

THE ROLE OF ENVIRONMENTAL AWARENESS, INNOVATION, AND PRICE IN ENCOURAGING INTEREST IN BUYING ELECTRIC VEHICLES

Hironimus Hari Kurniawan¹, Agus Purnomo Sidi²

¹Faculty of Asian Economics and Business, Asian Institute of Technology and Business Malang
email: hari.kurniawan@asia.ac.id

² Faculty of Asian Economics and Business, Asian Institute of Technology and Business Malang
email: agusps@asia.ac.id

ABSTRACT

This study aims to identify and analyze the influence of environmental awareness variables, innovative behavior, and price on electric vehicle (EV) buying interest in Indonesia. Using a quantitative approach, data was collected through an online survey involving 225 respondents from various major cities in Indonesia. The results of the analysis show that environmental awareness and price have a significant positive correlation with the buying interest of electric vehicles, with Spearman correlation values of 0.696 and 0.766, respectively. This indicates that the higher the environmental awareness and positive perception of the price of electric vehicles, the greater the interest of consumers to buy electric vehicles. In contrast, innovative behavior showed a weaker correlation with buying interest, with a correlation value of 0.375, indicating that technological innovation, while valued, is not a dominant factor in the purchase decision of electric vehicles. The coefficient of determination of 0.604 reveals that 60.4% of the variation in electric vehicle buying interest can be explained by these three variables, while the remaining 39.6% may be influenced by other factors such as product quality and infrastructure availability. These findings provide insights for electric vehicle manufacturers and policymakers to prioritize environmental and price awareness factors in their marketing strategies to drive wider adoption of electric vehicles in Indonesia.

Keywords: *Electric vehicles; Environmental awareness; Innovative behavior; Price; Buying interest;*

INTRODUCTION

Indonesia, as one of the largest automotive markets in the world (ASEAN AUTOMOTIVE FEDERATION, 2022), has great potential to lead in EV adoption in the region. The background of this research in general is that in order to realize the potential of the environmentally friendly industry in, there needs to be a better understanding of the obstacles that hinder EV adoption and the appropriate solutions to overcome them. Thus, this research is not only about continuing the innovation trend, but also about paving the way for a cleaner and more sustainable mobility future for Indonesia and the world.

Consumer purchasing behavior plays a crucial role in EV adoption, which not only impacts consumer preferences but also on product development strategies and government policies. Consumer purchase intention for EVs, perceived for environmental benefits and technological performance (Yang & Lan, 2023) Further research shows that the main determinants of consumer purchase intent for electric vehicles include environmental attitudes, brand awareness, and accessibility of charging infrastructure (DILOTSOTLHE, 2022). An exploration of EV purchase intent emphasizes factors such as product

innovation, trust in new technologies, and social influences as key elements that motivate consumers (Shanmugavel & Alagappan, 2023)

In the context of reducing transportation emissions, consumers' motivation to buy EVs is triggered by the desire to contribute to a cleaner environment as well as economic factors such as government incentives and lower operating costs (Abbasi et al., 2022). Thus, consumer purchasing behavior towards EVs is essential to advance the electric vehicle industry. The industry is not only responding to consumer preferences but also playing a strategic role in addressing climate change through the reduction of vehicle emissions. Therefore, a deep understanding of the factors influencing consumer purchasing behavior is important to support the growth of the EV industry.

The development of EVs reflects significant innovation in the automotive industry, driven by the urgent need for more sustainable transportation solutions. Research related to consumers' innovative behavior is critical to understanding how these innovations are received and how they affect their purchasing decisions. Alba Yela Aránega et al.(2023) revealed that innovative consumer behavior has an important

role in driving the acceptance and adoption of innovative products. This research emphasizes the importance of understanding the factors that drive innovative behaviors to facilitate the deployment of new technologies, such as EVs.

Hany Lubaba and Masyhuri Masyhuri (Lubaba & Masyhuri, 2022) explores how environmental attitudes interact with consumer innovation to influence their purchase intentions, especially towards environmentally friendly products. This shows that consumers who have a high concern for the environment are more likely to accept and buy EVs. Consumer innovation plays a significant role in predicting EV purchase intentions. The study also identified the intermediary effect regulated in the relationship between consumer innovation and purchase intent, highlighting the complexity of the factors influencing electric vehicle purchase decisions.

In the face of environmental challenges, Indonesia's automotive market is undergoing a significant paradigm shift with the emergence of Electric Vehicles (EV) as an environmentally friendly alternative to conventional vehicles. This research is an important step forward to formulate an effective solution in accelerating the mass adoption of EVs in Indonesia, with a focus on more effective marketing communication from automotive manufacturers. EVs are not only seen as a vehicle, but also as a symbol of change towards cleaner and more sustainable mobility. However, the success of EV adoption is determined not only by technological superiority alone, but also by a deep understanding of consumers' level of innovation and their perception of the environmental benefits that EVs offer.

The urgency of this study is to follow up on the phenomenon that although the attractiveness of Electric Vehicles or EVs is rated by automotive consumers is quite high, consumer concerns can significantly affect their adoption rate. The adoption of this technology is needed to support the government's roadmap in the use of EVs (*The Government Continues to Encourage the Use of Electric Cars by the Ministry of Transportation of the Republic of Indonesia*, n.d.). A deeper understanding of these concerns is important for EV actors, policymakers, and other stakeholders to provide solutions for accelerating EV adoption effectively (PWC, 2023). In addition to being seen as more environmentally friendly because it does not produce exhaust emissions, the use of EVs is expected to reduce dependence on limited fossil fuels.

According to Bhat et al.,(2024) , with the exception of the PRC, the adoption rate is quite

low in most emerging economies, which indicates a huge market opportunity for electric vehicles to revolutionize mobility behavior. Electric vehicles and similar alternative fuel vehicles are the latest advancements that require proper research and understanding. Because of the importance of the development of the EV Industry, the Government supports the birth of regulations, namely Presidential Decree Number 55 of 2019 concerning the Acceleration of the Battery-Based Electric Motorized Vehicle Program for Land Transportation (Awirya et al., 2023) . In fact, Indonesia as a country that ranks 14th as the largest automotive market in the world, has a very low EV market share, which only reaches 1%. This puts Indonesia behind countries such as Singapore (with a market share of 12%) and Thailand (with a market share of 1.2%) in terms of BEV adoption rate (UNDP, 2023)

In addition to environmental awareness and innovative behavior factors, price plays a very crucial role in influencing consumers' buying interest in electric vehicles (EVs). The price of electric vehicles is often one of the main considerations for consumers in Indonesia, especially since electric vehicles generally have a higher initial cost compared to conventional fossil fuel vehicles. Consumers tend to be very price sensitive, and often choose products that offer the best value at the most cost-efficient. In this context, the perception of price is not only limited to the purchase price of the vehicle itself, but also includes long-term costs such as operational, maintenance, and charging costs. Thus, competitive pricing strategies can be key in driving the adoption of electric vehicles in emerging markets such as Indonesia.

In addition, the existence of government incentives and the availability of attractive financing schemes can significantly increase the attractiveness of electric vehicles for consumers. Subsidies, tax cuts, and other incentives offered by the government can help reduce the financial burden on consumers and make electric vehicle prices more affordable. For example, some countries have managed to increase EV adoption through financial incentives that allow consumers to get immediate savings at the time of purchase, as well as lower operating costs compared to fossil fuel vehicles. This kind of incentive not only encourages consumers to switch to more environmentally friendly vehicles, but also creates a more conducive market environment for the growth of the EV industry.

Promotions and discounts offered by electric vehicle manufacturers can also play an

important role in attracting consumer interest. By offering discounts or special promotional programs, manufacturers can help overcome price constraints that are often a major barrier to purchasing decisions. In addition, consumers' perception of the value of electric vehicles can be improved through offerings that clearly demonstrate long-term savings, such as lower operating costs or the technological advantages offered. In this regard, effective communication regarding the economic benefits of electric vehicles is essential to build consumer trust and encourage them to make a purchase. Therefore, competitive pricing, supported by the right incentives and promotions, can be a significant driving factor in accelerating the adoption of electric vehicles in Indonesia.

The formulation of the problem in this study is whether innovative behavior, environmental awareness and price affect EV purchases. Where consumer behavior in deciding to buy an EV becomes slightly different from other products (Pratiwi & Sidi, 2022; Sidi, 2023). For this reason, further research is needed to understand how the role of innovative behavior and consumer environmental awareness in influencing EV purchases in Indonesia.

RESEARCH METHODS

This research is important because despite the growing trend of interest in EVs among Indonesia's automotive consumers, the reality is that consumer concerns can be a major obstacle to widespread EV adoption. It is not only about continuing the innovation trend, but also about harnessing the huge potential offered by EVs in creating a more sustainable mobility future in Indonesia and around the world. By better understanding the barriers to EV adoption and finding effective solutions, we can accelerate the transformation towards better sustainable mobility for all.

Based on background information and problem formulation, the problem-solving approach applied is to use management science

with a focus on marketing strategies to provide solutions to environmental sustainability. This study will adopt a quantitative approach to collect and analyze data from respondents. The online survey will be conducted using carefully designed questionnaires to gather information on consumer innovations, perceptions of environmental benefits, and EV-related purchase intent. Through cluster analysis or market segmentation, this research will seek to identify different consumer profiles based on consumer innovation levels, perception of environmental benefits, and EV purchase intentions. This will help in developing a more targeted marketing strategy. Figure 1 provides a further overview of the conceptual framework of this study. The findings from this study will be integrated into practical recommendations for stakeholders, including EV manufacturers, governments, and environmental organizations. This can include developing awareness campaigns, product enhancements, or developing policies that support EV adoption.

The respondents in this study were Indonesian citizens who expressed interest in purchasing electric vehicles. These participants were selected from major cities across Indonesia, including Jakarta, Bandung, Makassar, Medan, and Surabaya. The data collection process was conducted over 15 days, during which 225 valid responses were obtained. Given that the total population size was unknown, the researchers followed Roscoe's rule of thumb, which recommends a minimum sample size of 100 respondents for reliable analysis. The survey utilized a 5-point Likert scale to measure respondents' attitudes and preferences related to electric vehicle purchases.

In this study, 3 independent variables are discussed, namely Environmental Awareness (X1), Innovation Behavior (X2) and Price (X3) which are estimated to be related to the purchase interest (Y) of electric vehicles in Indonesia. The number of statement items used in this study is shown in Table 1.

Table 1 Number of Statement Items

Variable	Statement Items
X1	16
X2	23
X3	17
Y	22

RESULTS AND DISCUSSION

After distributing the questionnaire to several corners in Indonesia, 225 respondents were

obtained with the demographics of the respondents as seen in Table 2.

Table 2 Respondent Demographics

QUESTION	ITEMS	ANSWER	PERCENTAGE
Gender	Man	163	72,12%
	Woman	63	27,88%
Age	<= 25 Years	39	17,26%
	>25 - 35 Years	50	22,12%
	>35 - 45 Years	64	28,32%
	>45 - 55 Years	26	11,50%
	>55 - 65 Years	33	14,60%
	>65 years	14	6,19%
Domicile	Jakarta	84	26,99%
	Surabaya	57	17,26%
	Bandung	36	8,85%
	Medan	29	7,52%
	Makasar	20	6,19%
Profession	Self employed	33	14,48%
	Civil servants	28	12,41%
	Private Employees	95	42,07%
	Student	19	8,28%
	Other	51	22,76%
Income	< = 3,500,000	53	23,45%
	> 3,500,000 - 7,500,000	106	46,90%
	>7.500.000 - 12.500.000	45	20,00%
	>12.500.000 - 17.500.000	22	9,66%
	>17.500.000	0	0,00%
Interest	Electric Bike	144	63,71%
	Electric Cars	82	36,28%
Possession	Electric Bike	75	33,19%
	Electric Cars	42	18,58%
	Don't Have It Yet	109	48,23%

The majority of respondents in this study are men, which comprise 72.12% of the total respondents. In contrast, women only account for 27.88%, indicating that interest in purchasing electric vehicles is dominated by men. This is related to the results of research in the field that most of the visitors to the vehicle exhibition are dominated by men.

The most dominating age range of respondents is the age group between 35 and 45 years old, which covers 28.28% of the total respondents. This age group was followed by the age group of 25 to 35 years with 22.07%, and the age group of 55 to 65 years with 15.17%. The participation of the age group under 25 years old

was quite significant with 17.24%, while the age group over 65 years had the least number of respondents, which was 6.21%. This shows that the majority of respondents are in the productive age range, which is between 25 and 45 years old where this group is considered economically and socially active. And in this group, the need for transportation facilities is considered high because of the mobility carried out.

The respondents in this study came from five major cities in Indonesia, with the majority of respondents from Jakarta. A total of 84 respondents, or 26.99% of the total respondents, were from Jakarta, followed by 57 respondents, or 17.26%, from Surabaya. Bandung contributed 36

respondents, accounting for 8.85%, while Medan had 29 respondents, representing 7.52%. The city with the fewest respondents was Makassar, with 20 respondents, or 6.19% of the total. This distribution shows that most respondents came from major cities in Java, particularly Jakarta, while cities outside Java, such as Medan and Makassar, had a smaller contribution in terms of the number of respondents. This shows that interest in the purchase of electric vehicles is still dominated by cities from Jawa Island. This is possible because respondents from these cities are more open to new technologies and infrastructure for new technologies is easier to obtain than from others.

In terms of profession, most of the respondents worked as private employees, which accounted for 42.07% of the total respondents. Other professions include self-employed (14.48%), civil servants (12.41%), and students (8.28%). The "Other" category covers 22.76% of the total respondents, which may include a variety of other professions that are not clearly defined in this survey. This distribution shows that private employees have a higher buying interest than other professions. Researchers were unable to find a clear reason that could represent why private employees dominated the study. One of the things that may be able to provide an answer is that several electric vehicle exhibition places where this research is carried out are located around non-government office areas. So it is possible that those who attend the exhibition are private employees who have offices around the electric vehicle exhibition.

In terms of income, most respondents have an income between 3,500,000 to 7,500,000 rupiah

per month, which accounts for 46.90% of the total respondents. The group with an income of less than 3,500,000 rupiah is also quite significant, covering 23.45% of the total respondents. Meanwhile, respondents with incomes between 7,500,000 to 12,500,000 rupiah cover 20%, and those with incomes between 12,500,000 to 17,500,000 rupiah cover 9.66%. None of the respondents reported income above 17,500,000 rupiah. Looking at the profession of the respondents dominated by private employees, it is possible that the number of this group has an income between 3,500,000 to 7,500,000 rupiah per month.

Overall, the demographic profile of respondents shows that the majority of them are men of productive age, come from big cities such as Jakarta, work as private employees, and have a middle income. With this profile as a reference in this study to understand how this demographic affects the interest and ownership of electric vehicles among them. After knowing the demographics of the respondents, the researcher continued to analyze the results of the respondents' answers.

The first test conducted by the researcher is a research instrument test to ensure that the instruments used in the research are valid and reliable in the use of research. The researcher conducted a validity test by calculating the Pearson correlation between each item with a total score for each variable. As for the reliability test by calculating the Cronbach's Alpha value for each variable. The results of the validity test are presented in Table and the reliability test is in Table 3.

Table 3 Validation Test Results

Variable	Correlation Range	Items with Low Correlation
X1	0.159 to 0.841	X1.14 (0.159)
X2	-0.321 to 0.912	X2.11 (-0.321), X2.12 (-0.249)
X3	-0.190 to 0.781	X3.4 (0.056), X3.12 (-0.190), X3.13 (-0.059)
Y	0.185 to 0.822	Y.21 (0.185)

In connection with the finding of a correlation value below 0.3, to conduct a reliability test, the researcher first discarded these variable items. By removing 7 variable items with low

correlation, the researcher conducted a reliability test and obtained the results attached to Table 4.

Table 4 Reliability Test Results

Variable	Cronbach's Alpha
X1 (Environmental Awareness)	0.874
X2 (Innovative Behavior)	0.963
X3 (Price)	0.819
Y (Interest in Buying Electronic Vehicles)	0.894

With these results, the research instrument has been valid and reliable to be used in this study. In the classical assumption test, the collected data is not normally distributed. So the researcher used

a non-parametric Spearman Correlation test, and obtained the results as shown in Table 5.

Table 5 Correlation Test Results

Independent Variables	Correlation with Y (Interest in Buying Electric Vehicles)
X1 (Environmental Awareness)	0.696
X2 (Innovative Behavior)	0.375
X3 (Price)	0.766

The results of the Spearman correlation test calculation show that there is a positive relationship between the variables Environmental Awareness (X1) and Price (X3) with the Buying Interest of Electronic Vehicles (Y). The Spearman correlation for X1 with Y is 0.696, which indicates a fairly strong relationship between environmental awareness and electric vehicle buying interest. This means that the higher the level of environmental awareness among respondents, the greater their interest in buying electric vehicles. In addition, high environmental awareness can also be interpreted as a reflection of consumers' proactive attitude in supporting green initiatives and sustainable environmental policies. Environmentally conscious consumers not only consider the individual impact of their choices but also see the purchase of electric vehicles as part of their contribution to achieving larger goals, such as reducing carbon emissions and improving air quality. This attitude explains why respondents with high environmental awareness tend to have a greater buying interest in electric vehicles, as they see them as a long-term investment for a cleaner and healthier future.

The correlation between Price (X3) and Buying Interest in Electronic Vehicles (Y) is even stronger, with a value of 0.766. This correlation shows that price is a very important factor in influencing consumers' decision to buy electric vehicles. The better consumers perceive the price of electric vehicles—whether in terms of value, affordability, or long-term cost—the more interested they will be in making a purchase. This suggests that a competitive and transparent pricing strategy could be key in driving the adoption of electric vehicles in the market. Furthermore, consumer sensitivity to price reflects the market's need to create more choices in diverse price segments, so that it can reach different income groups. For example, electric vehicle offerings in various price tiers, from more affordable entry-level models to premium models, can help increase adoption in various market segments. This strategy

could also be accompanied by increased price transparency related to long-term cost savings, such as lower maintenance costs and energy-saving incentives, to further convince consumers of the economic benefits of switching to electric vehicles.

In contrast, the correlation between Innovative Behavior (X2) and Buying Interest in Electronic Vehicles (Y) was only 0.375, which showed a weaker relationship compared to other variables. Although innovative behavior is usually associated with the adoption of new technologies, in this context, it seems that the innovation factor is not very dominant in influencing the buying interest of electric vehicles. This could be due to the perception that innovation in electric vehicles is already considered the standard, or it may also be because other factors such as price and environmental awareness influence purchasing decisions more.

Overall, these results indicate that the marketing strategy and development of electric vehicle products should seriously consider environmental awareness and price factors, as these two aspects have a significant influence on consumer interest. Meanwhile, innovation must be maintained, but it should be understood that this may not be the main driver in consumers' decisions to buy electric vehicles.

From the results of the Spearman correlation test, Environmental Awareness (X1) showed a strong positive correlation with the Interest in Buying Electronic Vehicles (Y) with a value of 0.696. Item X1.12 ("I support measures to reduce pollution") had the highest mean of 4.69, followed by X1.16 ("I support the use of green energy technologies") with a mean of 4.63. These two items are very strong in supporting the correlation results because they show very high respondents' support for environmental issues, which in turn greatly affects the buying interest of electric vehicles that are considered more environmentally friendly.

Other items such as X1.9 ("I choose eco-friendly products") and X1.6 ("Small businesses

can make a positive contribution to the environment") with a mean of 4.29 and 4.35, respectively, also showed that aspects of high environmental awareness among respondents were strongly correlated with their interest in buying eco-friendly vehicles.

Innovative Behavior (X2) shows a weaker correlation with Buying Interest in Electronic Vehicles, with a Spearman correlation value of 0.375. However, items X2.23 ("It's important to know about technological innovation") with a mean of 4.31 and X2.7 ("Technology helps me complete daily tasks more efficiently") with a mean of 4.22 indicate that respondents who value technological innovation still have a stronger tendency to be interested in electric vehicles. However, because Spearman's correlation shows a weaker relationship, it indicates that innovation, while valued, is not as strong as other factors such as environmental awareness or price in influencing purchasing decisions.

Items with lower mean, such as X2.5 ("I feel comfortable using various modern technology apps and devices") with a mean of 3.26 and X2.6 ("I often spend time optimizing my use of technology") with a mean of 3.24, may contribute to this weak correlation because respondents may not yet see technology as a dominant factor in electric vehicle purchasing decisions.

Price (X3) shows the strongest correlation with Buying Interest in Electronic Vehicles, with a Spearman correlation value of 0.766. Item X3.8 ("Discounts make electric vehicles more attractive to me") with a mean of 4.38 and X3.15 ("Lowering the price of electric vehicles will increase my interest in electric vehicles") with a mean of 4.33 are examples of very strong indicators in support of this correlation. Respondents clearly indicated that more affordable prices or the existence of direct discounts increased their interest in electric vehicles.

Other items with high mean such as X3.7 ("I feel the price of an electric vehicle is worth paying") with a mean of 4.03 and X3.3 ("Electric vehicles provide benefits that are commensurate with the price") with a mean of 4.12 also support that a positive perception of price greatly influences buying interest. In contrast, items with a lower mean such as X3.4 ("I can afford an electric vehicle without financial hardship") with a mean of 2.66 suggest that for some respondents, financial ability may still be a barrier, even if the price of the vehicle is considered reasonable.

The determination coefficient (R^2) of 0.604 generated from the three independent variables (Environmental Awareness, Innovative

Behavior, and Price) to the dependent variable (Electronic Vehicle Buying Interest) shows that 60.4% of the variation in electric vehicle buying interest can be explained by these three variables. This means that most of the factors influencing the buying interest of electric vehicles can be predicted by the level of environmental awareness, innovative behavior, and price perception among respondents. Meanwhile, the remaining 39.6% of the variation may be due to other factors that are not included in this model, such as product quality, infrastructure availability, or other socioeconomic factors. These results confirm the importance of these three variables in influencing buying interest, as well as opening up space for the exploration of additional variables that may have a significant influence on consumer decisions.

In addition to the factors that have been discussed, additional variables such as consumer confidence in charging infrastructure and perception of electric vehicle brands also have the potential to influence buying interest. Uncertainty regarding the availability of adequate charging infrastructure, for example, can be a barrier for consumers interested in electric vehicles. Similarly, brand strength and perception of product quality from a particular brand can influence consumer decisions, especially in an emerging market like Indonesia. Therefore, further research that incorporates these variables can provide more comprehensive insights into the factors that drive or hinder the adoption of electric vehicles in Indonesia.

CONCLUSION

Based on the results of Spearman's correlation analysis and the data collected, it can be concluded that the variables Environmental Awareness (X1) and Price (X3) have a significant influence on the Buying Interest of Electronic Vehicles (Y). These findings show that the higher the respondents' awareness of environmental issues, the greater their interest in buying electric vehicles, which are considered more environmentally friendly compared to conventional vehicles. The strong correlation between price and buying interest also emphasizes the importance of price perception in consumer purchasing decisions. More affordable prices, whether through discounts, price reductions, or commensurate value offers, significantly increase consumer interest in electric vehicles. Meanwhile, the Innovative Behavior (X2) variable showed a weaker correlation, indicating that technological innovation, while important, was not a major driver in electric vehicle purchase decisions among respondents. These overall results

show that an effective marketing strategy for electric vehicles should focus on increasing environmental awareness and offering competitive prices to maximize consumer buying interest.

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