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Perceptions and EV Attributes Influencing Adoption in Indonesia: A TPB Approach

Muhammad Gifari Rusdi[1], Tengku Ezni Balqiah[2]
[12]University of Indonesia, Indonesia
Correspondence: muhamad.gifari11@ui.ac.id[1]

Abstract

Electric vehicles (EVs) are considered a promising solution for reducing greenhousegas emissions and environmental impacts. However, public perceptions of EVs remain diverse and are influenced by various factors. This study examines the effects of EV perceptions, perceived environmental benefits, perceived risks, incentive policies, vehicle attributes (design, economic feasibility, functionality, and safety), environmental concern, and knowledge on attitudes toward EVs and their adoption. It also investigates the roles of attitude, subjective norms, perceived behavioral control, and brand image in influencing EV adoption. A quantitative approach was employed using survey data from 296 respondents who had knowledge of EVs but did not own one. The data were analyzed using SmartPLS 3. The results indicate that EV perception, perceived environmental benefits, incentive policies, economic feasibility, functionality, safety, brand image, and environmental concern have significant positive effects on attitudes toward EVs. In contrast, perceived risks and design have negative effects on attitude. Knowledge was found to have no significant effect on either attitude or EV adoption. Design, economic feasibility, functionality, and safety significantly influence brand image. Furthermore, brand image, attitude, environmental concern, subjective norms, and perceived behavioral control positively affect EV adoption. These findings provide new insights into non-user perceptions of EVs in developing countries and identify key factors that encourage consumers to transition from conventional fuel-powered vehicles to EVs.

KEYWORDS

perception attributes; ev attributes; brand image; attitude; environmental concern; knowledge; ev adoption; subjective norm; perceived behavioral control.

Introduction

Currently, most Indonesians rely on vehicles for their daily activities. Vehicles have become an important part of the economy. The vehicle population in Indonesia is very large and continues to increase every year (Central Bureau Statistics, 2024). Most Indonesians prefer to use private vehicles such as motorbikes or cars due to the lack of adequate public transportation. This is shown in a BPS survey which shows that 88.7% of workers prefer to use private vehicles to go to the office compared to public transportation which is only used by 9.5% of commuter workers (Katadata, 2021). The adoption of electric vehicles (EV) in Indonesia is increasingly becoming a major concern in national efforts to reduce greenhouse gas emissions and negative impacts on the environment. According to the International Energy Agency (International Energy Agency, 2021), electric vehicles offer significant potential to improve air quality and reduce dependence on fossil fuels. In the Indonesian context, where air pollution is a major problem in big cities like Jakarta and Surabaya, switching to electric vehicles can help achieve sustainability and public health goals. The transportation sector contributes around 23% of total greenhouse gas emissions in Indonesia, with conventional motor vehicles being the largest contributor(Ministry of Industry of the Republic of Indonesia, 2021). He et al. (2018) showed that EV have strong support in China. However, most people are still hesitant to adopt them. To investigate consumer behavior, they proposed the personality-perception-intention conceptual framework. Their findings showed that consumer perception and personality are significant factors in EV adoption. However,

they did not consider attitude. Murtiningrum et al. (2022) confirmed that Attitude mediates the effect of EV perception on EV adoption. this results supported by previous studies by Wang et al. (2018a), Higueras-Castillo et al. (2019), Liu & Lai (2020), if EV characteristics (range, safety, comfort) meet customer needs, they are likely to have a positive impact on their assessment and intention Murtiningrum et al. (2022) Electric Motorcycle (EM) is one of the latest technology products and is considered environmentally friendly. Previous research by Wang et al. (2018a), Zhang et al. (2018), and Yang et al. (2020) showed that perceived risks have a significant negative effect on attitude. Meanwhile, Al-Majali (2020) investigated the impact of perceived risks in more depth on all types of EV: battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), and hybrid electric vehicles (HEV). The study classified risk factors into functional, physical, financial, social, and time risks. It was found that all risks except physical risks had a significant negative effect on EV purchase intention.

Murtiningrum et al. (2022) showed that perceived risks (PR) did not affect attitudes towards EV adoption. This result supported by Zhang et al. (2018) which explained that for someone who believes in their ability to overcome the risks of using an EV, the risk can be ignored. (Sierzchula et al., 2014) found a significant positive correlation between financial incentives and EV market share, while Aasness & Odeck (2015) asserted that consumers adopted EV mainly because of economic incentives that helped consumers save a lot of money. (Liu & Lai, 2020) showed that the incentive policies provided by the government were quite satisfying for customers. This finding supported by Murtiningrum et al. (2022) who found that perceived incentive policies can indirectly influence adoption through attitude. Therefore, if customers feel that incentive policies can help or provide benefits to them, then they will have a more positive attitude towards the intention to adopt EV. For EV Design, previous study by Seo et al. (2015) emphasized design as an important factor in automotive product attributes, and used overall design, car interior, and exterior styling as the main measurement items related according to (Choi & Lee, 2001) design is an important factor that influences consumer perceptions of the visual and functional aspects of a product. S. G. Kim (2018) analyzed that the importance of design exceeds technical elements in electric vehicles. Innovative design can also strengthen brand image as a pioneer in sustainable technology innovation. A study by (Noppers et al., 2014) found that consumers who view EV as innovative and environmentally friendly products tend to have a more positive brand image and a better attitude towards the vehicle. Fu et al. (2023) showed that EV design influences adoption indirectly through attitude and brand image. to (Liao et al., 2017) found that it was influenced by economic feasibility, technical and infrastructure factors, and policy characteristics. Weindel & Swoboda (2016) stated that 'economic feasibility' is obtained from financial sacrifice, which reflects the service perceived by consumers based on the convenience received and the costs incurred. Fu et al. (2023) also revealed that the economic feasibility of EV affects EV adoption through attitude and brand image. These EV attributes can significantly influence consumer attitudes (H. I. Kim & Kim, 2019). Functionality is defined as an attribute related to vehicle performance (Ajzen, 1991). J. R. Lee & Kim (2010) consider car performance as the ability of a car to operate at maximum efficiency under certain conditions. As mentioned, functionality includes attributes related to vehicle performance, such as engine power, driving method, gear type, acceleration force, noise, and safety (Park et al., 2014) However previous study from Fu et al. (2023) showed that functionality does not affect attitude.

Brand image is becoming increasingly important in the emerging new energy vehicle market. For consumers, the brand image of electric vehicles reflects their perception and reputation of innovative brands that influence their purchasing decisions (Jiang et al., 2021). Gong et al. (2023) examined the sustainable marketing strategies of electric vehicle companies in China. Their findings showed that a strong brand image increases customer engagement in the market and strengthens sustainable purchase intentions. Similarly, Isyanto et al. (2020) found that strong brand image perceptions lead to increased focused attention on the product, thereby increasing purchase intentions Panyagometh & Bian (2023) highlighted the mediating role of brand image and perceived value between perceived ESG and consumer attitude. This finding is consistent with Elseidi & El-Baz (2016) who emphasized the mediating effect of brand image and perceived value.

Murtiningrum et al. (2022) confirmed that knowledge has a significant positive effect on attitude. In accordance with Wang et al. (2018a) and Yang et al. (2020), it shows that increasing knowledge value will increase attitude value. In addition, Murtiningrum et al. (2022) also showed that knowledge positively affects EV adoption which is also in accordance with Wang et al. (2018a) and Yang et al. (2020), the more consumers know about EV, the more likely they are to buy them. Jensen et al. (2013)showed that environmental concern (EC) has a positive influence on preferences for electric vehicles both before and after using them. Bockarjova & Steg (2014) stated that people are more likely to adopt EV when they believe that the vehicle can reduce environmental risks. This resul supported by Murtiningrum et al. (2022) who showed that environmental concern (EC) significantly influences EV adoption.

Subjective Norm (SN) refers to the perceived social pressure to perform or not perform a particular behavior (Ajzen, 1991). In an EV adoption scenario, if coworkers, parents, or neighbors provide more favorable approval regarding the purchase of an electric vehicle, it is likely that greater he will have a stronger intention to purchase an electric vehicle. Therefore, a person's Subjective Norm towards the adoption of electric vehicles can predict and determine the intention to purchase an electric vehicle. Murtiningrum et al. (2022) showed that subjective norm has a significant positive effect on EV adoption. This finding confirms that support from close people, such as family, friends, and colleagues, plays an important role in increasing the intention to purchase an electric motorcycle (Zhang et al., 2018).

Perceived Behavioral Control (PBC) is one of the predictors of intention that refers to the level of ease or difficulty in performing a behavior. The greater the perceived behavioral control, the stronger a person's intention to perform the behavior (Ajzen, 1991). The study of Murtiningrum et al. (2022) increased PBC values will increase EV adoption. In other words, consumers who have full control over purchasing decisions and can purchase without difficulty will have higher purchase intentions than those who have less control (Zhang et al., 2018).

Attitude refers to the extent to which a person evaluates a behavior positively or negatively (Ajzen, 1991). In the Theory of Planned Behavior (TPB), attitude is used to directly predict behavioral intentions. In the context of EV adoption, the more positive a person's evaluation of purchasing an electric vehicle, the more likely he or she is to intend to purchase it. Therefore, a person's attitude toward EV adoption can predict his or her intention to purchase an electric vehicle. As described in (TPB), attitude has a significant positive effect on EV adoption (Murtiningrum et al., 2022). Previous studies such as Zhang et al. (2018), Wang et al. (2018a), and Shalender and Sharma (2021) also show that increasing attitude values will increase EV purchase or adoption intentions. International policies that support emission reductions such as the Paris Agreement

(UNFCCC, 2015), encourage many countries to carry out sustainable practices, including in the transportation sector. The Indonesian government has launched various incentives to encourage the adoption of electric vehicles, including tax cuts and subsidies for the purchase of electric vehicles (Ministry of Finance of the Republic of Indonesia, 2022). However, the effectiveness of this policy depends on public understanding and acceptance. Ajzen (1991) in the Theory of Planned Behavior (TPB) stated that individual attitudes, subjective norms, and perceived behavioral control influence behavioral intentions, including in the context of adopting new technologies. This study is expected to provide benefits or sources of reference for stakeholders in formulating effective policies and strategies to increase the adoption of electric vehicles in Indonesia. By analyzing public perceptions, electric vehicle attributes, and their impact on brand image and consumer attitudes, it is hoped that the findings of this study can help build an ecosystem that supports the use of electric vehicles, especially electric cars in Indonesia.

Methods

This study is intended to add to the literature related to EV adoption with the TBP approach and modify the research by (Murtiningrum et al., 2022) witth the following research model as shown on Figure 1.

This study applies quantitative methods with statistical analysis to process the data obtained. Researchers use primary data collected through the distribution of online questionnaires via the Whatsapp, Instagram, and Linkedin platforms using Google Form as a filling tool.

The appropriate sampling method used is the non-probability sampling method, specifically purposive sampling. The purpose of using this method is to collect data from respondents who have recent and relevant experience related to the adoption of electric vehicles. The criteria for respondents are non-EV users who have an interest and knowledge of electric vehicles (EV), the selection of this sampling criteria is related to the research objective which is to find out how individuals intend to switch to an EV without having previous experience of having an EV, this sample selection will produce organic intentions that come from knowledge, not from experience. The respondents selected were Indonesian citizens aged between 17 and 60 years. In determining the number of samples, (Hair et al., 2019) suggests that the minimum sample size is 5 to 10 times the number of research items. By using 59 items in this study, the number of samples needed ranges from 295 to 590 respondents with a list of questions and indicators in table 1.

This research obtained 296 answers that met the criteria. From the results of the questionnaire, based on demographics, the following results were obtained:

Based on Table 2, it was found that the majority of respondents in this study were female, namely 168 respondents (57%), 224 respondents had a bachelor's degree (76%), 194 respondents were aged 26-45 years (66%). In terms of monthly income, 135 respondents had an income of IDR < IDR 10 million (46%). Meanwhile, in terms of employment, 169 respondents worked as private employees (57%). Based on the results of the questionnaire on the most familiar EV brands, the Tesla brand is the EV brand most known by respondents with 104 respondents mentioning Tesla as the EV brand they know, followed by Hyundai (92) and Wuling (87).

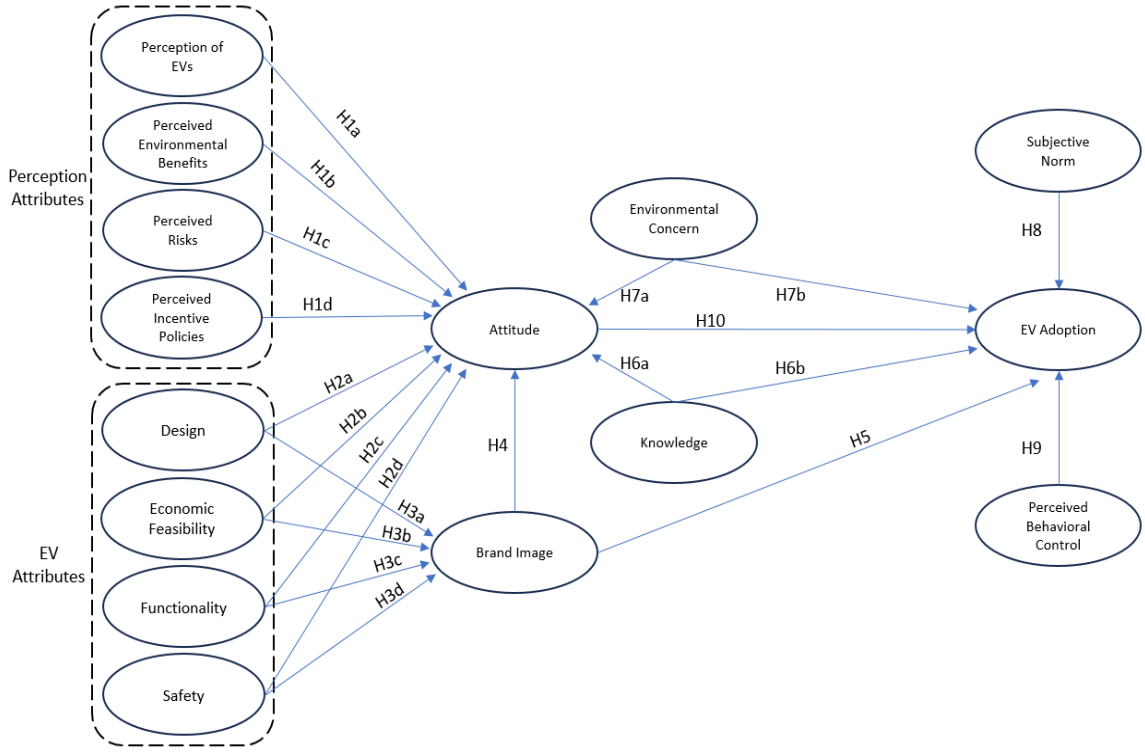

Figure 1. Research Framework

Table 1. Research Indicators

Variables	Indicator	Code	Reference
Perception of EV	I feel EV has good comfort	PEV1	Murtiningrum et al. (2022)
	I feel EV has good safety	PEV2	
	I feel the EV has good engine and battery performance.	PEV3	
	I feel that EV can support my daily activities (for example, work)	PEV4	

Variables	Indicator	Code	Reference
Perceived Environmental Benefits	I feel EV help reduce the impact of climate change by reducing pollution levels.	PEB1	Murtiningrum et al. (2022)
	I feel EV help protect the environment	PEB2	
	I feel EV help reduce the consumption of natural resources.	PEB3	
	I feel EV can reduce noise pollution compared to petrol cars.	PEB4	Degirmenci & Breitner
Perceived Risks	I'm worried that the EV performance (speed, range) won't meet my expectations.	PR1	Murtiningrum et al. (2022)
	I am concerned about the traffic risks of driving an EV at high speeds.	PR2	
	I'm worried about EV charging times being too long	PR3	
	I may have difficulty finding SPKLU (charging stations) when traveling by EV	PR4	Al-Majali (2020)
Perceived Incentive Policies	The government's subsidy for purchasing an EV was a consideration for me in purchasing an EV.	PIP1	Murtiningrum et al. (2022)
	Elimination of down payment (DP) encouraged me to adopt EV	PIP2	
	Electricity tariff discounts encourage me to adopt EV	PIP3	
	The existence of PpnBM (Luxury Goods Sales Tax) discounts and annual taxes encouraged me to buy an EV.	PIP4	
	Discounts on electricity upgrade costs encourage me to adopt EV	PIP5	
Design	The interior space design is practical	D1	Fu et al. (2023)
	EV has a good vehicle body and frame structure design.	D2	
	The interior and exterior design is luxurious	D3	
	This vehicle offers a wide range of design options.	D4	
Economic Feasibility	EV prices are in accordance with the features provided	EF1	Fu et al. (2023)
	EV have low vehicle maintenance costs	EF2	
	EV is very energy efficient	EF3	
	Other maintenance costs (outside the vehicle) are low, such as electricity, insurance, taxes.	EF4	
Functionality	EV have a higher quiet output compared to regular cars.	F1	Fu et al. (2023)
	EV have a higher maximum speed than regular cars.	F2	
	In the same type/category of car, the interior (front and rear seat space) of an EV is the same as a BBM car.	F3	
	I believe EV are fun to drive	F4	Long et al. (2019)
Safety	EV has extraordinary body rigidity	SF1	Fu et al. (2023)
	EV have long-term durability	SF2	
	This EV has superior safety features.	SF3	
	I believe that EV are safe vehicles to drive.	SF4	Long et al. (2019)
Brand Image	EV are more sophisticated and luxurious than fuel-powered cars in terms of implementing the latest technology.	BI1	Fu et al. (2023)
	brands fit my image better than regular cars.	BI2	
	I feel proud to own an EV brand compared to a regular vehicle.	BI3	
	I believe that EV fits my lifestyle	BI4	Long et al. (2019)
Knowledge	I am familiar with EV	KN1	Murtiningrum et al. (2022)
	I understand the advantages of EV	KN2	
	I am aware of the impact of EV on the environment.	KN3	
	My knowledge of EV is better than the people around me	KN4	
Environmental Concern	I support environmental conservation efforts by using renewable energy and reducing pollution.	EC1	Murtiningrum et al. (2022)
	I support energy conservation and environmental protection.	EC2	
	I am concerned about the increase in air pollution due to motor vehicle emissions.	EC3	
	I feel concerned when I read, watch, or hear news about environmental destruction.	EC4	
Subjective Norm	My friends, colleagues or family find EV interesting	SN1	Murtiningrum et al. (2022)
	I am more likely to adopt an EV if my friends, colleagues or family are using one.	SN2	
	If I adopt an EV, the people who are important to me will support my decision.	SN3	
	Adopting EV in line with current trends in the transportation sector	SN4	
Perceived Behavioral Control	If I can financially afford it, I will buy an EV in the near future.	PBC1	Murtiningrum et al. (2022)
	I see myself being able to afford an EV in the future	PBC2	
	I have the resources to adopt an EV	PBC3	
	I had no difficulty in deciding to adopt an EV.	PBC4	
Attitude	I feel that adopting EV is a good decision.	AT1	Murtiningrum et al. (2022)
	I feel that adopting an EV is a wise long-term decision.	AT2	
	I feel that adopting EV is a worthwhile thing to do.	AT3	
	I support government policies that encourage people to adopt EV.	AT4	

Variables	Indicator	Code	Reference
	I prefer EV to regular vehicles	AT5	Fu et al. (2023)
	I have a better feeling about EV compared to regular vehicles.	AT6	
	I believe EV are more reliable than regular vehicles	AT7	
EV Adoption Intention	I expect more makes and models of electric cars to enter the market.	EVA1	Murtiningrum et al. (2022)
	I am considering adopting an electric car in the near future.	EVA2	
	I plan to choose an electric car over a conventional one for my next purchase.	EVA3	
	If the electric car meets my expectations, I will recommend it to my friends, colleagues and family.	EVA4	

Source: Murtiningrum et al. (2022), Degirmenci & Breitner (2017), Al-Majali (2020), Fu et al. (2023), Long et al. (2019).

Table 2. Respondent's Profile

Types	Freq	%	Types	Freq	%
Gender			**Work**		
Woman	168	57%	Freelance	14	5%
Man	128	43%	Employee	169	57%
Total	296		Student	19	6%
Education			Unemployment	9	3%
Bachelor	224	76%	Businessman	76	26%
Postgraduate	39	13%	Pension	9	3%
Doctoral	6	2%	Total	296	
High School Equivalent	27	9%	**Married Status**		
Total	296		Bachelor	92	31%
Age			Marry	204	69%
17-25 Years	34	11%	Total	296	
26-45 Years	194	66%	**EV Car Ownership**		
46-65 Years	57	19%	Yes, it has	0	0%
>65 Years	11	4%	No, Don't Have Yet	296	100%
Total	296		Total	296	

Result and Discussion

To ensure the research model meets the requirements for accuracy, validity and reliability for use in research, convergent validity tests are carried out, construct reliability and AVE (Average Variance Extracted) tests are carried out, discriminant validity tests and composite validity tests are carried out while for reliability, Cronbach's alpha test is used by using the SmartPLS data processing application which is a variance-based approach that emphasizes prediction and explanation of target constructs. SmartPLS particularly useful for exploratory research, theory development, and situations where the goal is to identify factors influencing an outcome which aligned with the purpose of the study.

In this study, the factor loading limit value was > 0.6 and can be seen in table 3 where all indicators have outer loading values above 0.6.

It can be concluded that all statements have factor loading value above 0.7 so that the data obtained can be used for further analysis.

In the EV Adoption Intention variable, the adjusted R2 value is 0.839 (83.9%) so it can be concluded that the variables that play a role in forming the EV Adoption Intention variable, namely attitude, brand image, knowledge, environmental concern, subjective norm and perceived behavioral control have a high contribution in forming the EV Adoption Intention variable.

In the Attitude variable, the adjusted R2 value was 0.846 (84.6%) so it can be concluded that the variables that play a role in forming the Attitude variable, namely Perception of EV, Perceived Environmental Benefit, Perceived Risks, Perceived Incentive Policies, Design, Economic Feasibility, Functionality, Safety, Brand image, Knowledge and Environmental Concern have a high contribution.

To determine the significance of the entire research The results of the H1a test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.162 with a positive coefficient, a t-value of 2.913 above the model, the researcher looked at the t-value, p-value and path coefficient with the criteria that if the path coefficient value is positive, it indicates a positive relationship between variables, conversely if the path coefficient result is negative, it means there is a negative relationship in the construct by looking at the influence on the construct and it is noted that the t-value is greater than or equal to 1.65, then it can be said that there is a relationship between variables, the results of measuring the entire model can be seen in figure 2 below.

To determine the significance of the entire research model and answer the research hypothesis, researchers look at the T-value, p-value and path coefficient with the criterion when the path coefficient value has a positive value, indicating that there is a positive relationship between variables which can be seen in table 4.

Based on the table above, it can be seen that Perception of EV, Perceived Environmental Benefit, Perceived Incentive Policies, Economic Feasibility, Functionality, Safety, Brand Image and Environmental Concern have a significant positive effect on Attitude, while the variables Perceived Risks and Design have a negative effect on Attitude, while the variable Knowledge has no effect on Attitude. The variables Design, Economic Feasibility, Functionality, Safety have a significant effect on Brand Image.

For the EV Adoption Intention variable, based on table 4, it was found that Brand Image, Attitude, Environmental Concern, Subjective Norm and Perceived Behavioral Control have a significant positive effect on EV Adoption Intention,while the Knowledge variable has no effect on EV Adoption Intention.

Based on the research results, it was found that there were eighteen accepted hypotheses because they had a T Statistics value > 1.64 and a positive coefficient direction and P Values below 0.5 and there were three hypotheses declared rejected.minimum value of 1.65 and a p-value of 0.002 below 0.05, thus it can be concluded that H1a is accepted Perception of EV has a positive effect on attitude. These results support

previous research by Murtiningrum et al. (2022) confirming that Attitude can be influenced by EV perception and is consistent with the results found by Wang et al. (2018a), Higueras-Castillo et al. (2019), and Liu & Lai (2020) if the characteristics of EV (range, safety, comfort) meet customer needs, it is likely to have a positive impact on their assessment and intentions. This result is thought to be due to the improving perception of EV in the minds of consumers, not only providing superior features and the latest technology, using EV is considered a positive thing because it reduces air and noise pollution so that the advantages of EV increase consumers' positive attitudes towards EV. These results indicate an opportunity for EV providers to increase sales by improving consumer perceptions of EV, providing information about the impact of EV on the environment in marketing brochures is one step that can be taken to increase positive perceptions of EV.

The results of the H1b test can be seen in table 4 where based on the calculation results, the path coefficient figure is 0.118 with a positive coefficient, the t-value is 2.09 above the minimum value of 1.65 and the p-value is 0.019 below 0.05, thus it can be concluded that H1b is accepted and perceived environmental benefits have a positive effect on attitude. These results support previous research by Wang et al. (2018a) which showed that individuals' perceptions of the environmental benefits of electric vehicles significantly influence their attitudes towards EV use. The greater the perceived environmental benefits, the more positive their attitudes towards adopting electric vehicles. This finding is in line with Rezvani et al. (2015) who found that perceptions of the environmental benefits of electric vehicles contribute to positive attitudes towards EV use. Factors such as reduced emissions and contributions to environmental sustainability are the main driving factors. This shows that perceived environmental benefits positively influence attitudes. According to Murtiningrum et al. (2022) Electric Motorcycle (EM) is one of the latest technology products and is considered environmentally friendly. Educated people are considered to have higher awareness of these aspects. The higher the level of education, the higher the percentage of acceptance related to EV. Respondents in this study were dominated by private employees (58%) with a bachelor's degree (75%) and an age range of 26-45 years (65%), based on this demographic information, it can be concluded that the study respondents are individuals who understand the latest technology and environmentally friendly activities, so that EV as one of the environmentally friendly modes of transportation add to the positive impression of EV. Wang et al. (2018a) research shows that individual perceptions of the environmental benefits of electric vehicles significantly influence their attitudes towards EV use. The greater the perceived environmental benefits, the more positive their attitudes towards adopting electric vehicles. This finding makes perceived environmental benefits an important factor in improving public attitudes towards EV. Companies must prove the benefits of EV to the environment, such as reducing noise pollution in a way that is not excessive because currently the public is starting to be familiar with the term greenwashing.

The results of the H1c test can be seen in table 4 based on the calculation results obtained a path coefficient figure of 0.074 with a negative coefficient, a t-value of 1.72 above the minimum value of 1.65 and a p-value of 0.043 below 0.05, thus it can be concluded that H1c is accepted Perceived risks have a negative effect on attitude. This result supported previous research by Wang et al. (2018a), Zhang et al. (2018), and Yang et al. (2020) showing that perceived risks have a

Table 3. Convergent Validity Results

Variables	Indicator Notation	Loading Factor	AVE
Perception of EV	PEV1	0.842	0.687
	PEV2	0.824	
	PEV3	0.842	
	PEV4	0.806	
Perceived Environmental Benefits	PEB1	0.824	0.661
	PEB2	0.861	
	PEB3	0.830	
	PEB4	0.731	
Perceived Risks	PR1	0.867	0.746
	PR2	0.841	
	PR3	0.881	
	PR4	0.865	
Perceived Incentive Policies	PIP1	0.825	0.712
	PIP2	0.869	
	PIP3	0.856	
	PIP4	0.841	
	PIP5	0.827	
Design	D1	0.867	0.714
	D2	0.861	
	D3	0.871	
	D4	0.777	
Economic Feasibility	EF1	0.837	0.697
	EF2	0.845	
	EF3	0.853	
	EF4	0.803	
Functionality	F1	0.872	0.713
	F2	0.896	
	F3	0.857	
	F4	0.812	

SmartPLS 3 Output Source (2024)

significant negative effect on attitude. However, this result is

different from previous research by Murtiningrum et al. (2022).which showed that perceived risks (PR) did not affect attitudes towards EV adoption. This study did not show a significant effect of risk on attitudes towards EV adoption in Indonesia. This result is caused by the majority of respondents who do not yet have an EV (92%), so that concerns arise in their minds regarding risk factors that consumers are worried about, such as EV charging times being too long or difficulty finding SPKLU (charging stations) when traveling with an EV, despite government efforts to continuously improve facilities and infrastructure that can make it easier for EV owners to charge, but this remains a risk that consumers must face which can reduce consumers' desire to use EV. In addition, the research period can be the cause of the difference in these results. Where previous research conducted by Murtiningrum et al. (2022) was conducted in 2021 where at that time the electric car infrastructure was not as sophisticated as in 2024 and there were many policies that facilitated the ownership of electric vehicles.

The results of the H1d test can be seen in table 4 where based on the calculation results, the path coefficient figure is 0.125 with a positive coefficient, the t-value is 1.86 above the minimum value of 1.65 and the p-value is 0.032 below 0.05, thus it can be concluded that H1d is accepted and perceived incentive policies have a positive effect on attitude. These

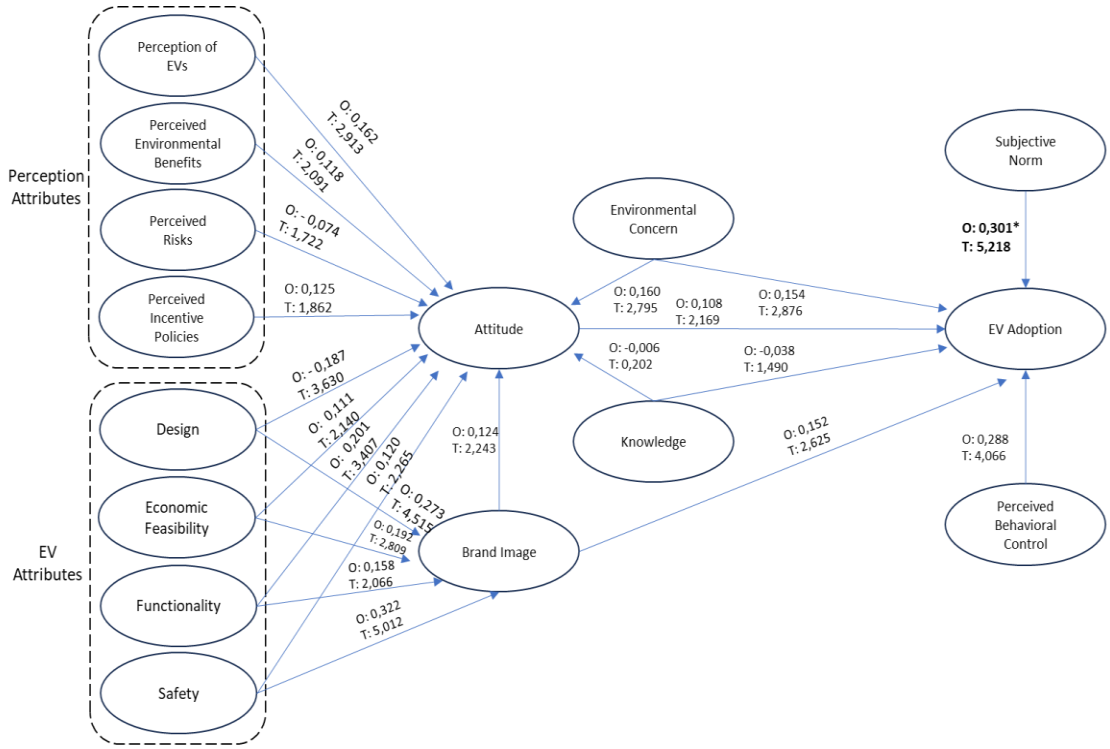

Figure 2. Overall Results of the Research Model

Table 4. Results of Path Coefficients Measurement

No	Path	(O)	T	P	Conclusion
H1a	Perception of EV has a positive effect on Attitude	0.162	2,913	0.002	Supported
H1b	Perceived Environmental Benefit has a positive effect on Attitude	0.118	2,091	0.019	Supported
H1c	Perceived Risks have a negative effect on Attitude	-0.074	1,722	0.043	Supported
H1d	Perceived Incentive Policies have a positive effect on Attitude	0.125	1,862	0.032	Supported
H2a	Design has a positive effect on Attitude	-0.187	3,630	0,000	Not Supported
H2b	Economic Feasibility has a positive effect on Attitude	0.111	2,140	0.016	Supported
H2c	Functionality has a positive effect on Attitude	0.201	3,407	0,000	Supported
H2d	Safety has a positive effect on Attitude	0.120	2,265	0.012	Supported
H3a	Design has a positive influence on Brand Image	0.273	4,515	0,000	Supported
H3b	Economic Feasibility has a positive effect on Brand Image	0.192	2,809	0.003	Supported
H3c	Functionality has a positive effect on Brand Image	0.158	2,066	0.020	Supported
H3d	Safety has a positive effect on Brand Image	0.322	5,012	0,000	Supported
H4	Brand Image has a positive influence on Attitude	0.124	2,243	0.013	Supported
H5	Brand Image has a positive effect on EV Adoption Intention	0.152	2,652	0.004	Supported
H6a	Knowledge has a positive effect on Attitude	-0.006	0.202	0.420	Not Supported
H6b	Knowledge has a positive effect on EV Adoption Intention	-0.038	1,490	0.068	Not Supported
H7a	Environmental Concern has a positive effect on Attitude	0.160	2,795	0.003	Supported
H7b	Environmental Concern has a positive effect on EV Adoption Intention	0.154	2,876	0.002	Supported
H8	Subjective Norm has a positive effect on EV Adoption Intention	0.301	5,218	0,000	Supported
H9	Perceived Behavioral Control has a positive effect on EV Adoption Intention	0.288	4,066	0,000	Supported
H10	Attitude has a positive effect on EV Adoption Intention	0.108	2,169	0.015	Supported

Source: Research Results (2024)

results support previous research by Li et al. (Li et al., 2016) showing that the incentive policies provided by the government are quite satisfying for customers. Meanwhile, previous research by Murtiningrum et al. (2022) found that Perceived incentive policies can indirectly influence adoption through attitude. This result is due to the government's incentive offer which is considered attractive, financial incentives for EV have been implemented by 30 countries, where these incentives include subsidies, taxes, registration fees, and circulation costs, (Sierzchula et al., 2014). Aasness & Odeck (2015) emphasized that consumers adopt EV mainly because of economic incentives that help consumers save a lot of money, and the presence of incentives increases consumers' positive impression of EV use because it helps the government's program in environmental conservation. Although the incentives for EV have invited pros and cons among the public due to budget efficiency, this study shows that incentives for EV are still worth using because they have a good impact on protecting the environment by helping the public switch to electric vehicles.

The results of the H2a test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.187 with a negative coefficient, a t-value of 3.63 above the minimum value of 1.65 and a p-value of 0.000 below 0.05, thus it can be concluded that H2a is rejected and Design has a negative effect on attitude. This result is thought to be caused by the characteristics of the respondents, where based on the results of the questionnaire it was found that the majority of respondents were middle class with an income of <IDR 10 million. With this income range, it is thought that respondents feel that the exterior and interior design of the EV which looks luxurious makes the price much higher than a BBM car, while respondents do not yet have buying power so that respondents feel that EV are expensive and unaffordable cars and reduce positive consumer attitudes to buy EV in the future. This assumption is supported by previous research by Tavitiyaman et al. (2024) who found that the weaker the consumer's buying power, the weaker the consumer's desire to buy a product, further related to the buying power of EV users, when buying a vehicle, consumers not only think about the cost of purchasing it but also the maintenance of the vehicle they buy, the more luxurious and high-quality the design of a product, the more concerns will arise about the high costs that must be incurred for maintaining the vehicle, This finding can show that the futuristic design of EV is not always well received by consumers, consumers who prefer simple designs, one of the things that respondents pay attention to is the build quality of the EV, a good design without being supported by good build quality does not improve respondents' attitudes towards using EV.

For the H3a hypothesis, the path coefficient value was found to be 0.273 with a positive coefficient, the t-value was 4.51 above the minimum value of 1.65 and the p-value was 0.000 below 0.05 so that it can be concluded that the Design variable has a significant positive effect on brand image and H3a can be accepted. The results of the study where design can influence brand image are in line with previous research by Fu et al. (2023) which found that EV design indirectly influences purchase intention through attitude and brand image. Seo et al. (2015) emphasized design as an important factor in automotive product attributes, and used overall design, car interior, and exterior style as the main measurement items related to it. Likewise, according to Choi & Lee (2001) design is an important factor that influences consumer perceptions of the visual and functional aspects of a product, but the futuristic and attractive EV design has not been able to improve respondents' attitudes, but design can be a factor that improves the brand image of EV considering the characteristics of the EV design which is firm, futuristic and clean because it does not emit pollution, either air or noise. In contrast to attitude, this finding shows that design can enhance the image of EV as future vehicles, with distinctive and futuristic designs, the majority of respondents can distinguish between EV and non-EV from the design of the vehicle used.

The results of the H2b test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.111 with a positive coefficient, a t-value of 2.14 above the minimum value of 1.65 and a p-value of 0.016 below 0.05, thus it can be concluded that H2b is accepted and economic feasibility has a positive effect on attitude. These results support previous research by Liao et al. (2017), which found that one of the factors for EV adoption is influenced by economic feasibility, and research by Fu et al. (2023) also revealed that the economic feasibility of EV influences EV adoption. According to Liao et al. (2017), in their survey of people's intentions to buy EV, they found that this was influenced by economic feasibility, technical and infrastructure stics. Weindel & Swoboda (2016) stated that 'economic feasibility' is obtained from financial sacrifice, which reflects the services felt by consumers based on the convenience received and the costs incurred. Economic feasibility that influences attitude is thought to be caused by the government's incentive offerings which are considered attractive and provide a real economic impact compared to buying a fuel-powered car. This finding shows that respondents consider good economic feasibility in purchasing an EV, the economic side that respondents consider is something that EV manufacturers can use to attract more consumers to switch to EV, the existence of programs such as free battery replacements, or the existence of free charging stations can encourage respondents to switch to EV due to economic factors.

The results of the H3b test found a path coefficient value of 0.192 with a positive coefficient, a t-value of 2.80 above the minimum value of 1.65 and a p-value of 0.003 below 0.05 so that it can be concluded that the economic feasibility variable has a significant positive effect on brand image and H3b can be accepted. These results support previous research by Fu et al. (2023) which found that the economic feasibility of EV affects brand image. This result is thought to be caused by the many economic reliefs offered by the government if using EV, Economic incentives in Indonesia itself consist of PpnBM (Luxury Goods Sales Tax) discounts, the cost of increasing home electricity capacity and annual taxes, which cannot be felt if consumers buy vehicles with fuel. This economic factor is the main consideration considering that the majority of respondents in this study were individuals who already had families and were in the middle class, coupled with the many EV car brands that are starting to be affordable, making the brand image of EV increase.

The results of the H2c test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.201 with a positive coefficient, a t-value of 3.40 above the minimum value of 1.65 and a p-value of 0.000 below 0.05, thus it can be concluded that H2c is accepted and functionality has a positive effect on attitude. The results of this study do not support previous research by Fu et al. (2023) which found that functionality does not affect attitude. Although EV have superior engine performance and noise suppression compared to traditional vehicles, it was found that these factors did not have a statistically significant effect in changing consumer preferences. EV are known for their various functional values, economic feasibility, and environmental values (H. I. Kim & Kim, 2019), the advantages of EV in terms of electric power usage and the use of futuristic technology are differentiators when compared to fuel cars, plus infrastructure support that can support EV' ability to operate increases respondents' positive attitudes towards EV use.

The test results for H3c found a path coefficient value of 0.158 with a positive coefficient, a t-value of 2.06 above the minimum value of 1.65 and a p-value of 0.020 below 0.05 so

that it can be concluded that the functionality variable has a significant positive effect on brand image and H3c can be accepted. These results support previous research by Fu et al. (2023) which found that EV functionality positively affects brand image. This result is due to EV marketing practices that not only offer the function of the vehicle but also its impact on the environment, increasing the image of products that market EV, the difference in performance factor is no longer something that makes the image of EV worse than fossil fueled cars where currently many EV brands have emerged that have engine performance that exceeds fossil fueled cars.

The results of the H2d test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.120 with a positive coefficient, a t-value of 2.26 above the minimum value of 1.65 and a p-value of 0.012 below 0.05, thus it can be concluded that H2d is accepted and safety has a positive effect on attitude. These results support previous research by Fu et al. (2023) which showed that safety positively influences attitude. Safety features are one of the main indicators in choosing a vehicle, the more complete the safety features offered, the more attractive the vehicle will be considered. In the context of EV, safety features include safety features, service life and a sturdy body where today many EV brands have emerged that offer qualified quality using the latest technology such as Tesla, BYD, and Hyundai so that the better the safety features provided will increase the positive attitude of consumers towards EV as a safe and quality vehicle.

In the H3d test, a path coefficient value of 0.322 was found with a positive coefficient, a t-value of 5.02 above the minimum value of 1.65 and a p-value of 0.000 below 0.05 so that it can be concluded that the safety variable has a significant positive effect on brand image and H3d can be accepted. These results support previous research by Fu et al. (2023) which showed that safety affects brand image and can positively influence EV adoption intentions. EV are considered future vehicles that have a myriad of safety features which are one of the main indicators in choosing a vehicle, the completeness of the safety features offered can be a differentiator from BBM cars. The existence of safety features that include safety features, service life and a sturdy body makes the image of EV as a safe car even more attached, supported by the many EV brands that offer qualified safety features using the latest technology such as Tesla, BYD, and Hyundai so that the better the safety features provided will improve the image of EV as a safe vehicle.

The results of the H4 test can be seen in table 4 where based on the calculation results, the path coefficient figure is 0.124 with a positive coefficient, the t-value is 2.24 above the minimum value of 1.65 and the p-value is 0.013 below 0.05, thus it can be concluded that H4 is accepted, brand image has a positive effect on attitude. These results support previous research by Fu et al. (2023) which found that brand image positively influences consumer attitudes, as well as research from Jiang et al. (2021) and Gong et al. (2023) which shows that a strong brand image increases customer engagement in the market and strengthens sustainable purchasing intentions. Likewise, Isyanto et al. (2020) found that the perception of a strong brand image leads to increased attention focused on the product. Panyagometh & Bian (2023) found a mediating role for brand image and perceived value between perceived ESG and consumer attitudes. This finding is consistent with Elseidi & El-Baz (2016) who emphasized the mediating effect of brand image and perceived value. Brand image is becoming increasingly important in the emerging new energy vehicle market. For consumers, the brand image of electric vehicles reflects their perception and reputation of innovative brands that influence their purchasing decisions (Jiang et al., 2021). Amidst the increasingly accessible flow of information, in the EV industry, a good brand image can give a positive impression of a brand, consumers will assess many factors such as after-sales service, news of failures of EV sold to the contribution of a product to environmental conservation, the better the image maintained by the company, the more positive the consumer's attitude towards the brand will be which will affect purchase intentions.

The results of the H5 test can be seen in table 4 where based on the calculation results, the path coefficient figure is 0.152 with a positive coefficient, the t-value is 2.65 above the minimum value of 1.65 and the p-value is 0.004 below 0.05, thus it can be concluded that H5 is accepted, brand image has a positive effect on EV adoption intention. These results support previous research by Bhakar and Bhakar (2013) showing that brand image has a positive influence on purchase intention in a study of the relationship between country of origin and brand image among consumers in India. Brand image is defined as a set of beliefs that consumers have about a company (Hwang et al., 2019). Brand image influences consumer behavior and plays an important role in differentiating from competitors, securing target markets, and driving purchase intentions (Han, 2017). Amidst the increasingly accessible flow of information, in the EV industry, having a good brand image can encourage purchases, consumers will assess many factors such as after-sales service, news of failures of EV sold to negative news about a brand before making a purchase. The majority of respondents earn less than IDR 10 million so they will be more selective in purchasing vehicles considering that they do not have many resources for repeated vehicle purchases so that the image of a brand becomes a determining factor in EV purchasing decisions. Consumers will also consider whether buying a brand will be able to provide a sense of pride and improve the individual's image in the eyes of those around them, so it is important for EV companies to use the right branding strategy.

The results of the H6a test can be seen in table 4 based on the calculation results obtained a path coefficient of 0.006 with a negative coefficient, a t-value of 0.20 below the minimum value of 1.65 and a p-value of 0.420 above 0.05, thus it can be concluded that H6a is rejected and knowledge has no effect on attitude. These results are different from previous research by Murtiningrum et al. (2022) confirming that knowledge has a significant positive effect on attitude. As well as research from Wang et al. (2018) and Yang et al. (2020), shows that increasing knowledge value will increase attitude value. This is thought to be due to the knowledge of EV that are closely associated with an environmentally friendly image, The more product knowledge consumers have, the more they understand the features (both advantages and disadvantages) of electric vehicles. Consumers with greater product knowledge will be more aware of the advantages of electric vehicles compared to traditional cars that use combustion engines, so they have greater benefits that will affect their attitudes towards electric vehicles and their intention to adopt, but this study did not find any effect of knowledge on attitudes even though based on descriptive analysis it was found that respondents' knowledge regarding EV was considered good, but has no effect on attitude. This is thought to be caused by knowledge of EV that are closely associated with an environmentally friendly image, which actually raises skepticism about the true benefits of EV as an environmentally friendly step as found in previous research conducted by Lee & Cheong (2024) which found that consumer knowledge can increase skepticism, currently 67% of electricity sources in Indonesia still use coal as fuel (Sinaga, 2024) where coal is considered an environmentally unfriendly resource because it produces large carbon emissions that pollute the air. This skepticism makes respondents assume that EV are a form of greenwashing, namely publicity stunts, misinformation, deliberate actions to confuse or deceive consumers with false claims about the environmental benefits of an environmentally friendly product, disguising or covering

up the image of a product or organization (Andreoli & Minciotti, 2023). This assumption is supported by previous research by Andreoli & Minciotti (2023) which found that greenwashing arising from skepticism can influence consumer behavior and research by Bladt (2024) which found that greenwashing has a negative effect on brand attitude.

The results of the H6b test found a path coefficient value of 0.036 with a negative coefficient, a t-value of 1.49 below the minimum value of 1.49 and a p-value of 0.068 above 0.05 so it can be concluded that the knowledge variable has no effect on EV adoption intention and H6b is rejected. This result is different from previous studies by Murtiningrum et al. (2022), Wang et al. (2018) and Yang et al. (2020) which showed that knowledge positively influences EV adoption. Yang et al. (2020) stated that product knowledge about electric vehicles includes various advantages such as comfort, high acceleration speed, low pollution, and minimal noise, as well as other features such as charging time and application coverage, but this study did not find any significant influence of knowledge on EV adoption intention even though based on descriptive analysis it was found that respondents' knowledge regarding EV was considered good, but has no effect on attitude, this is thought to be caused by respondents' knowledge regarding the environmental benefits of EV where the concept of EV as one of the environmentally friendly products actually raises skepticism about the use of EV as a step to preserve the environment as found in previous research conducted by Lee & Cheong (2024) which found that consumer knowledge can increase skepticism. Based on information from the Director General of Mineral and Coal, currently 67% of electricity resources in Indonesia still use coal as fuel (Sinaga, 2024) where coal is one of the largest producers of carbon emissions in the world so that the use of electric cars will increase electricity consumption which will directly increase the demand for electricity produced from coal. This skepticism makes respondents consider that EV are a form of greenwashing, namely publicity stunts, misinformation, deliberate actions to confuse or deceive consumers with false claims about the environmental benefits of an environmentally friendly product, disguising or covering up the image of a product or organization (Andreoli & Minciotti, 2023). Previous research from Javed et al. (2024) found that greenwashing reduces interest in buying environmentally friendly goods which is mediated by consumer knowledge.

For H7a test result can be seen in table 4 based on the calculation results obtained a path coefficient figure of 0.160 with a positive coefficient, a t-value of 2.79 above the minimum value of 1.65 and a p-value of 0.003 below 0.05, thus it can be concluded that H7a is accepted and environmental concern has a positive effect on attitude. This result is in line with research by Wang et al. (2018) which shows that environmental concern (EC) influences attitude and is different from previous research by Murtiningrum et al. (2022) which found that environmental concern (EC) did not have a significant influence on attitude. Based on the outer loading value that measures the strength of the relationship between each item and its construct. Each item in environmental concern and attitude has an outer loading value above 0.7. The highest outer loading value on the environmental concern item with a value of 0.900 is EC2, while the highest outer loading value on the attitude item with a value of 0.872 is AT6, so it can be concluded that the adoption of EV that support energy savings and environmental protection increases consumers' good feelings in using EV. Environmental Concern (EC) is generally related to the perception that the environment is declining in some way (Lai et al., 2015). Environmental concern (EC) is a psychological factor that significantly influences users' attitudes towards fully accepting electric vehicles.

The results of the H7b test found a path coefficient value of 0.154 with a positive coefficient, a t-value of 2.87 above the minimum value of 1.65 and a p-value of 0.002 below 0.05 so it can be concluded that the environmental concern variable has a significant positive effect on EV adoption intention and H7b can be accepted. These results are in line with research from Murtiningrum et al. (2022) which shows that environmental concern (EC) significantly influences EV adoption. Consumers who care about the environment tend to be the first to adopt EV. The higher the consumer's concern for the environment, the higher their intention to buy an EV. Jensen et al. (2013) argue that environmental concern (EC) has a positive influence on preferences for electric vehicles both before and after using them. Bockarjova & Steg (2014) stated that people are more likely to adopt EV when they believe that the vehicle can reduce environmental risks. From the results of the study and the understanding, it can be concluded that environmental factors are the main factors that drive positive consumer attitudes towards EV. Without environmental benefits, consumers will have difficulty identifying the advantages of EV compared to fuel cars. These environmental benefits also encourage the purchase of EV by individuals who previously owned fuel cars because they want to experience driving without polluting at a relatively cheaper cost.

The results of the H8 in table 4 shows the path coefficient figure is 0.301 with a positive coefficient, a t-value of 5.21 above the minimum value of 1.65 and a p-value of 0.000 below 0.05, thus it can be concluded that H8 is accepted subjective norm has a positive effect on EV adoption intention. These results are in accordance with previous research by Murtiningrum et al. (2022) showing that subjective norm has a significant positive effect on EV adoption. These findings confirm that support from close people, such as family, friends, and colleagues, plays an important role in increasing the intention to purchase an EV. Subjective Norm (SN) refers to the social pressure felt to do or not do a certain behavior (Ajzen, 1991). In an EV adoption scenario (Zhang et al., 2018), if coworkers, parents, or neighbors give more favorable approval regarding the purchase of an electric vehicle, it is likely that he or she will have a stronger intention to purchase an electric vehicle. Therefore, a person's Subjective Norm towards the adoption of electric vehicles can predict and determine the intention to purchase electric vehicles. In the context of this study, if we look at the majority of respondents who are married, it can be assumed that family support is the main factor that can encourage EV purchases.

The results of the H9 test can be seen in table 4 where based on the calculation results, the path coefficient figure is 0.288 with a positive coefficient, a t-value of 4.06 above the minimum value of 1.65 and a p-value of 0.000 below 0.05, thus it can be concluded that H9 is accepted perceived behavioral control has a positive effect on EV adoption intention. The results of this study support previous research by Murtiningrum et al. (2022) an increase in PBC value will increase EV adoption. Perceived Behavioral Control (PBC) is one of the predictors of intention that refers to the level of ease or difficulty in carrying out a behavior. The greater the perceived behavioral control, the stronger a person's intention to carry out the behavior (Ajzen, 1991). In other words, consumers who have full control over purchasing decisions and can buy without difficulty will have higher purchase intentions than those who have less control (Zhang et al., 2018). Therefore, a person's perceived behavioral control can explain their intention to purchase an electric vehicle. In this study, the majority of respondents already have jobs and a steady income, although the economic capacity of each individual is different, the incentives provided by the government can increase the economic capacity of each individual to switch to using EV.

The results of the H10 test can be seen in table 4 where based on the calculation results, the path coefficient figure is

0.108 with a positive coefficient, the t-value is 2.16 above the minimum value of 1.65 and the p-value is 0.015 below 0.05, thus it can be concluded that H10 is accepted, attitude has a positive effect on EV adoption intention. These results support previous studies by Zhang et al. (2018), Wang et al. (2018), and Shalender and Sharma (2021) which showed that increasing attitude values would increase EV purchase or adoption intentions. Attitude refers to the extent to which a person evaluates a behavior positively or negatively (Ajzen, 1991). In the Theory of Planned Behavior (TPB), attitude is used to directly predict behavioral intentions. In the context of EV adoption, the more positive a person's evaluation of purchasing an electric vehicle, the more likely he or she is to intend to purchase it. Therefore, a person's attitude towards EV adoption can predict their intention to purchase an electric vehicle. As described in (TPB), attitude has a significant positive effect on EV adoption (Murtiningrum et al., 2022). The results of the questionnaire showed a positive attitude from respondents towards purchasing EV, mainly because of a sense of pride in the environmental impact obtained, this positive attitude is formed from the good perception of EV, the benefits of EV for the environment, decreasing risk factors and incentives provided by the government, these factors encourage consumers to switch to using EV in the future. This finding shows that companies can use this positive attitude to encourage consumers to switch to EV. What can be done is to utilize social media as the main media in conveying the advantages of EV compared to fossil fuel cars.

Conclusion

This study concludes that perception of EV, perceived environmental benefit, perceived incentive policies, economic feasibility, functionality, safety, brand image and environmental concern have a significant positive effect on attitude, while variables perceived risks and design have a negative effect on attitude. Meanwhile, the variable knowledge does not affect Attitude. Variables design, economic feasibility, functionality, safety have a significant effect on brand image. This study concludes that brand image, attitude, environmental concern, subjective norm and perceived behavioral control have a significant positive effect on EV adoption. Meanwhile, the variable knowledge does not affect EV adoption. Based on the results of the study, it can be concluded that respondents consider perception of EV, perceived environmental benefit, perceived incentive policies, perceived risks, economic feasibility, functionality, safety, brand image, knowledge, environmental concern, subjective norm, perceived behavioral control and EV adoption to be good, respondents have a positive attitude towards EV adoption, this is because EV has good benefits for the environment, respondents consider that using EV is a source of pride because it helps in environmental conservation. .

In conducting this study, there are several limitations including screening of respondents' ages has not focused on the working class, as several respondents are students who are considered to have less resources to buy an EV, the majority of respondents come from the middle class with incomes below IDR 10 million, there is the potential that respondents do not yet have the financial capability to buy an EV because the price of an EV in the entry level class is around IDR 200-300 million and lastly using social media platforms for survey distribution introduces sampling bias toward digitally literate populations.

Future research can examine other variables that were not studied in this study, such as buying power, because the ability of consumers to switch to using EV is thought to differ depending on the consumer's buying power, as in previous research by Tavitiyaman et al. (2024) which found an influence of buying power on purchase intention, No comparison of survey results was carried out between lower middle class and upper middle class respondents who are suspected of having different financial capabilities and different perceptions in assessing the price value of EV

Further research is suggested to examine other variables not studied in this study such as buying power, price value, skepticism, or greenwashing because the ability of consumers to switch to using EV is thought to differ depending on the consumer's buying power as in previous research by Tavitiyaman et al. (2024) which found an influence of buying power on purchase intention, then research by Sarker et al. (2023) which found a positive influence of price value on attitude, and Andreoli & Minciotti (2023) which found that greenwashing arising from skepticism can affect consumer behavior and research by Bladt (2024) which found that greenwashing had a negative effect on brand attitude.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Guntur Prayogo and Karto Adiwijaya. All authors read and approved the final manuscript.

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