STUM
Sustainable Transportation and Urban Mobility
STUM 2(1): 15–29
ISSN 3063-1416

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Understanding the behavioral drivers of electric motorcycle adoption: A stimulus-organism-response perspective

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Received Date: January 20, 2025 Revised Date: February 25, 2025 Accepted Date: February 28, 2025

ABSTRACT

Background: This study investigates the influence of consumer experience, attitude, and perception on the intention to adopt electric motorcycles. Electric motorcycles are highly effective in reducing dependence on fossil fuels, thereby minimizing environmental pollution (CO_2 emissions). Based on the stimulus-organism-response (SOR) framework, this study aims to explore whether the experience of riding an electric motorcycle affects consumers' cognition and emotions (perceived relative advantage, perceived ease of use, perceived risk) in adopting electric motorcycles. **Methods:** Data were collected from 112 respondents in the Jabodetabek area who participated in an electric motorcycle test drive. The collected data were analyzed using partial least squares-structural equation modeling (PLS-SEM) with the assistance of SmartPLS software. **Findings:** The analysis results indicate that the experience of riding an electric motorcycle does not directly influence consumer intention to adopt electric motorcycles. However, it stimulates adoption intention through perceived relative advantage, perceived ease of use, and perceived risk. **Conclusion:** This study helps identify key factors that can enhance consumer intention to adopt electric motorcycles. **Novelty/Originality of this article:** This study provides new insights into the mediating role of perceived relative advantage, perceived ease of use, and perceived risk in the adoption process of electric motorcycles, contributing to the understanding of consumer behavior in the transition towards sustainable transportation.

KEYWORDS: electric motorcycles; driving experience; perceived ease of use; perceived risk; adoption intention.

1. Introduction

Environmental issues and climate change have been recognized as global concerns (Tan et al., 2014). The transportation sector is considered a significant contributor to environmental problems, as it is responsible for 23% of global CO_2 emissions through fuel combustion (Lee et al., 2021). Soiket et al. (2019) and Wang et al. (2020) explain that human activities significantly contribute to global climate change, including rising temperatures, ice melting, and rising sea levels. Carbon dioxide (CO_2) is one of the greenhouse gas emissions that is an air pollutant harmful to public health and human well-being (Soiket et al., 2019; Wang et al., 2020).

Cite This Article:
Najib, T. A. & Kusumastuti, R. D. (2025). Understanding the behavioral drivers of electric motorcycle adoption: A stimulus-organism-response perspective. *Sustainable Transportation and Urban Mobility, 2*(1), 15-29. https://doi.org/10.61511/stum.v2i1.2025.1813

Technological advancements in vehicles have shifted engines from traditional internal combustion to electric engines (Barkenbus, 2020). An electric motorcycle (EM) is defined as a vehicle that derives its driving power exclusively from an installed electric battery pack that can be recharged via a plug and electrical outlet (Egbue & Long, 2012; Jensen et al., 2013; She et al., 2017). Previous studies classified two-wheeled vehicles differently in China and Europe. In China, they are divided into electric two-wheelers, motorcycles, and bicycles, whereas, in Europe, they are categorized based on speed and power according to legal regulations, such as e-mopeds, e-bikes, and e-vehicles or scooters (Weinert et al., 2007). Eccarius & Lu (2020) assert that EMs differ from e-bikes because EMs cannot be pedaled by humans. Electric motorcycles mainly consist of Battery Electric Vehicles (BEV) and Plug-in Hybrid Electric Vehicles (PHEV) (Xu et al., 2020). BEVs operate on electrical energy stored in batteries that are recharged by connecting the vehicle to an electrical grid (Adhikari et al., 2020). BEVs do not consume petroleum-based fuel. However, PHEVs use batteries to store electricity from the power grid and rely on petroleum-based fuel to power their combustion engines. Electric motorcycles are seen as an alternative to the widespread use of Internal Combustion Engine Vehicles (ICEV), which rely on combustion engines burning traditional fuels, thereby emitting greenhouse gases (Egbue & Long, 2012).

Sales of electric motorcycles worldwide have increased dramatically, driven by supportive transportation policies (Song & Potoglou, 2020). In 2019, global electric motorcycle sales reached a record 2.1 million units, surpassing previous sales records (IEA Publications, 2020). In Indonesia, the number of electric motorcycle users increased 13-fold, accounting for 55% of the domestic electric motorcycle market share from 2020 to 2022 (Deloitte, 2023). Consumer intention to adopt electric motorcycles is often complex. Adoption intention arises from the interaction between internal and external factors (Li et al., 2017a; Wang et al., 2018b). Previous studies have explored factors influencing consumer intentions to adopt electric motorcycles. Ozaki & Sevastyanova (2011), Schuitema (2013), Sierzchula (2014), Bjerkan (2016), Coffman (2017), and Han (2017) identified these factors as including not only product attributes (e.g., price, performance, range, charging duration, and convenience) but also external situational factors (e.g., subsidy policies, fuel prices, charging costs, and charging infrastructure) (Xu et al., 2020). Despite the environmental benefits and growing trend of electric motorcycles, several barriers hinder the transition from ICEVs to electric motorcycles, particularly BEVs (Murugan & Marisamynathan, 2022). The primary barrier is the high purchase price due to expensive battery costs (Egbue, 2012; She, 2017). This study examines the relationships between variables influencing consumer intention to adopt electric motorcycles. It replicates the model by Xu et al. (2020). Referring to this model, the researchers use driving experience as an independent variable, while perceived relative advantage, perceived ease of use, and perceived risk act as mediating variables influencing consumer intention to adopt electric motorcycles. This study focuses on adoption intention rather than adoption behavior, which is influenced by external and situational factors.

1.1 Theoretical review and hypothesis development

The stimulus-organism-response (SOR) model was developed by Mehrabian and Russell in 1974. The SOR model is used to describe the relationship between the stimulus (S) experienced by an individual organism, the internal assessment generated by the individual organism, the factors influencing the organism (O), and the final outcome in the form of a response or impact felt by the organism (R). Researchers such as Mehrabian & Russell (1974) and Wang et al. (2018c, 2018d) stated that this model considers stimuli from various situational purchasing factors as antecedent variables, treats consumers' psychological motives such as emotions and cognition as intermediary variables, and takes approach or avoidance behavior as an output (Xu et al., 2020).

The stimulus (S) variable is the driving factor in the purchasing situation that influences consumers' cognitive and emotional processes. In the context of consumer adoption intention for electric motorcycles, the stimulus is conceptualized as an external

factor related to the intention to adopt electric motorcycles (Peng & Kim, 2014). Once consumer behavior is described as a stimulus-organism-response system, the stimulus consists of factors outside the individual organism, including marketing mix variables, cognition and emotion, and other contextual variables (Vieira, 2013). Response (R) refers to the final outcome in the form of actions or impacts felt, including psychological reactions such as adoption intention (Vieira, 2013). The SOR model provides a good explanation of psychological changes and consumer purchasing behavior. This study explores the influence of electric motorcycle driving experience on consumer attitudes and perceptions in adopting this technology.

1.2. Stimulus: electric motorcycle driving experience

Within the SOR framework, a stimulus is a set of attributes that can influence consumer perception (Peng & Kim, 2014), consisting of environmental stimuli and psychosocial stimuli (Wang et al., 2018d). Previous research has discussed stimuli, including product quality and value, the amount of information available, store atmosphere, image, branding, and various promotional methods (Lee et al., 2021). The primary goal of promotion is to inform, influence, persuade, and increase consumer awareness of the company and its marketing mix (Kotler, 1997).

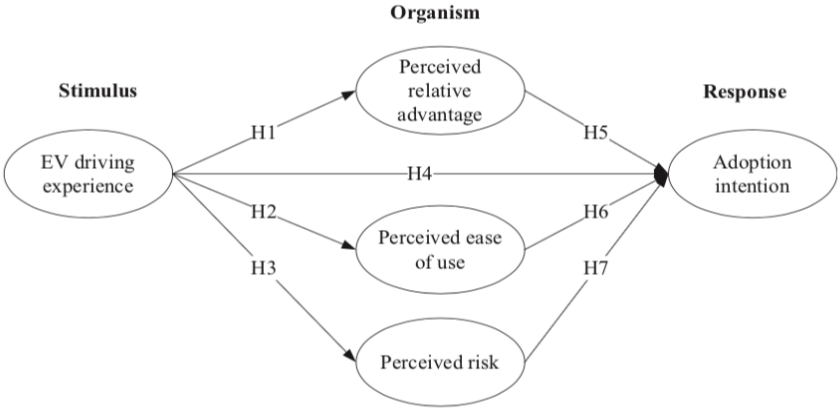

Fig 1. Research framework of consumer adoption intention of electric motorcycles.

In the current electric vehicle market, there are no restrictions on market promotional activities targeting consumers. According to Xu et al. (2020), marketers conduct promotions such as offering sales incentives, cashback, free services, vehicle trade-ins, and test drive facilities. As an innovative product, electric motorcycles require prospective users to understand their performance and features. Test drives are one of the ways marketers promote electric motorcycles. The electric motorcycle driving experience directly affects consumers' perceptions and cognition and increases their understanding of electric motorcycles, which in turn influences their attitude and adoption intention toward electric motorcycles. Therefore, the electric motorcycle driving experience is considered an external stimulus variable in the SOR framework (organism: perceived relative advantage, perceived ease of use, perceived risk).

H1: Consumers' driving experience positively impacts the perceived relative advantage of electric motorcycles.

Research by Burgess et al. (2013), Sierzchula et al. (2014), and Liao et al. (2017) shows a comparison between traditional fuel-powered vehicles and electric motorcycles, which have characteristics of positive externalities and disruptive innovation (Xu et al., 2020). Apart from environmental and technological factors, the innovative attributes of electric motorcycles also attract consumer perception (Schuitema et al., 2013; Li, 2017b). In general,

product innovation attributes include perceived relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). According to Rogers (2003), perceived relative advantage is the extent to which an innovation is considered superior to the idea it replaces. There are four characteristics of innovation in individual decision-making regarding adoption or rejection: compatibility, complexity, trialability, and observability.

Several studies using the SOR framework indicate that stimuli can influence consumer organisms, affecting consumer perception and cognition (Vieira, 2013). Individual experiences and social backgrounds can influence the development of their perceptions of specific products (Schulte, 2004). When consumers have an electric motorcycle driving experience, they tend to form an objective cognition of electric motorcycles based on their innovtive attributes. The experience of driving an electric motorcycle can make consumers believe that electric motorcycles are easy to ride and operate and have significant advantages over traditional fuel-powered vehicles (Han et al., 2017). This means that greater experience in riding electric motorcycles will have a more significant impact on consumers' perceptions of electric motorcycle innovation attributes, such as perceived relative advantage and perceived ease of use. Based on the discussion above, the following hypothesis is proposed:

H2: Consumers' driving experience positively impacts the perceived ease of use of electric motorcycles.

Furthermore, Rogers (2003) noted that perceived risk is also an important factor influencing innovation adoption and includes perceived risk as part of innovation characteristics. As a technologically innovative product, consumers believe that the risks associated with electric motorcycles include functional risks, safety risks, performance risks, and time risks (Li et al., 2017a; Wang et al., 2018b). In reality, the perceived risk of electric motorcycles is closely related to consumers' lack of understanding of them. If consumers truly understand and have knowledge of electric motorcycles, they can reduce perceived risk. Test drives, sharing, rentals, and other electric motorcycle driving activities can significantly increase consumer understanding of electric motorcycles, thereby reducing perceived risk. Therefore, this study proposes the following hypothesis (response: adoption Intention):

H3: Consumers' driving experience negatively impacts the perceived risk of electric motorcycles.

Adoption intention refers to the extent to which consumers are likely to purchase a particular product (Cheung et al., 2019). In this study, adoption intention refers to the likelihood of consumers adopting electric motorcycles. Specifically, it refers to the likelihood that consumers will choose electric motorcycles for travel, prioritize purchasing them, and recommend them to relatives and friends. Many factors influence the intention to adopt electric motorcycles. Schulte et al. (2004) noted that after gaining positive experiences with high-tech products, consumers find innovative products to be an attractive choice, and their positive perception of these products makes them more likely to purchase them. Based on the same logic, consumers' electric motorcycle driving experience can also influence their adoption intention (Xu et al., 2020). Based on these arguments, the following hypothesis is proposed:

H4: Consumers' driving experience positively impacts their adoption intention for electric motorcycles.

Additionally, many researchers have explored the relationship between innovative attributes and adoption intention for innovative products. Cheung et al. (2019) and Junglas et al. (2019) stated that consumers' perceived relative advantage positively affects adoption

intention when studying information technology products. Complexity is a barrier to adopting innovative products. When consumers perceive that an innovative product is easy to use and operate, they are more likely to purchase it (Moon et al., 2015). Regarding the impact of perceived risk, Litter and Melanthiou (2006) showed that users' perceived risk of online banking significantly negatively affects their intention to use it. Wang et al. (2020c) found that perceived risk negatively affects consumers' intention to use ride-sharing services. Wang et al. (2018b) also noted that perceived risk directly reduces consumers' intention to purchase specific products. In the context of this study, when consumers recognize the advantages of electric motorcycles, believe they are easy to ride and operate, and perceive lower risks, their intention to adopt electric motorcycles increases.

H5: Perceived relative advantage positively impacts consumers' adoption intention for electric motorcycles.

H6: Perceived ease of use positively impacts consumers' adoption intention for electric motorcycles.

H7: Perceived risk negatively impacts consumers' adoption intention for electric motorcycles.

2. Methods

In this study, the author used a cross-sectional method for data collection and hypothesis testing. The survey was conducted in the Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek) areas from the second week of February 2024 to the fourth week of May 2024. The reasons for selecting these areas were, first, the high level of air pollution caused by fossil fuel-powered vehicles. In Indonesia, in 2015, the largest contributor to air pollution was road transportation, including motorcycles, which produced 93% of CO_2 emissions (Lestari et al., 2020). Second, the accessibility of these areas to the Alvauto electric motorcycle showroom, which provides test drive facilities. The author directly asked respondents after they completed a test drive whether they were willing to participate in this survey. If they agreed, the author handed them the questionnaire directly.

The questionnaire consisted of three sections: the first section covered respondents' profile information, such as age, gender, place of residence, and monthly expenses excluding installments. The second section contained variable measurement items. The questionnaire was distributed in two stages. In the first stage, it was given to five respondents who had previously taken a test drive of an electric motorcycle. This stage helped refine word choice and sentence structure. In the second stage, the formal questionnaire was distributed with direct consent from respondents.

This study includes five variables, as shown in Figure 1: driving experience, perceived relative advantage, perceived ease of use, perceived risk, and adoption intention. Each variable has a set of measurement items. To ensure the validity and effectiveness of the scale, the measurement items were adapted from previous studies (Xu et al., 2020), with modifications made by the author to fit the context of this research. Based on Xu et al. (2020), this study adopted four items to measure electric motorcycle driving experience from Schulte et al. (2004) and Li et al. (2017b). Perceived relative advantage was adapted from Junglas et al. (2019) and Cheung et al. (2019) and included a total of three measurement items. Perceived ease of use was measured using three items based on Peters & Dutschke (2014), Schuitema et al. (2013), and Wang et al. (2018b). Perceived risk was measured with three items adopted from Egbue and Long (2012), Zhang et al. (2013), and Wang et al. (2020c). Lastly, adoption intention was measured using three items adopted from Han et al. (2017) and Wang et al. (2018b). All items were measured using a 6-point Likert scale, with 1 indicating "strongly disagree" and 6 indicating "strongly agree." The details of the variable measurement items are presented in the appendix. This study employed partial least squares structural equation modeling (PLS-SEM) using SmartPLS

software to analyze survey data. PLS-SEM was chosen due to its ability to handle complex variable relationships and its suitability for research with limited theoretical background and sufficient data.

The author conducted both inner model and outer model analyses. In the inner model, the author examined the extent to which independent variables influenced dependent variables (determinant coefficient) as a measurement tool and performed a path coefficient test using one-tailed bootstrapping. A hypothesis was considered significant if the t-value ≥1.645 and the p-value <0.05 (Malhotra, 2016). In the outer model, the author tested internal consistency, which measures the reliability of variables consisting of multiple indicators, using two indicators: composite reliability (CR≥0.7) and Cronbach's alpha (CA≥0.6) (Malhotra, 2016). Additionally, discriminant validity testing was conducted to ensure that latent variables were distinct from one another. The indicators used included the average variance extracted (AVE), where the expected AVE value was ≥0.5 (Malhotra, 2016). Furthermore, the researcher conducted the Fornell-Larcker test, where the value for each pair of latent variables should be ≤1, and performed a cross-loading test.

3. Results and Discussion

The research was conducted by the researcher by performing wording tests and main tests in a systematic manner in the specified stages. Wording tests are phrasing tests designed to identify problems with words translated from English into Indonesian by the researcher. In addition, wording tests are used to refine the wording of statements and questions so that the sentences are not ambiguous and can be understood effectively. In this test, a survey was conducted on five respondents. This survey resulted in suggestions for the proper and correct use of words and sentences. Next, the researcher revised the questions so that the information conveyed could be understood by the respondents.

In the next stage, the researcher conducted a main test by distributing formal questionnaires to respondents in person. The distribution of questionnaires was carried out at the electric motorcycle showroom counter, which provided driving tests, and also utilized social media platforms as a tool to assist in distributing the questionnaires. After the data was collected and compiled, the researchers analyzed the respondent data using SmartPLS 4 data analysis software to obtain the research results.

3.1 Research result

In this study, a total of 112 respondents were obtained. The respondents' profile information is presented in Table 1. Respondents were predominantly male, accounting for 63.3% of the total respondents, while female respondents accounted for 36.6%. The overall respondents are also predominantly from the 21-25 age group, accounting for 48% of the total respondents, followed by the 26-30 age group (22%), and those over 40 (13%). Furthermore, the table shows that the largest group of respondents spend the most money per month, specifically the group with expenditures of 1,500,000–2,500,000 IDR, accounting for 25%, followed by respondents with expenditures of 500,000–1,500,000 IDR, accounting for 21%, and the group with expenditures of 2,500,000-3,500,000 IDR and more than 4,500,000 IDR at 16%, 3,500,000-4,500,000 IDR, and the lowest group with expenditures less than 500,000 IDR at 9%.

Table 1. Respondent profile

Item	Classification	Frequency	Percentage
Gender	Male	71	63.3%
	Female	41	36.6%
Age	21-25	54	48%
	26-30	25	22%
	31-35	9	8%
	36-40	10	9%

	>40	14	13%
Residence	Jakarta	52	46%
	Bogor	9	8%
	Depok	15	13%
	Tangerang	13	12%
	Bekasi	23	21%
Monthly expenses (excluding installments)	≤500,000 IDR	10	9%
	501,000-1,500,000 IDR	24	21%
	1,501,000-2,500,000 IDR	28	25%
	2,501,000-3,500,000 IDR	18	16%
	3,501,000-4,500,000 IDR	14	13%
	>4,500,000 IDR	18	16%

The researcher assessed the reliability of the model by examining Cronbach's alpha, composite reliability, Rh0_A, and the average extracted variance (AVEl) values. A variable is considered reliable if the CA value is ≥0.6, and a variable is considered reliable if the composite reliability value is ≥0.7 (Malhotra, 2020). The AVEl value is also expected to exceed 0.5 (Hair et al., 2010). The results of the internal consistency test can be seen in the following table. Furthermore, convergent validity is conducted to determine the extent to which the construct represents the variables measured by its indicators. The researchers conducted this analysis by examining the values of cross-loading and AVEl (Variance Extracted). Hair et al. (2010) state that a good cross-loading value is 0.60. Malhotra (2016) states that the AVEl value must be greater than or equal to 0.5 for good construct reliability. Furthermore, the researcher will examine the Fornell-Larcker values to determine the correlation between latent constructs.

Table 2. Outer model analysis results

Construct	Item	Factor Loading	CA	CR	AVE
Driving Experience (DE)	DE1	0.801	0.902	0.932	0.774
Electric Motorcycle	DE2	0.895			
	DE3	0.904			
	DE4	0.914			
Perceived Relative	RA1	0.898	0.904	0.940	0.839
Advantage (RA)	RA2	0.935			
	RA3	0.916			
Perceived Ease of Use (PEU)	PEU1	0.874	0.688	0.828	0.619
	PEU2	0.805			
	PEU3	0.667			
Perceived Risk (PR)	PR1	0.875	0.885	0.929	0.813
	PR2	0.920			
	PR3	0.910			
Adoption Intention (AI)	AI1	0.863	0.851	0.910	0.771
	AI2	0.899			
	AI3	0.871			

Based on Table 2., 9 shows that the results of the Fornell-Larcker model, by comparing the square root of AVEl for each latent construct, are greater than the correlation values between the latent constructs and other latent constructs. Thus, the required criteria have been met.

Table 3. Mean and correlation of variable constructs

Variable	Mean	DE	RA	PEU	PR	AI
DE	3.645	0.878				
RA	3.73	0.729	0.880			
PEU	3.82	0.677	0.811	0.787		
PR	3.796	-0.737	-0.786	-0.637	0.902	
AI	3.90	0.811	0.847	0.734	-0.731	0.916

Table 3 shows that the results of the Fornell-Larcker model, by comparing the square root of AVEl in each latent construct, are greater than the correlation value between the latent construct and other latent constructs. Thus, the required criteria have been met. The results of reliability and validity tests are presented in Tables 2 and 3. The CA values for all five variables range from 0.688 to 0.904, while CR values range from 0.828 to 0.940, all exceeding the minimum acceptable level of 0.60. Therefore, the reliability of the variables is good and acceptable. All AVE values are above 0.619, exceeding the acceptable threshold of 0.50. Moreover, the squared AVE values are greater than the correlation coefficients of each pair of latent variables. These results indicate that both convergent and discriminant validity are also good and acceptable. Therefore, the measurement model in this study demonstrates sufficient reliability and validity.

In the next stage, the path coefficient values will be tested to determine the values that represent the hypothetical relationship between the independent variables and the dependent variables. The significance of the research hypothesis can be determined if the p-value is <0.05. Furthermore, the hypothesis can be considered significant if it has a t-value >1.645. The table below shows that there are five significant relationships between variables, while there are two insignificant relationships between variables, namely driving experience with electric motorcycles and adoption intention, as well as perceived ease of use and adoption intention.

Table 4. Hypothesis testing results (significance of path)

Hypothesis	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics	P value	Result
H1	DE → RA	0.847	0.851	0.034	25.137	0.000	Supported
H2	DE → PEU	0.811	0.811	0.025	32.510	0.000	Supported
H3	DE → PR	-0.786	-0.788	0.046	17.025	0.000	Supported
H4	DE → AI	-0.159	-0.124	0.154	1.074	0.142	Not Supported
H5	RA → AI	0.578	0.548	0.142	4.057	0.000	Supported
H6	PEU → AI	0.171	0.179	0.090	1.891	0.030	Supported
H7	PR → AI	-0.331	-0.321	0.123	2.697	0.004	Supported

3.2 Discussion

Based on the results of the hypothesis testing, external stimuli (S) from the experience of riding an electric motorcycle can trigger philosophical conditions in individuals where (O) there are relative advantages, perceived ease of use, and perceived risk that can activate (R) responsiveness in consumers. Additionally, in this study, the stimulus cannot directly activate responsiveness or adoption intention. This means that in this study, the driving experience of electric motorcycles does not directly influence consumers' intention to adopt electric motorcycles. The driving experience of electric motorcycles has a significant influence on consumers' willingness to adopt electric motorcycles. Based on the results of the hypothesis analysis, the researcher concludes that the driving experience of electric motorcycles influences and has a positive impact on perceived relative advantage and perceived risk, as well as a negative impact on perceived ease of use.

H1: The driving experience of electric motorcycles has a positive impact on the perceived relative advantage of electric motorcycles.

Based on the results of the hypothesis test, the researcher found that the relationship between electric motorcycle driving experience and relative advantage has a t-value of 25.137 and a p-value of 0.000. The value obtained has met the minimum requirement, indicating that the relationship between electric motorcycle driving experience and relative advantage is positive and significant. Thus, the data obtained supports the hypothesis.

The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that the experience of riding an electric vehicle has a positive

and significant influence on the perception of relative advantage. This perceived relative advantage refers to the extent to which the advantages of electric vehicles are considered better than those of traditional fuel vehicles. Additionally, the analysis results also indicate that after consumers conducted a test drive (DEl4: 0.914), they expressed a desire to learn more about electric motorcycles, such as the cost advantages that can reduce expenses, the performance of the motor in terms of acceleration and noise.

H2: The electric motorcycle driving experience of consumers has a positive impact on the perceived ease of use of electric motorcycles.

Based on the results of the hypothesis testing conducted by the researcher, it was found that the relationship between the driving experience of electric motorcycles and the perceived ease of use of electric motorcycles has a t-value of 32.510 and a p-value of 0.000. The value has met the minimum requirement, indicating that the relationship between electric motorcycle driving experience and perceived ease of use is positive and significant. Thus, the data obtained supports the hypothesis.

The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that when consumers have driving experience with electric motorcycles, it provides objective cognition toward electric vehicles, such as their innovative attributes. Han et al. (2017) also found that consumers have confidence that electric vehicles are easy to drive and operate, which highlights the significant advantages of electric vehicles compared to other vehicles. Additionally, the positive impact of electric motorcycle driving experience led consumers to feel that they could easily and skillfully operate electric motorcycles as well as charge their batteries.

H3: The electric motorcycle driving experience perceived by consumers has a negative impact on the perceived risk of electric motorcycles

Based on the results of the hypothesis testing conducted by previous researchers, the researcher found that the relationship between the variable of electric motorcycle driving experience and relative advantage has a t-value of 17.025 and a p-value of 0.000. The value obtained has met the minimum requirement, indicating that the relationship between the driving experience of electric motorcycles and perceived risk has a negative and significant impact. Thus, the data obtained supports the hypothesis.

The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that the experience of riding an electric vehicle has a negative and significant effect on the perception of risk associated with electric vehicles. Consumer decisions to change, delay, or cancel purchases are influenced by risk perception (Wang et al., 2018). Furthermore, consumers' concerns are essentially unavoidable, such as worrying about not being able to recharge the battery of an electric motorcycle or the battery running out while on the road. The greatest concerns of electric motorcycle consumers are PR2 with a value of 0.920 and PR3 with a value of 0.910. However, the hypothesis in this study also proves that consumers have a good experience riding electric motorcycles and have received a lot of information about electric motorcycles, thereby reducing the perceived risks.

H4: Consumers' electric motorcycle driving experience has a positive impact on their intention to adopt electric motorcycles.

Based on the results of the hypothesis testing in the previous study, the researcher found that the relationship between the driving experience variable and adoption intention has a t-value of 1.074 and a p-value of 0.142. The value does not meet the minimum requirement, so the influence of electric motorcycle driving experience on adoption intention is not significant. Therefore, the data obtained does not support the hypothesis. The results of the discussion of the research hypothesis do not have the same value as the

research conducted by Xul et al. (2020), which states that the experience of driving electric vehicles has a positive and significant impact on consumers' intention to adopt electric vehicles. This is because there is a lack of facilities and innovation in providing information related to electric vehicles in the research environment. In addition, consumers also receive many external stimuli. Therefore, in the research area, consumers' experience of riding electric motorcycles does not have a positive impact on their intention to directly adopt electric motorcycles.

H5: Perceived relative advantage has a positive effect on consumers' intention to adopt electric motorcycles.

Based on the results of the hypothesis testing, the researcher found that the relationship between relative advantage and adoption intention has a t-value of 4.057 and a p-value of 0.000. The t-value has met the minimum requirement, indicating that the relationship between relative advantage and adoption intention is positively and significantly influenced. Thus, the data obtained supports the hypothesis. The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that the perceived relative advantage of driving an electric vehicle has a positive and significant effect on adoption intention. When consumers realize the advantages of electric vehicles, they believe that electric vehicles are easy to drive and operate. This perceived relative advantage is based on the advantages in terms of daily usage costs, vehicle performance in terms of technology or acceleration, and lower emissions.

The loading factor value indicates that the highest perceived relative advantage felt by consumers is in terms of acceleration, power, and noise (RA2: 0.935). This is indirectly reflected in consumers' affective and cognitive responses, as described in the journal by Xul et al. (2020). From a behavioral perspective, the behavior of consumers shows a pattern of primary objectives by understanding the development of electric motorcycle technology, while also considering the cost aspect, where Indonesian society increasingly believes that lower costs are better for their well-being (Peltelr & Olson, 2010:10).

Furthermore, electric vehicles are far more environmentally friendly (RA3: 0.916). As stated by Sculitelrma et al. (2017), reducing carbon emissions and the transportation sector plays an important role in reducing serious environmental problems and addressing climate change issues. This finding presents an opportunity for the government to promote the use of electric motorcycles, which can significantly reduce environmental pollution.

Consultants have found that electric vehicles are more energy efficient (RA1: 0.898). Electric vehicles are vehicles that obtain their power exclusively from batteries (Shel et al., 2017). Most electric motorcycles circulating in Indonesia are battery electric vehicles (BEVs). According to Adhikari et al. (2020), BEVs are powered by electricity that is charged by connecting the vehicle to an electrical outlet. These electric motorcycles also do not have internal combustion engines, making electric motorcycles safe and environmentally friendly. Thus, perceived relative advantage has a positive influence on consumer adoption intentions for electric motorcycles.

H6: Perceived ease of use has a positive influence on consumer adoption intentions for electric motorcycles.

Based on the results of the hypothesis testing, the researcher found that the relationship between the perceived ease of use variable and adoption intention has a t-value of 1.891 and a p-value of 0.030. The t-value meets the minimum requirement, indicating that the relationship between perceived ease of use and adoption intention is positively and significantly influenced. Therefore, the data obtained does not support the hypothesis.

The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that the experience of riding an electric vehicle has a positive and significant effect on consumers' intention to adopt electric vehicles. The influence of riding an electric motorcycle and being able to receive information about the advanced

features of electric motorcycles compared to fuel-powered vehicles, as well as being able to charge and maintain electric motorcycles, has a significant influence on consumers' willingness to adopt electric motorcycles. From the initial indicators, PElUl1 scored the highest, indicating that consumers do not easily access truly informative information.

H7: Perceived risk has a negative impact on consumer intention to adopt electric motorcycles

Based on the results of the hypothesis testing, the researcher found that the relationship between the perceived risk variable and adoption intention has a t-value of 2.697 and a p-value of 0.000. The t-value has met the minimum requirement, indicating that the relationship between the variables is negative and significant. Thus, the data obtained supports the hypothesis.

The results of the discussion of the research hypothesis are consistent with the findings of Xul et al. (2020), who stated that the perceived risk of riding an electric vehicle has a negative and significant impact on consumers' intention to adopt electric vehicles. Low consumer awareness of electric motorcycles leads to high perceived risk. When consumers truly understand and become familiar with electric vehicles, the risks they perceive will decrease, thereby significantly reducing the perceived risk. Activities such as test drives, riding electric motorcycles, and using electric transportation facilities can provide consumers with information that reduces the risks perceived by low-income consumers. This is evident from the PR1, PR2, and PR3 indicators, which show significant concerns about electric motorcycles. PR1, PR2, and PR3 indicators, which indicate significant concerns about electric motor vehicles.

4. Conclusions

This study adopts previous research that examined consumer attitudes and perceptions regarding relative advantage, perceived ease of use, and perceived risk in adopting electric motorcycles. The analysis results indicate that the driving experience with electric motorcycles positively impacts perceived relative advantage and perceived ease of use while negatively impacting perceived risk. Furthermore, perceived relative advantage and perceived ease of use positively influence the intention to adopt electric motorcycles, whereas perceived risk has a negative effect. However, driving experience does not directly increase adoption intention; instead, it influences consumer intention through mediating factors such as perceived relative advantage, perceived ease of use, and perceived risk.

The findings suggest that relative advantage and perceived risk significantly impact the adoption of electric motorcycles and can be leveraged to enhance electric vehicle promotion efforts by the government, businesses, and marketers. From a marketing perspective, companies should consider organizing electric motorcycle exhibitions as a sales promotion strategy. These exhibitions can provide opportunities for test drives, as the study shows that driving experience affects perceived relative advantage, perceived ease of use, and perceived risk. Additionally, marketers can emphasize product quality through advertising, highlighting aspects such as acceleration, power, noise levels, and environmental benefits.

From a business standpoint, electric motorcycle manufacturers should implement selective distribution channels through showrooms or specialized outlets to allow consumers to experience the benefits firsthand. Collaboration with battery manufacturers is also crucial to ensure affordable battery availability, addressing consumer concerns. Furthermore, investing in research and innovation can help electric motorcycles gain wider public recognition for their advanced technology.

The government plays a key role in increasing public awareness of electric vehicle technology, ensuring that consumers understand the cost, performance, and environmental benefits compared to fuel-powered vehicles. Additionally, the government should take the lead in fostering innovation within the electric motorcycle industry and addressing both

technical and non-technical challenges. Safety regulations must also be established to ensure proper oversight and management of electric motorcycles.

This study does not explore external stimulus factors such as incentive policies, electric vehicle infrastructure, networks, and access to information, all of which may influence adoption intention. It also does not account for characteristics such as price, performance, quality, and service, which could further impact consumer decisions. The research is limited to cities surrounding the capital, and differences between urban and non-urban respondents may affect the generalizability of the findings. Additionally, the relatively small sample size could limit the universality of the results. Future research should expand the survey scope and increase the sample size for more comprehensive insights.

Further studies could also explore additional factors such as external stimuli and specific characteristics of electric motorcycles, as well as focus on actual consumer behavior rather than just adoption intention. Since this research primarily examines intention rather than concrete adoption behavior, future studies should consider analyzing real adoption patterns to provide a more holistic understanding of consumer decision-making in adopting electric motorcycles.

Acknowledgement
The authors expresses gratitude to all parties who contributed to this research, including those who provided valuable insights, guidance, and support throughout the study. Appreciation is also extended to individuals who assisted in data collection, analysis, and review, as well as to those who offered constructive feedback that helped improve the quality of this work.

Author Contribution
All authors contributed substantially to this research. Contributions included study conceptualization, data collection, analysis, and interpretation. The drafting and revision of the manuscript were conducted collaboratively, with all authors reviewing and approving the final version for submission.

Funding
This research received no external funding.

Ethical Review Board Statement
Not available.

Informed Consent Statement
Not available.

Data Availability Statement
Not available.

Conflicts of Interest
The authors declare no conflict of interest.

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