EFFORTS TO IMPROVE ELECTRIC CAR PURCHASE DECISIONS IN JAKARTA

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ABSTRACT

The shift toward electric vehicles (EVs) in many developed countries is driven by the need to reduce fossil fuel dependency and promote environmentally friendly transportation solutions. Following this global trend, the Indonesian government introduced PERPRES No. 55 of 2019 to accelerate the adoption of EVs, aiming to build public awareness and encourage the transition to electric mobility. In this study, we explore factors influencing purchasing decisions for electric cars in a specific region of Jakarta. The research highlights that electric cars offer multiple advantages, including lower environmental impact and more efficient travel costs, making them an increasingly attractive option for consumers. We gathered data from 112 electric car users in Jakarta using a quantitative research method and a simple random sampling approach. Data analysis using SMARTPLS Version 4 enabled a detailed examination of variable relationships. The findings reveal that perceived value and word-of-mouth promotion have an indirect positive effect on purchasing decisions, with brand image act as a mediating factor. The results highlight the importance of consumer perception, social influence, and brand image in shaping preferences for EVs. This study offers insights into EV consumer behavior in Jakarta, supporting strategies to boost EV adoption in Indonesia.

Keywords: brand image; perceived value; price; purchase decision; word of mouth

INTRODUCTION

The development of transportation in the world began with the use of horses as transportation, then in 1769 humans developed steam-powered vehicles to transport cannons. Since the emergence of steam-powered cars, it sparked ideas for scientists to develop automobiles. In 1860, Joseph E. Lenoir developed a fuel-powered car consisting of a mixture of coal, gas, and atmospheric air. After the emergence of fuel-powered cars, Carl Benz pioneered the patenting of a gasoline-powered car in 1879 with a perfected version, and to this day, gasoline-powered cars are still used for daily human transportation (Arief, 2020).

Transportation plays a vital role in supporting economic growth in a country (Rifqi Tsani et al., 2020). Indonesia is the 6th country with the most islands in the world, totaling 17,504 islands (Conrad, 2020). The numerous islands in Indonesia make transportation an effective means for goods and people to reach their destinations. The target of success in building a good transportation system is by developing facilities, infrastructure, and government policies. The growth of transportation in Indonesia has undergone significant development in line with the evolution of technology and the needs of society. From the early days of independence until now, Indonesia has witnessed various innovations in the transportation sector. Initially, transportation in Indonesia was dominated by traditional modes of transport such as boats, horse-drawn carriages and carts. However, with economic development, technology and transportation in Indonesia are undergoing rapid transformation.

Nevertheless, the challenge faced in transportation development in Indonesia is the disparity between islands that are well-connected and those that are not connected with adequate infrastructure. Continuous improvement efforts are being made to enhance inter-island connectivity, both through the development of ports, ferries and regional flights. The development of sustainable transportation has become a primary focus, with efforts to create

environmentally friendly transportation such as mass transit and the use of electric vehicles being pursued to reduce the negative impact of transportation on the environment.

According to the Central Statistics Agency (BPS) as quoted from Publik (2022), the transportation and warehousing sector increased by 15.79 percent in the first quarter of 2022 and experienced further growth of 21.27 percent in the second quarter of 2022. This indicates a positive trend in the transportation sector and a recovery from the COVID-19 pandemic. The growth in the transportation sector is due to the relaxation of government policies in traffic engineering management and encouraging the involvement of private companies in accelerating national economic growth.

Growth in the transportation sector can have various positive impacts on the economy and society in general. Transportation activities are increasing, which in turn boosts the mobility of goods and people, driving growth in related sectors such as trade, tourism, and logistics. Additionally, the growth of transportation also creates new investment opportunities, such as job creation and improved accessibility to markets and resources. However, in the context of the government's policy easing to support transportation growth, it is necessary to be wary of potential negative impacts. Among them, the potential for market monopolies by private companies, the increase in the use of private cars which can cause traffic congestion and the rise in environmental pollution. Therefore, in designing policies that support transportation growth, it is necessary to consider the balance between economic stimulation in efforts to protect the environment and the interests of society as a whole in the long term.

One approach that can support the growth of the transportation sector while reducing its negative impact is the implementation of the green product concept. Eco-friendly products or green products are designed to minimize negative environmental impacts throughout their life cycle, from production, use to disposal. In the context of transportation, the implementation of the green product concept can be carried out in various ways, including:

1. Environmentally Friendly Vehicles, the use of electric or hybrid vehicles that produce lower emissions compared to fossil fuel vehicles. As for the development of alternative fuel technologies such as biofuels and hydrogen.
2. Green Infrastructure, Development of environmentally friendly transportation infrastructure, such as bike lanes, comfortable sidewalks, and an efficient and integrated public transportation system. The application of smart technology in traffic management reduces congestion and vehicle emissions.
3. Green Logistics, Optimization of delivery routes to reduce fuel consumption and emissions. Use of environmentally friendly delivery vehicles and sustainable logistics practices.

By applying the concept of green products in the transportation sector, we can reduce the negative impact on the environment while still promoting economic growth. Policies that support the use of technology and environmentally friendly practices in transportation will not only reduce pollution and congestion but also create a healthier and more sustainable environment for the community. According to IQAIR (2023), Indonesia ranked 26th in the world for the worst air quality in 2022, with many major cities in Indonesia having the highest levels of poor air quality. For example, Jakarta had an air quality level of 36.2 µg/m³, followed by Bekasi with 35.4 µg/m³, and Surabaya reaching 34.4 µg/m³, which falls into the unhealthy category for sensitive groups. Air quality deteriorates due to gases with toxic substances produced from chemical, physical, or biological materials. One of the gases with the highest contribution to air pollution is carbon monoxide (CO), which is produced from the combustion of motor vehicles. Data from the Central Statistics Agency of DKI Jakarta (2022) recorded an

increase in the number of passenger cars from 2020 to 2021 by 5.3%, and from 2021 to 2022, the increase was recorded at 6.2%.

According to the source apportionment study by Vital Strategies & Bandung Institute of Technology (2023), motor vehicles in DKI Jakarta in 2018-2019 contributed the largest share of air pollution from other sources, amounting to 32%-57%. According to the Central Statistics Agency of DKI Jakarta (2022), there has been an annual increase in the growth of fossil fuel-powered passenger vehicles, which could result in higher air pollution emissions from 2018-2019. As time progresses, the long-standing use of fossil fuels has caused problems for the environment. The combustion of gasoline results in pollution that damages the environment and adversely affects human health. Fossil fuels are non-renewable natural resources, and according to research conducted by Kitami Institute of Technology, Japan (2016), fossil fuels will be depleted by 2050. The solution to this problem has led developed countries to decide to start abandoning fossil fuel vehicles and begin encouraging car manufacturers to produce electric cars, which are referred to as renewable energy sources (Soegeng Wahyoedi et al., 2021). Automotive companies around the world are competing to develop environmentally friendly vehicles and unlimited fuel, one of which is electric cars (Electric Vehicle). In recent years, the electric vehicle (EV) industry has been widely discussed and has emerged with high development potential (Hertzke et al., 2018). The advantages of electric vehicles (EVs) have been considered one of the most promising green technologies for reducing carbon emissions and energy consumption in the transportation sector. Understanding and exploring the factors that influence consumers' intentions to adopt electric vehicles (EVs) is important (Wang et al., 2018).

Based on the study, the Indonesian government is striving to encourage the public to switch from fossil fuel-powered vehicles to electric vehicles. This effort is realized through various policies and regulations that support the development of the electric vehicle industry in Indonesia, one of which is Presidential Regulation Number 55 of 2019 concerning the Acceleration of the Battery Electric Vehicle Program for Road Transportation (2019). In this regulation, the government provides many conveniences in using electric cars, specifically in Chapter III regarding the provision of incentives in Article 17 paragraphs (1) and (2), where the central government and regional governments provide incentives to accelerate the battery-based electric vehicle program for road transportation. The incentives referred to are in the form of fiscal incentives and non-fiscal incentives.

The electric vehicle market offers many opportunities, and global Electric Vehicle sales are expected to increase to 4.5 million units by 2020, accounting for about 5 percent of the total global light vehicle market (Björck & Lu, 2019; Hertzke et al., 2018). Electric vehicles are considered more environmentally friendly because they do not emit toxic gases and greenhouse gases compared to traditional diesel or gasoline cars (Europe Environment Agency, 2018). The market for electric vehicles in Indonesia began to develop in 2017, when Tesla appeared through general importers, and in 2022, PT. Hyundai Motor Manufacturing Indonesia (HMMI) became the first company to produce electric vehicles in Indonesia. However, the growth of electric car sales is not yet fully optimal, due to the negative stigma in society. For example, in Jakarta, there are 19 electric car charging stations, each station only has 1 to 3 electric car charging units. Meanwhile, in the European Union, one station can have 6 to 8 units, and electric car charging is even available in parking lots. According to Omonov et al. (2022), there are 4 countries that have the most electric vehicle charging stations per 100 km.

The research conducted by Jiang et al (2021) explains a study on brand image and perceived risk in the electric vehicle startup industry regarding consumer purchase intentions in China, showing a positive influence of brand image on the intention to purchase electric vehicles. Furthermore, Setiawan (2018) explains that there is no direct influence of word of mouth on purchase intention, but it has an indirect influence mediated by the brand image of low-cost green cars (LCGC) in Jakarta. In addition, Dhanabalan et al (2018) research showed a positive influence of perceived value on purchase decision of cars in India. These studies serve as the foundation for this research; however, no research has yet been found regarding the direct influence of perceived value and word of mouth on purchase decisions, as well as the indirect influence through brand image mediation and the moderation of electric car prices in the Special Region of Jakarta.

METHOD

The quantitative method used with the aim of collecting data that can be measured numerically, resulting in interesting statistics (Sugiyono, 2018). The data collection method used was a questionnaire distributed to electric car users in Jakarta area in May 2023. The population in this study consisted of electric car users in Jakarta area from January to May 2023, totaling 4,641 electric cars (Ahdiat, 2024). The sample used in this study was taken based on Hair et al. (2018), who stated that in determining the sample by multiplying the number of statements by 5-10 parameters. This study used 22 statements multiplied by 5 parameters, which amounts to 110 electric car users, with probability sampling technique and sampling using simple random sampling.

This research refers to the public's decision to switch from fossil fuel vehicles to electric or environmentally friendly vehicles, with observed parameters including perceived value (X1), word of mouth (X2), brand image (Z), purchase decision (Y) and moderated by price. This research uses SEM-PLS (Structural Equation Model – Partial Least Squares) analysis. This analysis aims to test and develop the model, thereby providing the ability to draw model paths between variables and determine variable indices. The measurement model used consists of two types, namely the outer model and the inner model. The outer model includes three tests: reliability test, convergent validity test and discriminant validity test. The inner model includes three tests: R-squared test, predictive relevance test and path coefficient test.

RESULT AND DISCUSSION

Measurement Model Test (Outer Model)

This measurement model test is used to determine the feasibility of the relationship between latent variables and observed indicators. This measurement model test consists of 3 tests: reliability test, convergent validity test and discriminant validity test.

Reliability Test

Table 1.
Results of the Reliability Test

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Rule of Thumb	Model Evaluation
Brand Image	0,838	0,838	0,886	0,700	Reliable
Perceived Value	0,801	0,806	0,870	0,700	Reliable
Price	0,745	0,751	0,834	0,700	Reliable
Purchase Decisions	0,806	0,810	0,866	0,700	Reliable
Word Of Mouth	0,897	0,902	0,928	0,700	Reliable

Source: Data processed with SmartPLS Ver. 4, 2024

Composite Reliability measures the actual reliability value of a construct. The practical rule for Composite Reliability is that its value should exceed 0.7, although a value of 0.6 is still acceptable (Abdillah & Hartono, 2015). According to Ghozali (2018), reliability testing aims to evaluate whether the data obtained from the research instrument shows an adequate level of internal consistency. This internal consistency is evaluated using the Cronbach's Alpha value method. A research instrument is considered reliable if its Cronbach's Alpha value exceeds 0.60.

Table 1, it shows that all variables have Cronbach's alpha and composite reliability values above the threshold or more than 0.70. This indicates that the consistency and stability of the instruments used are high, so it can be concluded that all the constructs in this study have become valid measurement tools and possess good reliability.

Convergent Validity Test

Alfa et al (2017) state that convergent validity testing measures the extent to which the expected indicators truly converge and reflect a construct. According to Ghozali in the journal by Alfa et al (2017), it is explained that a correlation can be considered to meet convergent validity if its loading factor exceeds a value considered high, such as 0.7. Convergent validity occurs when the scores produced by two different instruments measuring the same construct have a high correlation. The practical rule used to assess convergent validity is that the outer loading value > 0.7 and the communality value > 0.5 and the Average Variance Extracted (AVE) value > 0.5. This means that the correlations tested in the convergent validity test must have AVE and communality values within the range of 0.5 to 0.7. Although a loading factor value of 0.50 - 0.60 is still acceptable as long as the model is still in the development stage. (Abdillah & Hartono, 2015).

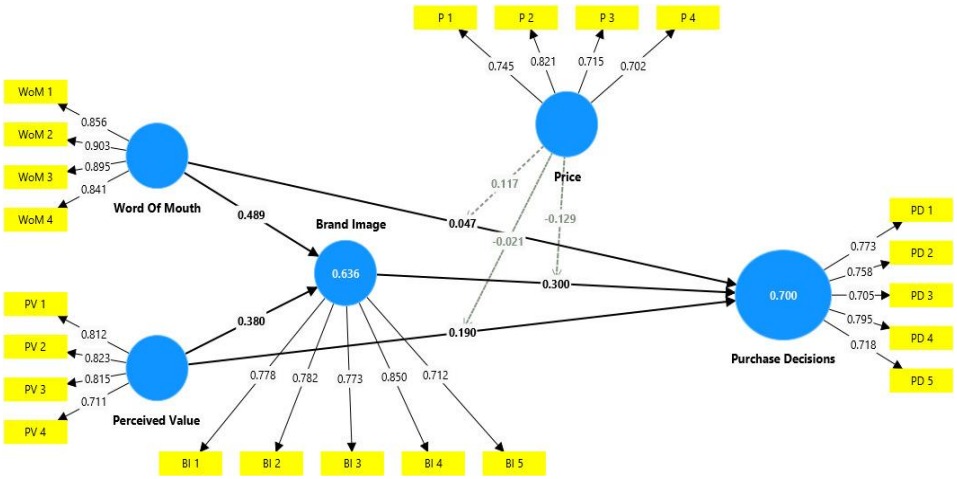

Figure 1 Results of SmartPLS 4 Measurement

Source: Data processed with SmartPLS Ver. 4, 2024

In the output, it was found that the loading factor of all indicators exceeded 0.7, so it can be concluded that the indicators used in the study have met the convergent validity. The results of the above analysis can be presented by the author in the form of Table 2 regarding the following convergent validity results:

Table 2 shows that all indicators received values above the loading factor threshold of 0.7. This analysis indicates that the indicators used effectively measure and converge into the intended construct.

Table 2.
Results of the Convergent Validity Test

Variable	Item	Outer Loading Value	Rule of Thumb	Information
Perceived Value (X1)	PV1	0.812	0,700	Valid
	PV2	0.823	0,700	Valid
	PV3	0.815	0,700	Valid
	PV4	0.711	0,700	Valid
Word of Mouth (X2)	WoM1	0.856	0,700	Valid
	WoM2	0.903	0,700	Valid
	WoM3	0.895	0,700	Valid
	WoM4	0.841	0,700	Valid
Brand Image (Z)	BI1	0.778	0,700	Valid
	BI2	0.782	0,700	Valid
	BI3	0.773	0,700	Valid
	BI4	0.850	0,700	Valid
	BI5	0.712	0,700	Valid
Price (Variabel Moderasi)	P1	0.745	0,700	Valid
	P2	0.821	0,700	Valid
	P3	0.715	0,700	Valid
	P4	0.702	0,700	Valid
Purchase Decisions (Y)	PD1	0.773	0,700	Valid
	PD2	0.758	0,700	Valid
	PD3	0.705	0,700	Valid
	PD4	0.795	0,700	Valid
	PD5	0.718	0,700	Valid

Source: Data processed with SmartPLS Ver. 4, 2024

Discriminant validity test

Discriminant validity is the extent to which constructs in a model differ from one another. Heterotrait-monotrait ratio (HTMT) is used to assess the extent to which constructs in the model are more correlated with their own indicators compared to the indicators of other constructs.

Table 3 Results of the Heterotrait-Monotrait Ratio Test (HTMT)

	Brand Image	*Perceived Value*	*Price*	*Purchase Decisions*	*Word Of Mouth*
Brand Image					
Perceived Value	0,868				
Price	0,694	0,513			
Purchase Decisions	0,891	0,794	0,878		
Word Of Mouth	0,855	0,793	0,673	0,778	

Source: Data processed with SmartPLS Ver. 4, 2024

Structural Model Test (Inner Model)

R-squared test

Here are the results of the R-squared test presented in the following table:

Table 4.
R-squared Test Results

	R-*squared*	R-*squared adjusted*
Brand Image (Z)	0,636	0,629
Purchase Decisions (Y)	0,700	0,680

Source: Data processed with SmartPLS Ver. 4, 2024

Predictive Relevance Test (Q2)

Hair et al. (2018) state that if Q2 is less than 0.25, it can be interpreted as having low predictive ability, whereas if it is above 0.25, it is considered to have moderate predictive ability, and if it

is above 0.50, it can be said to have strong/high predictive ability. Below is the Predictive Relevance test table (Q2).

Table 5.
Results of Predictive Relevance Test (Q2)

	Q^2 predict
mage (Z)	0,622
se Decisions (Y)	0,602

Source: Data processed with SmartPLS Ver. 4, 2024

Path Coefficient Test

The path coefficient test or hypothesis test can be accepted if the T-statistic value is above 1.96 (5% significance) and the P-values are ≤ 0.05. The testing is conducted using bootstrapping to determine the T-statistic value and P-values. The results of the hypothesis testing are presented in the following path coefficient test table:

Table 6.
Path Coefficient Test Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistics	P values	Information
Brand Image -> Purchase Decisions	0,3	0,29	0,094	3,189	0,002	Significant
Perceived Value -> Brand Image	0,38	0,375	0,084	4,544	0,000	Significant
Perceived Value -> Purchase Decisions	0,19	0,188	0,096	1.978	0,049	Significant
Word Of Mouth -> Brand Image	0,489	0,49	0,076	6,448	0,000	Significant
Word Of Mouth -> Purchase Decisions	0,047	0,054	0,116	0,407	0,684	Not Significant
Price x *Perceived Value -> Purchase Decisions*	-0,021	-0,017	0,087	0,239	0,811	Not Significant
Price x *Word Of Mouth -> Purchase Decisions*	0,117	0,098	0,128	0,917	0,360	Not Significant
Price x *Brand Image -> Purchase Decisions*	-0,129	-0,118	0,113	1.146	0,252	Not Significant

Source: Data processed with SmartPLS Ver. 4, 2024

Mediation Test

In this mediation test analysis, it is conducted to delve deeper into whether the brand image variable successfully mediates the influence of the independent variable on the dependent variable or not, which can be elaborated on in the indirect effects output. The condition for testing the mediation variable is that if the P-value is less than 0.05, then the independent variable affects the dependent variable through the mediation variable. Here, the author presents the table of indirect effects output from this research:

Table 7.
Results of the Indirect Effects Output Test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics	P values	Information
PV -> BI -> PD	0.114	0.110	0.046	2.496	0.013	Significant
WoM -> BI -> PD	0.147	0.142	0.050	2.941	0.003	Significant

Source: Data processed with SmartPLS Ver. 4, 2024

CONCLUSION

In conclusion, the perceived value received by electric vehicle users has a positive influence on brand image and purchase decision of electric vehicles. Word of mouth recommendations also play an important role in building brand image, although they do not directly influence purchasing decisions without the support of other elements such as price. A strong brand image has been proven to enhance purchasing decisions. This research aligns with previous findings that indicate perceived value, word of mouth, and brand image are key factors in influencing consumer purchasing decisions. In addition, price also plays a significant role as an independent variable that influences purchasing decisions, emphasizing that appropriate pricing is very important to attract consumers.

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