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PRICE PERCEPTION, CHARGING INFRASTRUCTURE AND ENVIRONMENTAL CONSCIOUSNESS THAT INFLUENCE ADOPTION OF ELECTRIC VEHICLE (EV): MALAYSIA PERPSECTIVES

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ABSTRACT

Electric vehicles (EVs) are increasingly viewed as a sustainable solution to global issues, including climate change, carbon emissions, and energy security. This study explores key factors influencing EV adoption in Malaysia, focusing on price perception, charging infrastructure, and environmental consciousness. A quantitative method was employed, utilizing 119 completed survey responses to examine how these factors influence consumer purchase intentions. Findings indicate that price perception is not a significant barrier to EV adoption. Although high upfront costs are often viewed as a concern, government incentives, subsidies, and perceived long-term savings reduce their impact. Charging infrastructure, however, emerged as a crucial factor. Consumers highlighted the limited availability and accessibility of charging stations as a major concern, suggesting that infrastructure development is essential to support widespread adoption. This study offers valuable insights for policymakers, industry stakeholders, and environmental advocates. It emphasizes the need for continued investment in EV charging infrastructure and public awareness campaigns to promote sustainable transportation. These efforts are vital to achieving broader environmental goals and accelerating Malaysia's transition to cleaner mobility.

Keywords: price perception, charging infrastructure, environmental consciousness. Influence, purchase intentions

INTRODUCTION

Electric vehicles (EVs) have revolutionized the global automotive industry by providing a sustainable alternative to traditional internal combustion engine vehicles (Veza et al., 2023). As nations around the world work to lower carbon emissions, tackle climate change, and improve energy security, the adoption of EVs has accelerated, becoming a key strategy in achieving these objectives (Belaïd et al., 2023).

The global EV market has seen remarkable growth, with automakers making substantial investments in research and development to advance the performance of the battery technology, prolong the driving range, and expand charging infrastructure. Countries including Norway, China, and the United States have become frontrunners in EV adoption by introducing incentives, subsidies, and strict emission regulations to speed up the shift to electric mobility (Abdul Qadir et al., 2024).

In Malaysia, the shift towards electric vehicles is also gaining traction, propelled by government initiatives, environmental considerations, and the need to diversify the transportation sector (Abdul Yamin, 2023; Muzir et al., 2022). The Malaysian government has introduced several key policies to incentivize the adoption of EVs, including tax exemptions, rebates, and infrastructure development to support charging stations across the country.

With a strong focus on sustainability and reducing carbon footprint, Malaysia is positioning itself as a main player in the Southeast Asian region for promoting electric mobility (Ignatius, 2023). Increasing awareness among Malaysian consumers regarding the benefits of EVs, along with technological and infrastructure advancements, is setting the stage for a cleaner and sustainable future transportation environment in the country. This introduction sets the stage by highlighting the global trends and transition towards electric vehicles while emphasizing Malaysia's role in embracing this sustainable technology and implementing strategies to enhance the acceptance of EVs across the country (Muzir et al., 2022).

The acceptance of electric vehicles (EVs) in Malaysia faces challenges effected by several key factors, namely price, infrastructure development, and environmental impact awareness. Despite the increasing global shift towards sustainable transportation solutions, the rate of EV adoption in Malaysia remains relatively low (Lim, Teo, & Ho, 2024). The interplay of pricing dynamics, inadequate charging infrastructure, and varying levels of environmental consciousness among consumers poses significant hurdles to the broad adoption and incorporation of electric vehicles in Malaysia's automotive market (Muzir et al., 2022).

The lack of comprehensive strategies addressing the affordability of EVs, the convenience of charging infrastructures (Li et al., 2024), and the promotion of environmental benefits has hindered the seamless transition towards electric mobility in Malaysia. Therefore, a critical examination of these factors and their impact on the embracing electric vehicles is essential to formulate effective policies, infrastructure investments, and awareness campaigns that can accelerate the uptake of EVs and drive sustainable transportation practices in Malaysia.

The three study objectives include:
1. To examine the impact of price on embracing electric vehicles among Malaysians, assessing how pricing dynamics impact consumer decisions and preferences towards EVs in the Malaysian automotive market.
2. To understand the impact between environmental awareness and the acceptance of electric vehicles among Malaysians, exploring how increasing environmental consciousness influences consumer perspectives and actions regarding sustainable transportation options like EVs.
3. To evaluate the influence of charging infrastructure characteristics on the acceptance of electric vehicles among Malaysians, examining the importance of accessibility and dependability of charging infrastructure in promoting the acceptance and integration of EVs into daily transportation routines in Malaysia.

This study aims to explore whether Malaysians intending to purchase electric cars are impacted by factors such as car price, charging infrastructure attributes, and environmental concerns. By investigating this, the research seeks to determine how influential these factors are in shaping individuals' intentions to embrace electric vehicles. This analysis will provide insights into Malaysian interest in electric cars and the likelihood of changing from conventional vehicles to electric ones.

The price of EVs, including upfront purchase costs, maintenance expenses, and total ownership costs, will be assessed as a determinant influencing EV adoption among Malaysians. Variations in EV pricing will be examined to understand their impact on consumer purchasing decisions and willingness to switch from traditional gasoline-powered vehicles to EVs.

The presence, accessibility, dependability, and convenience of charging infrastructure for EVs will be evaluated as independent variables influencing EV adoption in Malaysia. Factors such as the density of charging stations, charging time, compatibility with EV models, and infrastructure expansion plans will be analysed to determine their influence on consumer adoption behaviour and perceived barriers to EV ownership.

Environmental consciousness, including attitudes, beliefs, and behaviours related to climate change, air pollution, and sustainability, will be examined as an independent variable influencing EV adoption among Malaysians. The level of environmental concern among consumers will be assessed to understand its role in driving demand for EVs and willingness to prioritize environmental benefits over other considerations when making vehicle purchasing decisions.

These independent variables will be systematically analysed to investigate their individual and collective effects on the adoption of EVs among Malaysians. This will later on contribute to a thorough understanding of the factors shaping EV uptake among Malaysian consumers. The acceptance of electric vehicles (EVs) among Malaysians holds immense significance due to its future influence on certain aspects of society. By understanding the key determinants that influence the uptake of EVs, this study can shed light on critical areas benefiting the environment, government policies, the automotive industry, and overall national development.

Regarding environmental benefits, the shift to electric vehicles in Malaysia would significantly contribute to lower down the greenhouse gas emissions and air pollution. By encouraging cleaner transportation options, the adoption of EVs can play a crucial part in confronting issues of climate change and enhancing air quality, thus promoting a healthier and sustainable environment for the current and future generations.

From a governmental perspective, insights gained from studying factors influencing EV acceptance would be able to come out with a formulation of effective policies and incentives to increase the shift towards electric mobility. This includes strategies such as tax incentives, infrastructure investments, and regulatory structures that support the widespread adoption of EVs, aligning with Malaysia's sustainability goals and dedication to lowering carbon emissions

For the automotive industry, understanding the enablers and obstacles to EV adoption can guide manufacturers in developing tailored strategies to meet buyer demands and enhance competition in the market. This study can help industry players in designing and marketing EV models that resonate with Malaysian consumers, fostering innovation and expansion in the electric vehicle sector.

Additionally, adopting electric vehicles can support in nation-building by driving technological innovation, generating employment opportunities in the green economy, and establishing Malaysia as a frontrunner in sustainable transportation practices, particularly in Southeast Asia. Embracing EVs can elevate the country's global standing, attract investments, and stimulate economic growth, aligning with Malaysia's vision for a greener and more prosperous future.

This study seeks to explore how the acceptance of electric vehicles (EVs) among Malaysians is affected by price, charging infrastructure attributes, and environmental concerns. this study seeks to provide meaningful information into the factors that promote or delay the acceptance of electric vehicles in Malaysia's automotive sector.

The limitation in this study includes the sample size, possibly effecting the applicability of the findings to wider contexts or various populations. A smaller sample size could restrict the research's ability to draw broad conclusions about the broader population of Malaysian EV adopters.

External factors outside the scope of the study, such as economic conditions, government policies, and technological advancements, may influence EV adoption rates. These external variables could introduce confounding factors that are challenging to account for in the research. Time constraints could be a limitation, affecting the depth of the study and the ability to track long-term trends in EV adoption among Malaysians. Shorter time frames may restrict the analysis of evolving patterns and behaviours related to electric vehicle uptake. Resource limitations, including budgetary constraints and access to specialized expertise or technology, could impact the scope and scale of the research, potentially restricting the breadth of the study's exploration into the elements impacting the acceptance of electric vehicles (EVs) in Malaysia.

LITERATURE REVIEW

Studies have highlighted that in developed countries; consumers show a greater awareness of electric vehicles compared to those in developing nations. The understanding and clarity surrounding the issues related to EVs are more pronounced in developed regions. Conversely, in developing countries, the conducive conditions necessary for the growth of the electric automobile industry are often lacking.

It is crucial to note that the relationship between these influencing factors can vary across different countries. The dynamics shaping the acceptance of EVs are influenced by a multitude of factors unique to each geographical location. By synthesizing and analysing the research findings from diverse regions, the objectives of the study is to increase our understanding of how these factors interact and impact the acceptance of EVs among Malaysians.

Purchase Intention within the Theory of Planned Behaviour (TPB)

TPB is a commonly used psychological and marketing model designed to understand and forecast human behaviour, particularly in the context of purchasing decisions. Within TPB, purchase intention serves as a pivotal factor influencing actual buying behaviour, shaped by three primary components.

Factors Affecting Purchase Intention Attitude Toward the Behaviour

This relates to each individual person on overall evaluation or perception of the behaviour in question, specifically, the act of making a purchase. Favourable attitudes typically correlate with stronger purchase intentions.

Subjective norms involve the perceived social pressures or influence from others about the behaviour. In the realm of purchase intention, it reflects an individual's interpretation of whether significant social entities (e.g., family, peers, experts) endorse or oppose the intended purchase.

Perceived behavioural control denotes the perceived ease or difficulty of carrying out the behaviour. It encompasses factors such as one's perceived financial capacity to afford the purchase, access to resources, and perceived obstacles or challenges.

These three elements interact to shape an individual's intention to make a purchase. For instance, a person who holds a positive attitude toward a product, perceives social approval for purchasing it, and feels confident in their ability to acquire it, is likely to exhibit a stronger intention to buy. By comprehending purchase intention within the TPB framework, marketers and researchers can pinpoint and address the factors that influence consumer decision-making processes, thereby devising more effective strategies to promote desired purchasing behaviours.

Overview and Definition and The Relationship Between Price of EVs with Purchase Intention

The worldwide increase in electric vehicle (EV) adoption signifies a unified effort by countries to lower down the greenhouse gas emissions and decrease dependency on conventional fuels. In Malaysia, the momentum towards embracing EVs has been supported by a range of incentives and programs. Nonetheless, research indicates that pricing stands out as a pivotal determinant affecting EV acceptance.

A recent study has scrutinized the present scenario and patterns concerning electric vehicle pricing in Malaysia, highlighting its potential impact on adoption rates.

Previous studies have demonstrated the pricing of EVs in Malaysia is shaped by several factors, including import taxes, manufacturing expenses, and government incentives, all of which impact the embracing of EVs in the country. As of 2024, EVs in Malaysia typically come with higher initial costs in comparison to conventional internal combustion engine vehicles. This price disparity is primarily due to the expenses associated with battery technology, which represents a significant portion of an EV's manufacturing outlay.

Despite the higher upfront expenses, there has been a gradual decrease in the pricing of electric vehicles in Malaysia in recent years, leading to an uptick in adoption trends. However, the market penetration rate for EVs in Malaysia remains relatively low in comparison to more developed nations. The drop in prices can be credited to improvements in battery technology, economies of scale in production, and governmental initiatives aimed at fostering EV adoption through incentives and subsidies.

Attributes of Charging Infrastructure

The accessibility and quality of charging infrastructure are very critical for the wide usage of electric vehicles. In Malaysia, comprehending the characteristics of charging infrastructure is crucial for encouraging EV usage and overcoming obstacles to electric mobility.

Infrastructure for electric vehicles encompasses charging stations (their locations, density within a specific radius, and charging times) and the road network catering to electric vehicle requirements. Numerous studies, both domestic and international, have explored the link between infrastructure and purchase intentions. Research indicated a positive correlation between infrastructure and purchase intentions (Kester et al., 2018; Habich-Sobiegalla et al., 2019; Rietmann et al., 2020).

A study done by Han et al. (2017) in Anhui province, China, involving 609 observational samples, discovered a positive correlation between infrastructure and attitudes towards electric vehicles. Although the global number of electric car charging stations remains limited in comparison to the conventional gasoline vehicles, there are ongoing efforts to enhance and expand this infrastructure. Electric vehicles provide benefits in terms of driving range and charging times (Ustaoglu & Yıldız, 2012). To highlight these benefits, car manufacturers are actively constructing new and improved charging stations to promote the growing interest of EVs.

1. Accessibility: The proximity and ease of access to charging stations are crucial factors impacting EV drivers' convenience and range concern. Evaluating the availability of charging stations is a serious consideration for promoting the acceptance of EVs in Malaysia.

2. Reliability: The reliability of charging stations, including their functionality and maintenance, is paramount to ensure a seamless charging experience for EV owners. Concerns about reliability can discourage potential EV buyers, underscoring the need for a dependable charging network.

3. Coverage: The geographical distribution and coverage of charging facilities across Malaysia effect the feasibility of long-distance travel and the overall convenience of owning an electric vehicle. Examining the coverage of charging infrastructure sheds light on gaps that need to be addressed to support EV users effectively.

A previous study examining the characteristics of charging infrastructure for electric vehicles in Malaysia offers valuable insights for policymakers, industry players, and electric vehicle enthusiasts. Improving the accessibility, reliability, and coverage of charging facilities is crucial for expediting the shift promoting sustainable electric transportation in Malaysia, thus encouraging greater adoption of electric vehicles nationwide.

Environmental Concern

The transition to electric vehicles (EVs) holds significant promise for reducing carbon emissions and mitigating environmental impact in Malaysia. However, alongside the environmental benefits come various considerations regarding the overall environmental impact of EV adoption. Numerous studies have shown that eco-friendly and electric vehicle technologies can influence consumers' buying decisions. Environmental factors are a major indicator of the changing consumer attitude towards electric vehicles (EVs) and play a significant role to determine when one's to decide to purchase EVs.

A previous study demonstrated that one of the main environmental benefits of adopting electric vehicles (EVs) is the reduction in greenhouse gas emissions. By replacing traditional internal combustion engine vehicles with EVs, Malaysia can lower its carbon footprint and support global efforts to fight climate change.

The acceptance of EVs can significantly improve air quality, particularly in urban areas with high vehicle pollution. Since EVs produce zero tailpipe emissions, they are able to lower down harmful pollutants like nitrogen oxides (NOx), particulate matter (PM), and volatile organic compounds (VOCs). Better air quality can lead to substantial health benefits, including fewer respiratory illnesses and enhanced overall well-being for the population.

Embracing electric vehicles in Malaysia brings forth a mix of environmental opportunities and challenges. By leveraging the environmental benefits of electric EVs, such as lower down the greenhouse gas emissions and better air quality, raising awareness can significantly boost EV adoption rates in Malaysia. Through collaborative initiatives involving the government, industry, and civil society, Malaysia can successfully navigate the transition towards electric mobility, aiming to minimize environmental impact and foster long- term sustainability.

RESEARCH METHODOLOGY

Quantitative research methodology being applied in order to examine the factors influencing the acceptance of EVs in Malaysia. It focuses on price perception, charging infrastructure attributes, and environmental concerns. Quantitative methods are applied to systematically quantify relationships between these variables and consumer purchase intentions, ensuring objective and reproducible insights.

The research design integrates structured data collection and statistical analysis to assess the proposed hypotheses. A survey-based approach being applied by distributing questionnaires to a diverse population across Malaysia's 13 states and three federal territories. The survey questionnaire, captures demographic information and measures key variables using a seven-point Likert scale. It ranges from "strongly disagree" to "strongly agree." The purpose is to ensure the comprehensive coverage of respondents' perspectives, enabling the identification of patterns and trends in EV adoption.

The target population includes potential EV consumers irrespective of gender, age, education, or income level. A random sampling technique is utilized to ensure it representing to the whole sample. A total of 384 questionnaires were distributed, with returned responses of 153 responses. Only 119 responses valid usable questionnaires to be analysed. Another 34 responses were unfit to be included for analysis due to incomplete responses.

The survey questionnaire comprises of two sections including gathering the demographic details about the respondents, while the next part focuses on assessing the dependent and independent variables relevant to the research. The questionnaire will be shared with colleagues and friends across Malaysia through a Google Form link distributed via WhatsApp and various social media platforms namely TikTok, Facebook, and Instagram. Subsequently, the data collected will be analysed using JASP.

Data analysis was conducted using JASP statistical software, encompassing reliability tests, correlation analysis, and multiple regression analysis. These methods validate the internal consistency of measurement scales, explore relationships between variables, and quantify the predictive strength of the independent variables—price perception, charging infrastructure attributes, and environmental concerns—on purchase intention.

This methodology provides a structured framework to examine the factors shaping EV adoption in Malaysia. By leveraging quantitative tools, the study ensures the reliability and validity of its findings. This later on contributes to valuable insights to inform strategies for enhancing EV uptake and fostering sustainable transportation in the region. The primary goal of descriptive statistics is to provide a clear and concise overview of the data's main features. This will help in identifying patterns, trends, and characteristics within the data set without making wider inferences.

Internal consistency of the measurement scales being assessed through a reliability test using Cronbach's alpha is conducted. A reliability test was conducted in a previous study using the Cronbach's alpha value. In order to verify the reliability of the data, the same validity test and reliability assessments will be carried out. This ensures the validity of the constructs such as price perception, charging infrastructure attributes, and environmental concerns. Values above 0.7 indicate acceptable reliability.

Correlation analysis being used to examine the strength and direction of relationships between the variables. This method identifies significant associations, such as how charging infrastructure and environmental concerns influence purchase intention.

Whereas, multiple regression analysis is performed to quantify the impact of the independent variables—price perception, charging infrastructure attributes, and environmental concerns—on the dependent variable, purchase intention. The regression model identifies which factors significantly predict EV adoption, with statistical significance determined by p-values (<0.05). These statistical methods provide a comprehensive framework for testing hypotheses and deriving meaningful insights, supporting evidence-based recommendations for enhancing EV adoption in Malaysia.

ANALYSIS AND FINDINGS

Analysis on the mean and standard deviations of the variables was conducted. There are three independent variables (IVs) and one dependent variable (DV). A 7- point Likert scale was used to gauge responses, where 1 represents 'strongly disagree' and 7 represents 'strongly agree.' The 7-point Likert scale is used to measure how individual people feel or think about a particular topic. The reason was to cover the variety of customers' mindsets, as everybody has different responses and feelings.

Table 1
Descriptive Statistics for Variables

Variables	N	Mean	Std. Deviation	Minimum	Maximum
Purchase Intention	181	4.308	1.596	1.000	7.000
Price Perception	181	3.653	1.149	1.000	7.000
Charging Infrastructure Attribute	181	3.324	1.311	1.000	7.000
Environmental Concern	181	5.392	1.190	1.000	7.000

Purchase Intention measures the likelihood of consumers intending to purchase a product. With a sample size of 181, the mean value is 4.308, indicating a moderate to high purchase intention on a scale from 1 to 7. The standard deviation is 1.596 suggests a relatively extensive range of responses, with some consumers showing very low intention (minimum of 1.000) and others showing very high intention (maximum of 7.000).

Price Perception assesses how consumers assess the price of a product. The mean value is 3.653, which is slightly above the midpoint of the scale, suggesting that consumers generally perceive the price as reasonable. The standard deviation is 1.149, indicating moderate variability in responses. The minimum and maximum values are 1.000 and 7.000, respectively, showing perceptions of price vary widely among consumers.

Charging Infrastructure Attribute evaluates consumers' views on the availability and quality of charging infrastructure. The mean value is 3.324, which is below the midpoint, indicating that there may be concerns among consumers regarding the adequacy of charging infrastructure. The standard deviation of 1.311 shows a moderate spread in responses, with minimum and maximum values between 1.000 and 7.000.

Environmental Concern measures the level of concern consumers have about environmental issues. With a mean value of 5.392, it is clear that environmental concern is relatively high among the sample. The standard deviation is 1.190, showing some variability in the level of concern. The minimum value is 1.000, but the maximum value of 7.000 indicates that many consumers pay serious attention on the environmental issues.

Assessing the normality of the data is crucial for choosing the right statistical tests and ensuring the results are valid. This section examines whether the data for key variables namely price perception, charging infrastructure attribute, environmental concern, and purchase intention which later followed by a normal distribution. The normality assessment was performed using statistical measures of skewness and kurtosis.

Normality was assessed using the skewness and kurtosis methods. Skewness was done when the metric indicates the asymmetry of the data distribution. Values ranging from-2 to 2 are typically considered acceptable for a normal distribution. Whereas, kurtosis was performed when the metric indicates the peak of the data distribution. Values between -7 and 7 are generally considered acceptable for a normal distribution.

Table 2
Skewness and Kurtosis values for the key variables

Variables	N	Skewness	Kurtosis
Purchase Intention	181	-0.213	-0.592
Price Perception	181	-0.017	0.016
Charging Infrastructure Attribute	181	0.290	-0.362
Environmental Concern	181	-0.837	1.040

The table above provides the skewness and kurtosis values for four key variables: Purchase Intention, Price Perception, Charging Infrastructure Attribute, and Environmental Concern. These metrics help evaluate the normality of the data distribution for each variable. Skewness helps to determine the asymmetrical behavior of the frequency distribution, or in a simple term, the lack of symmetry of tails for both left and right of the frequency curve. A distribution or dataset is symmetric if it looks the same to the left and right of the center point. Whereas, kurtosis is the extent to which a frequency distribution is peaked in comparison with a normal curve. It is the degree of peaked ness of a distribution.

Purchase Intention, with a skewness of -0.213 and a kurtosis of -0.592, exhibits a slight leftward skew, indicating a longer tail on the left side of the distribution. The kurtosis value implies a relatively flat distribution compared to a normal one. Overall, the data for Purchase Intention is fairly symmetrical with moderate variability.

Price Perception, with a skewness of -0.017 and a kurtosis of 0.016, indicates a nearly symmetrical distribution that closely follows a normal distribution. The skewness value is almost zero, showing minimal asymmetry, while the kurtosis value suggests a distribution that is neither too peaked nor too flat. This implies that respondents' perceptions of price are evenly distributed.

Charging Infrastructure Attribute, with a skewness of 0.290 and a kurtosis of -0.362, exhibits a slight rightward skew, indicating a longer tail on the right side of the distribution. The negative kurtosis value indicates a distribution that is somewhat flatter than the normal distribution. This means that while most respondents have similar views on charging infrastructure, there are a few with significantly different opinions.

Environmental Concern has a skewness of -0.837 and a kurtosis of 1.040. The negative skewness indicates a leftward skew, suggesting that more respondents have higher levels of environmental concern. The positive kurtosis value indicates a more peaked distribution, meaning most respondents have similar, high levels of concern, with fewer extreme values.

Reliability Test

Table 3
Reliability analysis using Cronbach's Alpha for variables

Variable	Cronbach's Alpha
Purchase Intention	0.849
Price perception	0.720
Charging Infrastructure Attribute	0.717
Environmental Concern	0.727

The Cronbach-Alpha coefficient is crucial for assessing the reliability of research scales and questionnaires. When the alpha coefficient is less than 0.6, it indicates a weak strength of association, suggesting low consistency among items. This suggests that the items might not measure the same underlying construct effectively, leading to unreliable results. An alpha coefficient between 0.6 and 0.7 is considered acceptable, showing moderate internal consistency.

This range suggests that the items are reasonably reliable, but there may still be room for improvement. Future studies might need to make minor adjustments or add more items to enhance reliability. When the alpha coefficient is above 0.8, it signifies a strong level of association, meaning the items are highly consistent with each other. This high reliability score indicates that the items are consistently measuring the same underlying construct, providing dependable and consistent results. Scales with a high Cronbach-Alpha coefficient are considered reliable and can be confidently used in research to draw meaningful conclusions.

Correlation Analysis

Correlation analysis was undertaken to explore the relationships between the variables in this research. Pearson's correlation coefficient (r) was applied to measure the strength and direction of the linear relationships between pairs of variables. The correlation coefficient ranges from - 1 to 1, with values closer to 1 or -1 indicating stronger relationships, and values near 0 indicating weaker relationships. The analysis identified several significant relationships among the variables: purchase intention, price perception, charging infrastructure attribute, and environmental concern. The results are summarized in Table 4.

Purchase Intention

This variable shows significant positive correlations with all other variables. The correlation with Price Perception is 0.431, indicating a moderate positive relationship. This shows that as consumers have a better perception of prices, their intention to buy goes up. The correlation with Charging Infrastructure Attribute is stronger, at 0.559, implying that better perceptions of charging infrastructure are associated with higher purchase intentions. Similarly, the correlation with Environmental Concern is 0.549, indicating that higher environmental concern is linked to greater purchase intention. All these correlations are statistically significant with p-values less than .001.

Table 4

Pearson's Correlation Coefficients

Variable	Purchase Intention	Price Perception	Charging Infrastructure	Environmental Concern
Purchase Intention	1.000			
Price Perception	0.431 (< .001)	1.000		
Charging Infrastructure Attribute	0.559 (< 0.001)	0.656 (0.001)	1.000	
Environmental concern	0.549 (< 0.001)	0.357 (< 0.001)	0.473 (< 0.001)	1.000

Price Perception

This variable also shows significant positive correlations with the other variables. The correlation with Charging Infrastructure Attribute is 0.656, the highest among the correlations, suggesting a strong relationship. This means that favourable perceptions of price are closely linked to positive views on charging infrastructure. The correlation with Environmental Concern is 0.357, indicating a moderate positive relationship, where higher environmental concern is associated with more favourable price perceptions. These correlations are also statistically significant with p-values less than 0.001.

Charging Infrastructure Attribute

This variable has significant positive correlations with all other variables. The correlation with Environmental Concern is 0.473, indicating a moderate positive relationship. This suggests that better perceptions of charging infrastructure are associated with higher environmental concern. The correlations with Purchase Intention (0.559) and Price Perception (0.656) have already been discussed, highlighting the importance of charging infrastructure in influencing both purchase intention and price perception. All correlations are statistically significant with p-values less than 0.001.

Environmental Concern

This variable shows significant positive correlations with all other variables. The correlation with Purchase Intention is 0.549, indicating a moderate to strong positive relationship. This suggests that higher environmental concern is linked to greater purchase intention. The correlations with Price Perception (0.357) and Charging Infrastructure Attribute (0.473) have already been discussed, showing that environmental concern is an important factor influencing both price perception and views on charging infrastructure. All correlations are statistically significant with p-values less than 0.001.

Regression Analysis

To better understand the factors influencing purchase intention, a multiple regression analysis was performed. This analysis aimed to quantify the impact of four independent variables, price perception, charging infrastructure attributes, and environmental concer on the dependent variable, purchase intention. The results shown in Table 5 include unstandardized coefficients, standard errors, standardized coefficients, t-values, and significance levels (p-values) for each predictor variable.

Table 5
Regression Coefficients

Model		Unstandardized	Standard Error	Standardized	*t*	*p*
H_0	(Intercept)	4.308	0.119	-	36.309	< 0.001
H_1	(Intercept)	-0.083	0.454	-	-0.183	0.855
	Price Perception	0.117	0.105	0.084	1.106	0.270
	Charging Infrastructure Attribute	0.404	0.098	0.332	4.123	< 0.001
	Environmental Concern	0.486	0.087	0.362	5.568	< 0.001

Model H_0

The null hypothesis (H_0), the unstandardized coefficient is 4.308 with a standard error of 0.119. The intercept is statistically significant, as evidenced by a t-value of 36.309 and a p-value below 0.001. This suggests that the baseline level of Purchase Intention is 4.308 when all independent variables are zero.

Model H_1

In the case of the alternative hypothesis (H_1), the unstandardized coefficient is -0.083 with a standard error of 0.454. The t-value of -0.183 and p-value of 0.855 indicate that the intercept is not statistically significant in this model.

Price Perception

The unstandardized coefficient is 0.117 with a standard error of 0.105. The standardized coefficient is 0.084, the t-value is 1.106, and the p-value is 0.270. This indicates that Price Perception is not a statistically significant predictor of Purchase Intention in this model.

Charging Infrastructure Attribute

The unstandardized coefficient is 0.404 with a standard error of 0.098. The standardized coefficient is 0.332, the t-value is 4.123, and the p-value is less than 0.001. This indicates that Charging Infrastructure Attribute is a statistically significant predictor of Purchase Intention, with a positive relationship. This means that better perceptions of charging infrastructure are associated with higher purchase intentions.

Environmental Concern

An unstandardized coefficient of 0.486 with a standard error of 0.087 results in a standardized coefficient of 0.362. The t-value is 5.568, and the p-value is less than 0.001. This indicates that Environmental Concern is also a statistically significant predictor of Purchase Intention, with a positive relationship. This suggests that higher environmental concern is linked to greater purchase intention.

In summary, the regression analysis shows that Charging Infrastructure Attribute and Environmental Concern are significant predictors of Purchase Intention, while Price Perception is not. This suggests that consumers are more likely to be influenced in their purchase decisions by their views on charging infrastructure and their environmental concerns than by their perceptions of price. These insights can help businesses and policymakers focus on improving charging infrastructure and addressing environmental concerns to enhance purchase intentions.

DISCUSSION AND CONCLUSION

Hypothesis 1 (H_1) posits that the purchase cost of electric cars significantly influences consumer acceptance of electric vehicles. However, the regression analysis conclude that the unstandardized coefficient for Price Perception is 0.117 with a p-value of 0.270. Since the p-value is greater than 0.05, this indicates that Price Perception does not have a statistically positive impact on Purchase Intention. Therefore, Hypothesis 1 (H_1) is not supported. This suggests that the price of electric cars may not be a decisive factor for consumers in Malaysia when considering adoption.

The rejection of H_1 suggests that the price of electric cars may not be a decisive factor for consumers in Malaysia when considering adoption. This could be due to several reasons. Firstly, consumers might prioritize other elements such as environmental impact or the presence of charging infrastructure over the cost. For example, a study by Wang et al. (2017) found that environmental benefits and technological advancements often outweigh cost considerations for many consumers. Secondly, government incentives and subsidies for electric vehicles (EVs) might mitigate the impact of the purchase price, making it less significant in the decision-making process. To bolster EV adoption, the Malaysian government has set ambitious targets, aiming for 15% EVs by 2030 and 38% by 2040 of the annual total industrial volume (TIV) (Pandak, Piaralal, & Rethina, 2024).

Lastly, the perceived extended savings on fuel and upkeep costs could overshadow the initial purchase price, leading consumers to focus more on these long-term benefits. For instance, research by Zhang et al. (2013) highlighted that long- term savings are a significant motivator for EV adoption.

Hypothesis 2 (H_2): Charging infrastructure attributes significantly influences the adoption of electric cars among consumers in Malaysia.

Hypothesis 2 (H_2) suggests that charging infrastructure attributes significantly impact consumer acceptance of electric vehicles. According to the analysis, the unstandardized coefficient for Charging Infrastructure Attribute is 0.404, and the p-value is below 0.001. This indicates a statistically significant positive influence on Purchase Intention. Therefore, Hypothesis 2 (H_2) is supported. This finding highlights the importance of robust and accessible charging infrastructure in encouraging consumers to adopt electric cars. It suggests that improvements in charging infrastructure could lead to higher adoption rates (Pandak, Piaralal, & Rethina, 2024).

The acceptance of H_2 highlights the important role of charging facilities in the adoption of electric cars. Adequate and having a robust network of charging points mitigates range anxiety, a typical worry among potential EV purchasers. It ensures that consumers can conveniently recharge their vehicles, making EVs a more convenient and attractive option. This finding is backed by the International Energy Agency (IEA), which emphasizes the significant of public charging infrastructure in urban areas to facilitate EV adoption.

Additionally, a study by the University of Maryland found that increased access to charging stations significantly boosts EV ownership, particularly in regions with limited home charging options.

Hypothesis 3 (H$_3$) proposes that environmental concern significantly impacts consumer acceptance of electric cars. The regression results show that the unstandardized coefficient for Environmental Concern is 0.486 with a p-value of less than 0.001, indicating a statistically significant positive influence on Purchase Intention. Therefore, Hypothesis 3 (H$_3$) is supported. This implies that consumers with greater environmental concerns are more inclined to adopt electric cars (Pandak, Piaralal, & Rethina (2024).

The acceptance of H$_3$ suggests that those who are more environmentally conscious tend to prefer electric vehicles. This aligns with the growing understanding and worry about climate change and environmental sustainability. Consumers who prioritize minimizing their environmental impact and contributing to environmental conservation are more inclined to choose EVs over traditional internal combustion engine vehicles. Research by Liao et al. (2017) supports this, showing that environmental concern is a key driver of EV adoption. Furthermore, a study by Adnan et al. (2018) found that knowledge of environmental issues significantly influences consumers' decisions to adopt eco-friendly technologies.

In conclusion, the regression analysis validates that charging facilities and environmental concern significantly affect the acceptance of electric cars in Malaysia. However, it does not validate the hypothesis that purchase price has a significant effect on the acceptance of electric cars in Malaysia. These findings can assist policymakers and businesses in prioritizing the enhancement of charging facilities and addressing environmental concerns to promote the adoption of electric cars.This research facilitates to the academic literature on consumer behaviour and electric vehicle adoption by providing empirical evidence on the elements influencing EV acceptance in Malaysia. It extends existing research by examining the specific context of Malaysia, a developing country with unique market dynamics and consumer preferences. The study's findings can inform future research on EV adoption in similar contexts and assist in crafting more effective strategies for promoting sustainable transportation. Additionally, this research highlights the importance of considering regional differences in consumer behaviour, which can lead to more tailored and effective policy interventions.

The results of this research offer valuable inputs for policymakers, practitioners, and researchers. By tackling the identified implications and leveraging the findings of this research, stakeholders can create more effective strategies to encourage the adoption of electric vehicles and facilitate the shift to a sustainable transportation system. The acceptance of electric vehicles (EVs) is a multifaceted issue that needs a complex understanding of various influencing factors. Future research could delve into several key areas to build on the findings of existing studies and provide deeper insights into EV adoption. The role of government incentives, consumer education, or regional differences within Malaysia shall be look at for future studies.

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