of enhancing their daily activities or productivity, their intention to adopt EVs increases. This aligns with the hypothesis that PU plays a critical role in shaping behavioural intentions. Studies in Malaysia and other regions confirm that consumers who recognize the functional advantages of EVs are more inclined to adopt them. For example, a study by Wang et al. (2021) demonstrated that the perceived economic and environmental benefits of EVs positively influence adoption behaviour.

Facilitating conditions (FC) and attitude (AT) have a significant positive influence on consumers' intention to adopt EVs, with p-values of 0.000 for both variables. Facilitating conditions, such as access to charging infrastructure, government incentives, and technical support, have a significant positive influence because they reduce the perceived barriers to EV adoption. When consumers feel that resources and support systems are readily available, they are more confident about adopting new technologies. Research by Azad et al. (2023) found that the availability of EV infrastructure significantly impacts consumers' willingness to transition from traditional vehicles to EVs, particularly in developing countries. This is especially true in the South Zone of Malaysia, where the expansion of EV-related infrastructure is a critical factor in encouraging adoption. Similarly, a positive attitude (AT) toward EVs plays a critical role in driving their adoption. A positive attitude toward EVs significantly influences adoption because attitudes are directly linked to intentions and behaviours. Consumers with favourable perceptions of EVs, driven by environmental concerns, technological curiosity, and perceived prestige, are more likely to adopt them. The Theory of Planned Behaviour (TPB) suggests that attitudes strongly predict behavioural intentions. For example, Lim et al. (2022) found that Malaysian consumers who held positive attitudes toward the sustainability and technological sophistication of EVs demonstrated higher adoption rates.

However, Perceived Ease of Use (PEOU) and social influence (SI) were found to have no significant influence on consumers' intention to adopt EVs, as their p-values (PEOU = 0.280, SI = 0.249) were above the significance threshold of 0.05. These factors may be influential but not as strong as the main factors when it comes to influencing the intention to use electric vehicles such as the steps to learn to use electric vehicles. Similarly, social influence (SI) indicates that peer or social pressure may not be a decisive factor for EV adoption in this region. Consumers appear to rely more on their individual perceptions and practical considerations rather than social influence when making decisions about EVs.

In conclusion, the findings indicate that perceived usefulness, facilitating conditions, and attitude are the key factors influencing consumers' intention to adopt EVs in the South Zone of Malaysia. These results emphasize the importance of highlighting the practical benefits of EVs, improving infrastructure, and fostering positive consumer attitudes. On the other hand, the lack of significance for perceived ease of use and social influence suggests that these factors may be less relevant in shaping adoption intentions and may require less emphasis in future strategies or campaigns.

Third Objective is to examine which of the factors has the strongest influence on the consumers' intention to adopt EVs in South zone of Malaysia. This study aimed to identify the factor with the most significant impact on consumers' intention to adopt electric vehicles in the south zone of Malaysia. Based on the multiple regression analysis results, attitude (AT) emerged as the strongest predictor, with the highest unstandardized coefficient ($B = 0.521$) and a significant p-value ($p < 0.001$). This finding indicates that the consumer's positive attitude towards electric vehicles plays a critical role in their adoption decision.

Facilitating conditions (FC) also demonstrated a significant influence ($B = 0.270$, $p < 0.001$), highlighting the importance of supportive infrastructure and resources for adoption. On the other hand, perceived usefulness (PU), while statistically significant ($B = 0.105$, $p = 0.007$), showed a relatively smaller effect compared to attitude and facilitating conditions. Perceived ease of use (PEOU) and social influence (SI) did not have significant effects on consumers' intention to adopt electric vehicles, with p-values of 0.280 and 0.249, respectively. These results suggest that while ease of use and social factors may contribute to shaping opinions, they are not the primary drivers for the adoption of electric vehicles in this region.

In conclusion, the findings emphasize that fostering a positive attitude and ensuring adequate infrastructure and support systems are crucial strategies for encouraging electric vehicle adoption in South Malaysia.

## CONCLUSION

The findings of this study provide valuable insights for stakeholders aiming to enhance the adoption of electric vehicles (EVs) in the South Zone of Malaysia. The significant influence of perceived usefulness (PU) demonstrates that consumers prioritize the practical benefits of EVs, such as cost savings and environmental sustainability. This aligns with the findings of Davis (1989) and Ozaki and Sevastyanova (2011), who

emphasized that products perceived as beneficial and valuable are more likely to influence behavioural intentions. Manufacturers and marketers should emphasize the tangible benefits of EVs, such as reduced fuel expenses, lower maintenance costs, and positive environmental impacts, through targeted advertising campaigns and promotional strategies.

The significant role of facilitating conditions (FC) highlights the necessity of developing adequate infrastructure and resources to support EV adoption. This is consistent with Venkatesh et al. (2003) and Wang et al. (2020), who found that facilitating conditions, including infrastructure and resources, significantly influence the adoption of new technologies. Policymakers and industry stakeholders should prioritize expanding EV charging networks, offering subsidies, and increasing public awareness about the availability and convenience of EV infrastructure. These efforts will help mitigate perceived barriers and enhance consumer confidence in adopting EVs. Similarly, the strong influence of attitude (AT) underscores the importance of fostering positive consumer perceptions toward EVs. This finding aligns with Ajzen (1991), who posited that positive attitudes are crucial drivers of behavioural intention. Additionally, Rezvani et al. (2015) emphasized that promoting environmental awareness and framing EVs as modern and innovative solutions can shape consumer attitudes. Collaborations between government agencies and environmental organizations can further amplify these efforts by launching campaigns that highlight the environmental and societal benefits of adopting EVs.

On the other hand, the insignificance of perceived ease of use (PEOU) suggests that consumers may already perceive EVs as user-friendly, as supported by Davis (1989), who argued that ease of use becomes less relevant when technology is perceived as useful. Consequently, stakeholders should focus their resources on addressing other consumer concerns, such as infrastructure and cost.

Finally, the lack of influence from social influence (SI) indicates that societal norms and peer pressure are not key determinants for EV adoption in the South Zone of Malaysia. This finding aligns with the study by Silva et al. (2022), which suggested that personal preferences and practical considerations often outweigh social factors in technology adoption. Rather than relying on social norms, manufacturers and policymakers should focus on individual-centric marketing strategies that emphasize the personal benefits of EVs, such as convenience, cost savings, and sustainability.

In conclusion, the findings emphasize the need for a multi-stakeholder approach involving manufacturers, policymakers, and marketers. By addressing infrastructure gaps, promoting practical benefits, and fostering positive attitudes, stakeholders can effectively encourage EV adoption in the South Zone of Malaysia. These strategies, grounded in previous studies, provide a comprehensive roadmap for accelerating the transition to sustainable transportation solutions.

## ACKNOWLEDGEMENT

We would like to acknowledge the academic staff and the final year project student of FPTT, UTeM that make the journey of this article publication, a reality.

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