

## Analysis of factors influencing consumer purchase intention on electric motorcycle

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### Abstract

*Air pollution is worsening due to the increasing emissions produced by motor vehicles each year. The consumption of vehicle fuels releases various pollutants into the atmosphere, necessitating efforts to control air pollution to prevent the emissions from worsening. Electric motorcycles represent an environmentally beneficial innovation. With electric motorcycles, it is hoped that pollution resulting from carbon emissions will decrease, providing a solution to future energy scarcity. Electric motorcycles have an advantage over conventional motorcycles in that they can reduce emissions, as they do not emit gas. However, the use of electric motorcycles has not yet achieved optimal results. Therefore, this research aims to determine the influence of Subjective Norms, Perceived Behavioral Control, and Environmental concerns on Consumer Attitudes towards Purchase Intention of electric motorcycles. Data was collected by engaging 167 civil servants in Bali Province with an online survey to test four hypotheses. Analysis and hypothesis testing were conducted using the SmartPLS software. This research findings that all hypotheses are supported; Subjective Norm, Perceived Behavioral Control, and Environmental Concern significantly influence Consumer Attitude toward Purchase Intention of electric motorcycles. It is important to consider these factors and develop a holistic strategy to promote Purchase Intention for electric motorcycles.*

**Keywords:** *subjective norm, perceived behavioral control, environmental concern, attitude, purchase intention, electric motorcycle*

### Introduction

Motorcycles are a popular mode of transportation in many parts of the world. In some Asian cities, motorcycles are the main choice of transportation. Globally, about 58 percent of the total motorcycle users come from the Asia Pacific region and other Asian regions, including South and East Asia (Aditiya, 2023). Based on research conducted by the PEW Research Center (2023), Thailand has the highest number of motorcycle users in the world, with 87 percent of households owning at least one motorcycle. Other countries with high levels of motorcycle use include Vietnam (86 percent), Indonesia (85 percent), Malaysia (83 percent), and China (60 percent). The majority of people in various cities in Indonesia choose motorcycles as their main means of transportation. Although the

government has prepared public transportation options as an alternative to the use of private vehicles, people tend to consider motorcycles as more practical than the currently available public transportation. The relatively high price of cars is also a reason why Indonesians prefer motorcycles. Apart from being used as a means of daily transportation, motorcycles nowadays also act as a source of income for most people.

Air pollution is getting worse due to the impact of gas emissions produced by motorized vehicles which are increasing every year. The impact of these carbon emissions from the environmental sector is to increase the amount of greenhouse gases that have an impact on global warming and the deterioration of natural ecosystems. Emissions from the transportation sector are the second largest contributor to total emissions in the energy sector. The transportation sector produces around 157,326 Gg CO<sub>2</sub>e with an average increase rate of 7.17% every year (ESDM, 2020). This increase in emissions is in line with the increase in fuel consumption, which reached 7.56% per year (ESDM, 2020). Various ways have been taken to reduce the use of fossil fuels in land transportation. One of them is by using an electric motorcycle. Based on the Regulation of the Minister of Transportation Number PM 65 of 2020, an Electric Motorcycle is a motorcycle that is driven by an electric motor and gets a supply of electric power resources from the battery directly in the vehicle. According to the Indonesian Motorcycle Industry Association (AISI), sales of electric motorcycles in Indonesia have not yet achieved encouraging results. Based on data collected by AISI, sales of electric motorcycles only reached 31,827 units in October 2022 while sales of conventional motorcycles were recorded at 537,587 units (Santika, 2023). Based on this data, the number of electric motorcycles is still very small compared to conventional motorcycles, at only 5,6%. Therefore, it is important to identify the factors that influence the intention to use electric motorcycles.

In this study, the authors conducted an analysis related to the factors that influence consumer purchase intentions for electric motorcycle products with Theory of Planned Behaviour and Tricomponent Attitude Models theory as well. The Theory of Planned Behavior is widely used to examine consumer behavior in terms of using green products and environmentally friendly products because it can accommodate various environmental variables within a comprehensive framework, especially the connection between purchasing behavior and environmental aspects. Understanding the Tri Component Attitude Model aims to understand how to form attitudes toward electric motorcycle products on cognitive, affective, and conative components and how these attitudes can influence purchase intentions (Malhotra et al., 2017). According to Schiffman and Wisenblit (2019), the tri-component attitude model is a model that describes the attitude structure and states that attitudes consist of three components namely affective, cognitive, and conative components. This study examines several variables that can influence consumer attitude and then end in purchase intention, namely subjective norm, perceived behavioral control, and environmental concern.

The relationship between these variables has been carried out in previous research by Bhutto et al. (2021) where the study found that subjective norm, perceived behavioral control and environmental concern affect consumer

attitudes toward purchase intention. This is also in line with research conducted by Zaremohzzabieh et al. (2020) which examines the effect of consumer attitudes on purchase intentions for environmentally friendly products. The results obtained are subjective norm, perceived behavioral control, and environmental concern affect consumer attitude and attitude also has a positive and significant effect on purchase intention of environmentally friendly products. However, based on research conducted by Hasheem et al. (2022) found that one of the variables, namely environmental concern, did not have a significant effect on attitude.

According to Hwang et al. (2020), subjective norm reflects the way individuals judge other individuals in certain actions. This indicates that subjective norm is a behavioral factor that is influenced by social environments such as family, friends, work colleagues, and other individuals who provide support in a person's decision-making process. Associates, relatives, coworkers, and social circles play pivotal roles in molding the subjective norm. The determination to behave in a specific way hinges on these groups. Subjective norms represent the discernible viewpoints of individuals significant to someone, impacting their decision-making process (Garg & Joshi, 2018). Therefore, this study hypothesizes :

*H1: Subjective norm has a positive effect on consumer attitude towards purchasing intention for electric motorcycles.*

An individual's belief in their capacity to make decisions regarding specific behaviors is termed perceived behavioral control (Al Mamun et al., 2018). When people perceive themselves as having abundant resources and opportunities, their perceived behavioral control strengthens, consequently increasing their intention to purchase green products, such as green skincare items (Sun & Wang, 2020). Earlier studies have indicated that perceived behavioral control positively and significantly impacts the intention to purchase, as evidenced in research by Paul et al. (2016) and Chaudhary and Bisai (2018). So, the hypothesis obtained:

*H2: Perceived Behavioral Control has a positive effect on consumer attitude towards purchasing intention for electric motorcycles.*

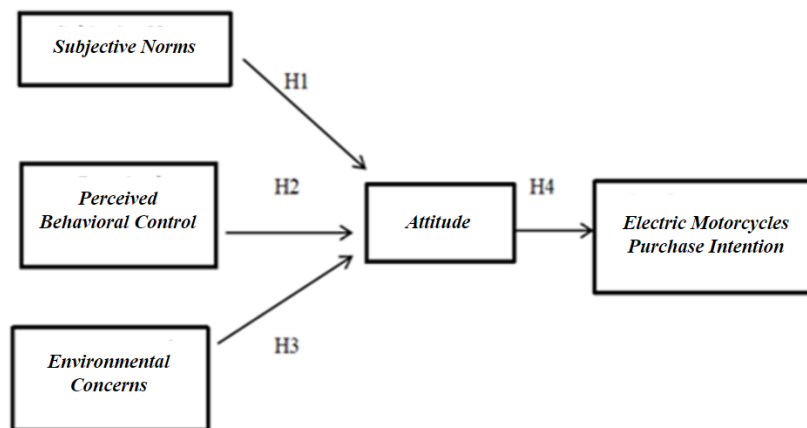
Chi et al. (2021) explain that if consumers believe that adopting slow consumption behavior effectively contributes to the environment, then they are more likely to purchase products that support this goal. According to Paul (2016), environmental concern is a component of environmental attitudes that influences purchase intention (Paul et al., 2016). When individuals are aware of the deteriorating environmental conditions and feel responsible for their surrounding environment, they tend to choose environmentally friendly products (Huang et al., 2014). Yadav and Pathak (2016) demonstrated that environmental awareness notably affects the attitudes of young consumers in India towards green products. Similarly, Maichum et al. (2016) revealed that environmental awareness directly influences Thai consumers' attitudes toward green products. Research on the adoption of green products suggests that individuals' sense of environmental responsibility and contribution to environmental protection are associated with heightened personal environmental concern. Moreover, individuals tend to embrace green products when they express concern for the environment (Verma et al., 2019). The variable of environmental concern is a primary predictor for the

elevation of consumer attitudes toward green products (Sulis, 2022). Hence, this study hypothesizes :

*H3: Environmental concern has a positive effect on consumer attitudes towards purchasing intention for electric motorcycles.*

According to Al Mamun et al. (2020), attitude reflects an individual's preferences for the products or services they intend to purchase. Singhal and Malik (2021) state that attitude is a key indicator that can predict someone's willingness to buy environmentally friendly products. By choosing eco-friendly products, individuals demonstrate their positive attitude towards environmental conservation efforts and contribute to reducing pollution. In general, attitudes underlie individuals' and communities' or societies' beliefs about the favorable or unfavorable views of a particular behavior or thing (Cowan & Kinley, 2014). Attitudes formed by consumers will play a crucial role in decision-making through the intention to purchase products (Chi et al., 2021). Based on the findings of Reimer et al. (2017), consumers' purchase intentions will increase in tandem with their positive attitudes toward products believed to offer benefits. So, the hypothesis obtained:

*H4: Attitude has a positive influence on the purchase intention of electric motorcycles.*



**Figure 1. Research Model**

This research model is a modification of the Theory of Planned Behavior by Ajzen (1991). To predict consumer behavior towards purchasing intention, it is necessary to consider that subjective norms, perceived behavioral control, and environmental concern can influence attitudes related to the purchase intention of electric motorcycles.

### Research Method

In this study, the researcher applied a quantitative approach. This research uses Partial Least Square - Structural Equation Modeling (PLS-SEM). Regarding the use of PLS SEM, Hair et al. (2019) state that the minimum sample size to represent a population is 5 times the number of indicators. Therefore, the calculation of the minimum sample size in this study is as follows: minimum

sample size = 20 research indicators x 5 = 100. The data in this study were collected through a survey method. In this context, researchers conducted a survey using a questionnaire distributed online via Google Forms to respondents who are State Civil Administration working in the Bali province area. We chose State Civil Administration in the Bali province as a respondent because the Bali provincial government already has regulations in use electric vehicles, making it a very interesting subject for research. To determine the type of sample to be used in this study, the researchers applied purposive sampling technique where the sample is taken only if it meets the following criteria : The respondents are State Civil Administration in Bali Province; and respondents do not own an electric motorcycle. We obtained about 167 respondents from January to February 2024.

Partial least squares (PLS) can be used to analyze high-dimensional regression problems, where the number of predictors can far exceed the number of observations (Xie & Chen, 2022). There are three stages of analysis for the data that has been collected in this study, namely: outer model analysis, inner model analysis, and hypothesis analysis. All data analysis was conducted using SmartPLS 3 software.

### **Result and Discussions**

The questionnaire was distributed from December 2023 to January 2024. During this time, researchers managed to collect 167 respondents who had participated and met the research criteria.

**Table 1. Sample Characteristics**

	Characteristics	Frequency	(%)
Gender	Female	71	42,50%
	Male	96	57,50%
Age	Under 25 years old	6	4%
	25-34 years old	70	42%
	35-44 years old	55	33%
	45-54 years old	30	18%
	Over 55 years old	6	4%
Educational Background	SMA/SMK	5	3%
	Diploma	14	8,40%
	Bachelor	116	69,40%
	Master	30	18%
	Doctorate	2	1,20%
Job	PNS	148	88,60%
	PPPK	19	11,40%

Based on Table 1, it is evident that the majority of the respondents' gender is dominated by males, accounting for 57.5%. In terms of age, the majority of respondents are aged between 25-34 years, totaling 42%. Regarding their highest level of education, the majority are bachelor's degree graduates, with a percentage of 69.4%. As for the respondents' occupations, which also include State Civil Administration (ASN) in the Bali Provincial Government, they are

divided into two categories: Civil Servants (PNS) and Civil Servants with Work Agreements (PPPK). The majority of respondents who filled out the questionnaire are Civil Servants (PNS), accounting for 88.6%.

**Table 2. Definition of Operational Variables, Validity and Reliability**

Indicator	Mean	SD	Factor Loading	AVE > 0.5	Cronbach	Evaluation
<b>Subjective Norm</b>						
I think people around me thought that I should use electric motorcycle near future.	4,251	1,747	0,908	0,83	0,932	Valid
I think people who are important to me they want to buy electric motorcycle	4,527	1,611	0,923			
I think if I purchase electric motorcycle, then the most people who is important to me would also buy electric motorcycle.	4,419	1,721	0,91			
I think peoples opinion I value the most when I make my decision to adopt electric motorcycle near future	4,054	1,819	0,901			
<b>Perceived Behavioral Control</b>						
I think the price of electric motorcycle is important to me and I can afford it when I decide to buy	5,826	1,327	0,74	0,658	0,828	Valid
I think the maintenance and repair of electric motorcycle is important to me when I decide to buy	6,048	1,142	0,856			
I think I can find where to buy I think I can find where to buy electric motorcycle if I wanted to buy if I wanted to buy	5,521	1,371	0,763			
I think I will look for an electric motorcycle repair place if my electric motorcycle has a breakdown	5,861	1,166	0,878			

**Table 2. Definition of Operational Variables, Validity and Reliability (Cont'd)**

***Environmental Concern***

I think environmental problems are becoming more and more serious in recent years	6,335	1,007	0,901	0,749	0,889	Valid
I think human beings should live in harmony with nature in order to achieve sustainable development	6,383	0,946	0,9			
I think we are not doing enough to save scarce natural resource from being used up	6,467	0,984	0,882			
I think individuals have the responsibility to protect the environment	5,886	1,329	0,771			

***Attitude***

I like electric motorcycle because it is wise idea to use it.	5,377	1,396	0,949	0,813	0,922	Valid
I like electric motorcycle because it gives positive message to the society	5,389	1,405	0,94			
I like electric motorcycle because it is favorable to environment	5,94	1,334	0,829			
I like electric motorcycle because it is necessary to the society	5,06	1,491	0,883			

***Purchase Intention***

I intent to purchase electric motorcycle because it is environmental friendly.	5,389	1,512	0,890	0,746	0,886	Valid
I intent to buy electric motorcycle in near future.	4,335	1,794	0,824			
I feel that I will played a great part in helping the environment when I drive electric motorcycle.	5,263	1,398	0,92			
I intent to purchase electric motorcycle over conventional motorcycles when their product qualities are similar	5,204	1,588	0,817			

Based on Table 2, respondents' assessment of all variables is high. The mean value of each measurement item is in quadrants 4 and 5 which indicates

an affirmative response to the statements contained in the questionnaire. The standard deviation of the data collected through the questionnaire is still within the normal criteria (Laobucci, 2010). Furthermore, the composite reliability test is carried out by checking the Average Variance Extracted (AVE) value of each construct. Based on Table 2, shows that the results of the convergent factor loading validity test and the AVE value for each variable have a value greater than 0.5 so that all variables in this study can be said to be valid. The highest AVE value is shown by the subjective norm (SN) variable with an AVE value of 0.830, while the lowest AVE value is shown by the perceived behavioral control (PBC) variable with an AVE value of 0.658. Meanwhile, Cronbach's alpha for each variable is greater than 0.7 so that based on the value of the test, all indicators in this study can be said to have met the valid and reliable requirements.

**Table 3. Heterotrait-Monotrait Ratio of Correlations (HTMT)**

	Attitude (A)	Environmental Concern (EC)	Perceived Behavioral Control (PBC)	Purchase Intention (PI)	Subjective Norm (SN)
Attitude (A)					
Environmental Concern (EC)	0,450				
Perceived Behavioral Control (PBC)	0,614	0,624			
Purchase Intention (PI)	0,864	0,373	0,537		
Subjective Norm (SN)	0,721	0,193	0,389	0,756	

In addition, the authors conducted a Heterotrait-Monotrait Ratio of Correlations (HTMT) test to ensure discriminant validity. Table 3 shows that all Heterotrait-Monotrait Ratio of Correlations (HTMT) values are less than 0.9, thus confirming that all variables are valid.

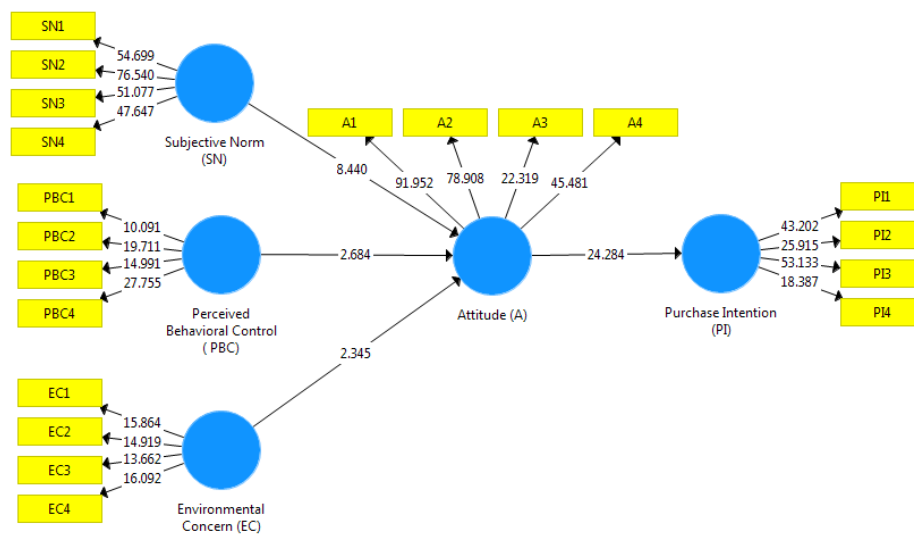
Through the bootstrapping process in PLS, T-statistic test parameters are obtained to predict the existence of a causal relationship. In the structural model analysis model (inner model), researchers will carry out several stages. The stages that will be carried out include measuring the coefficient of determination ( $R^2$ ), measuring the effect size ( $f^2$ ), measuring the predictive relevance of Stone-Geiser ( $Q^2$ ) by blindfolding, and seeing the significance of the structural model. According to Ghazali (2012), the interval of a good R Square value is in the range of values between 0 -1 (0 to  $\leq 1$ ). The following are the results of testing the coefficient of determination ( $R^2$ ) value using SmartPLS as listed in Table 4 below.



**Table 4. Determination Coefficient Results**

Variable	R Square	R Square Adjusted
Purchase Intention (PI)	0,677	0,676
Attitude (A)	0,589	0,581

Based on the table, it can be seen that the subjective norm (SN), perceived behavioral control (PBC), and environmental concern (EC) variables contribute an influence of 58.9% to the attitude construct (S). On the other hand, the remaining 41.1% is the contribution of the influence of other variables that are not included in this research model. Furthermore, the attitude variable (A) contributes an influence on purchase intention (PI) of 67.7%. Meanwhile, 32.3% is the amount of contribution of other factors that are not included in this research model. Hypothesis testing using SmartPLS is given in Figure 2.



**Figure 2. Visualization of Research Results**

**Table 5. Analysis and Structural Result**

Hypothesis	Path	Original Sample	T-statistics	P-Values	Result
H1	Subjective Norm (SN) -> Attitude (A)	0,549	8,44	0,000*	Accepted
H2	Perceived Behavioral Control (PBC) -> Attitude (A)	0,285	2,547	0,008*	Accepted
H3	Environmental Concern (EC) -> Attitude (A)	0,183	2,345	0,019*	Accepted
H4	Attitude (A) -> Purchase Intention (PI)	0,823	24,284	0,000*	Accepted

Hypothesis 1 is supported by the research results which show that the path coefficient ( $\gamma_1$ ) is 0.549 and has a positive value with a T-value of 8.440 and a P-value of 0.000 or  $\leq 0.05$ . This indicates that subjective norm significantly positively

influences consumer attitudes toward purchase intention of electric motorcycle products. It can be concluded that hypothesis 1 is supported. In line with research conducted by Prerna Garg and Richa Joshi (2018) who found that subjective norm significantly affects consumer attitudes toward a product. In addition, research conducted by Changhyun and Huanjiao (2017) also found the same thing that subjective norm has a positive and significant influence on consumer attitude towards products. Advice and also recommendations from close friends and neighbors can influence a person's attitude toward using a product.

The results also show that the path coefficient ( $\gamma_1$ ) is 0.285 and has a positive value with a T-value of 2.547 and a P-value of 0.008 or  $\leq 0.05$ . This indicates that perceived behavioral control significantly positively affects consumer attitudes toward purchase intention of electric motorcycle products. It can be concluded that hypothesis 2 is supported. Consumer attitude is also positively influenced by perceived behavioral control (PBC). This is in line with the findings of Chetioui et al. (2019) and Yasa et al. (2022) who also found that perceived behavioral control has a positive effect on consumer attitude towards product use. According to Ru et al., (2018), Perceived Behavioral Control refers to an individual's perception of the ease or difficulty of performing a behavior. Perceived behavioral control represents an individual's view of the extent to which they can perform the behavior.

The third hypothesis, namely the effect of environmental concern on consumer attitude towards electric motorbikes, is supported by the results of research showing the path coefficient ( $\gamma_1$ ) of 0.183 and is positive with a T-value of 2.345 and a P-value of 0.019 or  $\leq 0.05$ . This indicates that environmental concern significantly positively affects consumer attitudes toward purchase intention of electric motorcycle products. It can be concluded that hypothesis 3 is supported. Research conducted by Adnan et al, (2018) also found similar results that environmental concern affects consumer purchase intention for electric vehicles. Environmental concern reflects the extent to which individuals feel concerned about the balance of the ecosystem and the environmental impact of their decisions and behavior. This awareness can encourage the intention to buy an electric motorcycle as a more environmentally friendly alternative.

The fourth hypothesis is proven to be positive and significant with the results of the study showing the path coefficient ( $\gamma_1$ ) of 0.823 and a positive value with a T-value of 24.284 and a P-value of 0.000 or  $\leq 0.05$ . This indicates that attitude significantly positively influences consumer purchase intention for electric motorcycle products. It can be concluded that hypothesis 4 is supported. Furthermore, attitude is proven to have a positive influence on the purchase intention of electric motorbikes. The results of this study are in line with the findings of Garg and Joshi (2018) and Nam et al. (2017) who found a positive correlation between attitude and purchase intention.

Components of the Theory of Planned Behavior are able to identify factors that influence consumer purchase intention towards electric motorcycles. Attitude towards behavior refers to the extent to which someone holds a positive or negative evaluation of a specific behavior. In the context of purchasing electric motorcycles, an individual's attitude can be influenced by various factors such as environmental awareness, cost efficiency, vehicle performance, and perceptions of technological innovation. One structural model of attitude is the Tricomponent

Attitude Model, consisting of three components: cognitive, affective, and conative (action). In the context of purchasing electric motorcycles, affective components may include positive feelings related to individual contributions to environmental conservation and satisfaction with the use of environmentally friendly technology. The subjective norm aspect is a form of affective response that influences an individual's attitude towards the purchase intention of a product. It affects how individuals respond to the opinions and expectations of their friends and family members. If individuals perceive that their close ones view positively the purchase of electric motorcycles due to environmental reasons or technological novelty, they may feel more motivated to follow these social norms. Subjective norm is perceived to influence an individual's attitude towards the purchase intention of a product.

Perceived behavioral control can also influence an individual's confidence level in their ability to purchase electric motorcycles. If consumers feel capable of overcoming barriers such as the price of electric motorcycles and access to repairs, and they have control over their behavior, their attitude towards the product tends to be more positive, thereby increasing purchase intention. Environmental concern is a cognitive aspect related to beliefs about environmentally friendly products. It is grounded in individuals' knowledge about electric motorcycles. This knowledge may include individuals' awareness of the negative impacts generated by conventional motor vehicles on the environment.

Knowledge possessed can include individual awareness of the negative impacts that conventional motorized vehicles have on the environment, such as exhaust emissions that cause air pollution and contribute to climate change. This knowledge is part of the cognitive component that shapes individual attitudes towards environmental issues.

## **Conclusion**

In this study, several hypotheses were tested, including subjective norm, perceived behavioral control, and environmental concern which were seen to have an influence on attitude toward purchase intention on electric motorcycle. The following are the conclusions in this study; Subjective norm variables affect consumer attitude towards purchasing intention for electric motorcycle. When a consumer feels that the people closest to them view positively towards purchasing an electric motorcycle, they will feel more motivated that they shape consumer attitudes toward the purchase intention of an electric motorcycle; The perceived behavioral control variable affects consumer attitudes towards purchasing intention for electric motorbikes. Positive emotional feelings or motivation that comes from affective values can strengthen consumers' beliefs in their ability to perform this behavior, and help them overcome obstacles that may arise in the buying process; The environmental concern variable affects consumer attitude towards purchasing intention for electric motorbikes. When individuals have a high level of environmental concern, they tend to be more aware of environmental issues and may have better knowledge about the impact of products or services on the environment so that which can shape individual attitudes in their purchase intention for electric motorcycles; Attitude variables affect the purchase intention of electric motorbikes. When consumers already have a positive attitude, it will influence the formation of purchase intentions for

electric motorbikes. This study makes a significant contribution to the understanding of consumer behavior in the context of green technology adoption, specifically electric motorcycles. By analyzing the factors influencing consumers' purchase intention, the research identifies key elements such as environmental awareness and social influence that play crucial roles in purchase decisions. The novelty of this study lies in its holistic and comprehensive approach to evaluating various psychological and social determinants that have previously received less attention in the literature. The findings of this research not only expand academic understanding of purchase intention but also provide practical insights for manufacturers and marketers to design more effective and sustainable marketing strategies. It is also providing valuable insights for policymakers, marketers, and manufacturers aiming to promote eco-friendly mobility solutions.

Companies can strengthen the influence of subjective norms by developing marketing programs that highlight the use of electric motorcycles as a socially valued choice. This could include advertising campaigns that include testimonials from respected individuals or groups who have adopted or used electric motorcycles. In addition, the Company can also strengthen perceptions of behavioral control by providing more comprehensive information on the use, maintenance, and benefits of electric motorcycles. This could include usage guides and responsive customer service to address technical or logistical barriers that potential buyers may perceive. In addition, the company can also provide test drives so that potential buyers have experience using electric motorcycles and can find out the advantages and disadvantages of the product to be purchased.

Promotions that emphasize the environmental benefits of using electric motorcycles to increase purchase intent. This could include reduced carbon emissions, fuel savings, and other positive impacts on the environment. By reinforcing the perception that purchasing an electric motorcycle is a pro-environment move, companies can attract more environmentally conscious customers, which can increase positive attitudes towards electric motorcycles. The government is also expected to continue the electric motorcycle subsidy program to increase the use of electric motorcycles in Indonesia. The limitations of this study include conducting research in only one region and using only four variables to determine consumer purchase intention towards electric motorcycles. Suggestions for future research are expected to develop more relevant constructs to understand consumer purchase intention towards environmentally friendly products and to analyze electric motorcycle purchases using the Theory of Trying.

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