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ANTECEDENTS OF INTEREST IN PURCHASING ELECTRIC MOTORCYCLES IN MEDAN

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Abstract

This study aims to analyze the influence of technological innovation, environmental awareness, and price on the purchase intention of electric motorcycles in Medan City. The research employs a quantitative approach with a causal research design. The population consists of residents of Medan City who use electric motorcycles, and the sample was determined using random sampling, resulting in one hundred respondents. Data were collected through observation and questionnaires. The data analysis includes validity testing, reliability testing, classical assumption tests, multiple linear regression analysis, partial tests (t-tests), and simultaneous tests (F-tests) using IBM SPSS Statistics version 23. The results show that partially technological innovation has a positive and significant effect on purchase intention for electric motorcycles, environmental awareness also positively influences consumers' intention to buy, and price is identified as a significant and positive factor that affects consumers' purchasing decisions. Simultaneously, these three variables strongly influence the increase in purchase intention for electric motorcycles in Medan City. These findings indicate that technological innovation, environmental awareness, and price are essential components in developing strategies to expand the electric vehicle market in Indonesia.

Keywords: *Technological Innovation, Environmental Awareness, Price, Purchase Intention*

Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh inovasi teknologi, kesadaran lingkungan, dan harga terhadap niat beli sepeda motor listrik di Kota Medan. Penelitian ini menggunakan pendekatan kuantitatif dengan desain penelitian kausal. Populasi terdiri dari penduduk Kota Medan yang menggunakan sepeda motor listrik, dan sampel ditentukan menggunakan pengambilan sampel acak, menghasilkan seratus responden. Data dikumpulkan melalui observasi dan kuesioner. Analisis data meliputi pengujian validitas, pengujian reliabilitas, pengujian asumsi klasik, analisis regresi linier berganda, uji parsial (uji-t), dan uji simultan (uji-F) menggunakan IBM SPSS Statistics versi 23. Hasil penelitian menunjukkan bahwa secara parsial inovasi teknologi memiliki pengaruh positif dan signifikan terhadap niat beli sepeda motor listrik, kesadaran lingkungan juga berpengaruh positif terhadap niat beli konsumen, dan harga diidentifikasi sebagai faktor signifikan dan positif yang memengaruhi keputusan pembelian konsumen. Secara simultan, ketiga variabel ini sangat berpengaruh terhadap peningkatan niat beli sepeda motor listrik di Kota Medan. Temuan ini menunjukkan bahwa inovasi teknologi, kesadaran lingkungan, dan harga merupakan komponen penting dalam mengembangkan strategi untuk memperluas pasar kendaraan listrik di Indonesia.

Kata Kunci: Inovasi Teknologi, Kesadaran Lingkungan, Harga, Niat Beli

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INTRODUCTION

The development of electric vehicles in Indonesia has been growing rapidly along with the increasing need for environmentally friendly and efficient transportation. The central government has encouraged the acceleration of electric vehicle adoption through various policies, such as fiscal incentives and programs for converting fossil-fuel vehicles. However, implementation at the regional level still varies significantly. Medan City, as one of the major metropolitan areas outside Java Island, has great potential for the development of electric motorcycles, considering its high levels of air pollution and traffic congestion. Nevertheless, the adoption rate of electric motorcycles in Medan remains relatively low compared to other major cities such as Jakarta. This is due to limited infrastructure, relatively high prices, and the low level of public understanding regarding the benefits of electric vehicles.

Motorcycles remain the dominant mode of transportation in Medan due to their flexibility and efficiency in dealing with traffic congestion. However, the dominance of fossil-fuel vehicles contributes to increased air pollution and noise, which negatively impact health and the environment. Local government initiatives to promote the use of electric motorcycles, such as providing electric vehicles for official use and launching eco-friendly transportation campaigns, have not yet significantly increased public purchase intention. This indicates that various factors still influence consumers' decisions to purchase electric motorcycles.

One of the factors that may influence consumers' purchase intention is technological innovation. Advances in technology, such as longer battery life, shorter charging time, smoother engine performance, and integration of digital features, add value for consumers. However, the public's limited knowledge about these technological advantages has prevented them from fully shifting to electric motorcycles. According to Yadi et al. (2024), the development of more efficient and user-friendly technologies has become a key attraction for consumers when considering the purchase of electric motorcycles.

In addition, environmental awareness is also an important factor in driving purchasing decisions. Electric motorcycles do not produce exhaust emissions and contribute to reducing air pollution. Public awareness of the importance of protecting the environment can influence their preference for eco-friendly vehicles. Sisrika and Prasojo (2024) found that environmental awareness has a positive effect on purchase intention, indicating that the higher a person's environmental concern, the greater their tendency to buy electric vehicles.

Another important factor is price, which plays a crucial role in consumers' purchasing decisions. Although electric motorcycles offer lower operational costs compared to conventional motorcycles, their relatively high initial prices remain a major obstacle. The imbalance of government incentives and subsidies further worsens this issue, making electric motorcycles less affordable for the general public. Putra et al. (2023) stated that although electric motorcycles provide long-term cost savings, their high initial prices discourage consumers from switching from conventional vehicles. Therefore, this study aims to analyze the effects of technological innovation, environmental awareness, and price on the purchase intention of electric motorcycles in Medan. The findings of this research are expected to provide empirical contributions to the development of consumer behavior models in sustainable transportation and offer insights for both government and manufacturers in formulating strategies to accelerate the adoption of electric vehicles.

LITERATURE REVIEW

This paper analyzes the main principles of scientific concepts, limitations, and norms related to research variables. These theories include grand theory, middle theory, and applied theory, as well as the relationships or influences between variables. The theoretical study utilizes secondary and primary sources. The use of secondary sources or textbooks should not exceed 40% of the total number of references.

METHOD

This study employs a quantitative causal research design aimed at examining the effect of technological innovation, environmental awareness, and price on consumers' purchase intention toward electric motorcycles in Medan City. The population was the consumer who have purchased or are potential users of electric motorcycles and a sample of 100 respondents was determined using accidental sampling. Primary data were collected through structured questionnaires and direct observation, using Likert-scale items to measure each construct. The data were analyzed using SPSS version 23, including validity and reliability tests, classical assumption tests (normality, heteroscedasticity, and multicollinearity), and multiple linear regression analysis to test hypotheses. The analysis method that used was multiple linear regression analysis

RESULTS AND DISCUSSION

Descriptive Statistics

Table Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Technology Innovation	100	18,00	45,00	37,3800	6,79242
Environment Awareness	100	10,00	45,00	38,5400	7,13566
Price	100	11,00	45,00	34,9000	8,14949
Purchase Interset	100	11,00	45,00	33,2800	8,81239
Valid N (listwise)	100				

The results of the descriptive statistical analysis show that all variables in this study technological innovation, environmental awareness, price, and purchase intention were measured from 100 respondents. The technological innovation variable has a minimum score of 18.00, a maximum of 45.00, a mean of 37.38, and a standard deviation of 6.79, indicating that respondents generally perceived a high level of technological innovation with relatively consistent responses. The environmental awareness variable shows a minimum score of 10.00, a maximum of 45.00, a mean of 38.54, and a standard deviation of 7.14, suggesting that respondents tend to have strong environmental awareness. The price variable has a minimum value of 11.00, a maximum of 45.00, a mean of 34.90, and a standard deviation of 8.15, implying that perceptions of price vary more widely among respondents. Meanwhile, the purchase intention variable has a minimum value of 11.00, a maximum of 45.00, a mean of 33.28, and a standard deviation of 8.81, showing that the overall level of purchase intention toward electric motorcycles in Medan is moderate, with relatively diverse respondent opinions.

Validity and Reliability Test

The results of the validity test show that all statement items for each variable have correlation coefficient (r-count) values greater than the r-table value of 0.361, indicating that all items are valid.

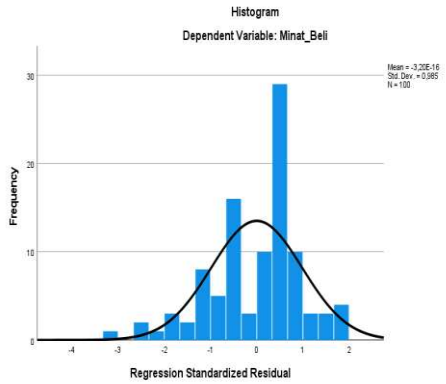
The results of the reliability test presented indicate that all variables in this study have Cronbach's Alpha values above the minimum acceptable threshold of 0.60, confirming that the measurement instruments used are reliable.

Normality Test

In this study, the results of the normality test were used to determine whether the regression model of the dependent and independent variables follows a normal distribution. In this

research, data normality was tested using the following methods:

a. Histogram graph analysis



The histogram above illustrates the results of the normality test for the dependent variable, purchase intention, based on the regression standardized residuals. The distribution of the residuals forms a pattern that closely resembles a bell-shaped curve, indicating that the data are approximately normally distributed. The mean value of the residuals is very close to zero (Mean = –3.20E–16), and the standard deviation is 0.985, which is near the expected value of 1 for standardized residuals. These findings suggest that the residuals are symmetrically distributed around the mean and do not exhibit significant skewness or kurtosis. Therefore, it can be concluded that the normality assumption in the regression model has been met, implying that the model is suitable for further analysis.

b. Kolmogorov-Smirnov Analysis

Table Kolmogorov Smirnov

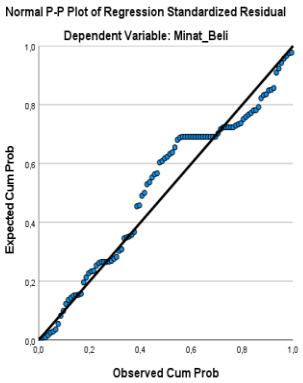
One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		100
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	5,06141870
Most Extreme Differences	Absolute	,143
	Positive	,075
	Negative	-,143
Test Statistic		,143
Asymp. Sig. (2-tailed)[c]		,200

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

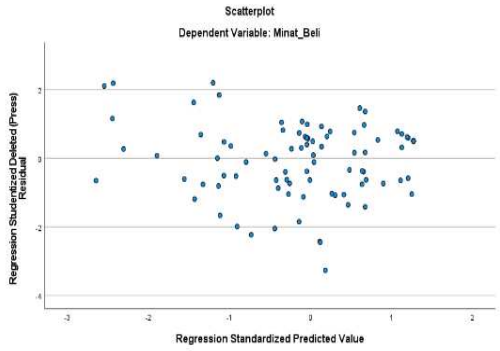
Based on the results of the One-Sample value is greater than the significance level of 0.05, indicating that the data are normally distributed. Therefore, the normality assumption is fulfilled, and the data are suitable for use in subsequent parametric statistical analyses, such as linear regression or correlation analysis. This result shows that the distribution of residual data does not differ significantly from a normal distribution, implying that the model used is consistent with the basic assumptions of parametric testing. Kolmogorov-Smirnov Test, the Asymp. Sig. (2-tailed) value was obtained at 0.200. This

c. Normal P-Plot



The Normal P–P Plot of Regression Standardized Residuals for the dependent variable *Purchase Intention* shows that the data points are distributed closely along the diagonal line. This pattern indicates that the residuals follow a normal distribution, as the observed cumulative probabilities are nearly identical to the expected cumulative probabilities. The absence of significant deviations from the diagonal line suggests that there are no major normality issues in the regression model. Therefore, it can be concluded that the residuals meet the assumption of normality, and the regression model is appropriate for further statistical analysis.

Heteroscedasticity Test



The scatterplot of the regression standardized residuals for the dependent variable *Purchase Intention* shows that the data points are randomly distributed above and below the zero line without forming a specific pattern. This random distribution indicates that the variance of the residuals is consistent across all predicted values, meaning there is no clear evidence of heteroscedasticity. In other words, the spread of residuals remains relatively uniform throughout the range of predicted values. Therefore, it can be concluded that the regression model meets the assumption of homoscedasticity, implying that the model is appropriate and the estimation results are unbiased and reliable for further interpretation.

Table Glejser Test

Table Glejser Test

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	7,723	1,705		4,528	,000
	Inovasi_Teknologi	,025	,080	,057	,311	,756
	Kesadaran_Lingkungan	,064	,068	,156	,942	,348
	Harga	,060	,053	,165	1,133	,260

a. Dependent Variable: ABS_Res

Based on the results of the Glejser Test in Table, it can be observed that none of the independent variables significantly affect heteroscedasticity, as all significance values (Sig.) are greater than 0.05. The Sig. values are 0.756 for Technological Innovation, 0.348 for Environmental Awareness, and 0.260 for Price. This indicates that there is no evidence of heteroscedasticity in the regression model, meaning the assumption of homoscedasticity is met. In other words, the variability of residuals does not depend on the independent variables in the model.

Multicollinearity Test

Table Multicollinearity Test

Model	Collinearity Statistics Tolerance	VIF
(Constant)		
Technology Innovation	,288	3,477
Environment Awareness	,358	2,793
Price	,463	2,158

a. Dependent Variable: Minat_Beli

Based on the multicollinearity test results, all independent variables have Tolerance values above 0.1 and VIF (Variance Inflation Factor) values below 10. The Tolerance for Technological Innovation is 0.288 with a VIF of 3.477, for Environmental Awareness Tolerance is 0.358 with a VIF of 2.793, and for Price Tolerance is 0.463 with a VIF of 2.158. This indicates that there is no multicollinearity problem in the regression model, meaning the independent variables are not highly correlated and can be used together in the regression analysis.

Multiple Linear Regression

Table Multiple Linear Regression

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	4,994	3,019		-1,654	,101		
	Inovasi_Teknologi	,524	,142	,404	3,693	,000	,288	3,477
	Kesadaran_Lingkungan	,052	,121	,042	,431	,667	,358	2,793
	Harga	,478	,093	,442	5,134	,000	,463	2,158

a. Dependent Variable: Minat_Beli

Based on the results of the multiple linear regression analysis in Table, the regression equation is as follows:

1. The fact that purchase intention will remain 4.994 regardless of the values of the independent variables (X), such as technological innovation, environmental awareness, and price, is indicated by the constant (a) = 4.994.
2. The technological innovation variable has an impact of 0.524 on purchase intention, as shown by the

coefficient X1 (b1) = 0.524. This indicates that the purchase intention value increases by 0.524 for every one-unit increase in technological innovation.

3. The fact that the environmental awareness variable has an effect of 0.052 on purchase intention is shown by the coefficient X2 (b2) = 0.052. Thus, the purchase intention value increases by 0.052 for every one-unit increase in environmental awareness.
4. The fact that the price variable has an effect of 0.478 on the decision is shown by the coefficient X3 (b3) = 0.478. Consequently, the purchase intention value increases by 0.478 for every one-unit increase in price.

Hypothesis Test

T- Test

Model		Unstand Coe B	Unstand Coe Std. Error	Standardized Coefficients Beta	t	Sig.	Collinea Statisl Tolerance	Collinea Statisl VIF
1	(Constant)	4,994	3,019		-1,654	,101		
	Inovasi_Teknologi	,524	,142	,404	3,693	,000	,288	3,477
	Kesadaran_Lingkungan	,522	,121	,042	3,431	,000	,358	2,793
	Harga	,478	,093	,442	5,134	,000	,463	2,158

a. Dependent Variable: Minat_Beli

Based on Table above, it can be observed that: The significance level (0.000) for the technological innovation variable is less than 0.05, and the t-value (3.693) is greater than the critical t-value (1.984). Therefore, it can be concluded that H1 is accepted, indicating that technological innovation has a significant positive effect on purchase intention. The significance level (0.000) for the environmental awareness variable is also less than 0.05, and the t-value (3.431) is greater than the critical t-value (1.984). Thus, it can be concluded that H2 is accepted, showing that environmental awareness has a significant positive effect on electric motorcycle purchase intention. The significance level (0.000) for the price variable is less than 0.05, and the t-value (5.134) is significantly higher than the critical t-value (1.984). Therefore, it can be concluded that H3 is valid, meaning that price has a significant positive effect on purchase intention.

F Test

Table F Test

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5151,982	3	1717,327	65,005	,000[b]
	Residual	2536,178	96	26,419		
	Total	7688,160	99			

a. Dependent Variable: Minat_Beli

b. Predictors: (Constant), Harga, Kesadaran_Lingkungan, Inovasi_Teknologi

Based on the ANOVA results in the table above, the F-value is 65.005 with a significance level of 0.000. Since the significance is less than 0.05, it can be concluded that the regression model is statistically significant overall. This means that the independent variables, Technological Innovation, Environmental Awareness, and Price, together have a significant effect on Purchase Intention. The Sum of Squares shows that the variation in Purchase Intention explained by the model (Regression) is 5151.982, while the variation not explained by the model (Residual) is 2536.178, out of a total variation of 7688.160.

Determination Test

Table Determination Test

Table Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics R Square Change	Change Statistics F Change	Change Statistics df1	Change Statistics df2	Change Statistics Sig. F Change
1	,819[a]	,670	,660	5,13989	,670	65,005	3	96	,000

a. Predictors: (Constant), Harga, Kesadaran_Lingkungan, Inovasi_Teknologi

b. Dependent Variable: Minat_Beli

The Adjusted R Square value is 0.660, as shown. This indicates that technological innovation, environmental awareness, and price contribute 66.0% of the variation in purchase intention. The remaining 34% is influenced by variables such as lifestyle,

ease of use, reviews, product ratings, and other factors not included in this study.

Discussion

The findings of this study indicate that technological innovation has a significant influence on consumers' purchase intention toward electric motorcycles. This finding is in line with previous studies which emphasize the role of technological advancement in shaping consumer acceptance of new technologies. According to Davis (1989), perceived usefulness and perceived ease of use are key determinants of behavioral intention toward adopting new technology. In the context of electric motorcycles, innovations such as improved battery efficiency, extended driving range, and smart features enhance consumers' perceptions of product usefulness and reliability, thereby increasing their purchase intention. Similarly, Rogers (2003) argues that innovation characteristics, including relative advantage and compatibility, significantly affect the diffusion of new technologies. These findings are further supported by Zhang et al. (2020), who found that technological performance is a critical factor influencing consumers' intention to adopt electric vehicles.

Likewise, the results demonstrate that environmental awareness has a positive and significant effect on consumers' purchase intention. This finding is consistent with the Theory of Planned Behavior proposed by Ajzen (1991), which suggests that attitudes and personal values significantly influence behavioral intentions. Consumers who possess higher environmental awareness tend to develop favorable attitudes toward environmentally friendly products. Empirical studies by Han et al. (2019) and Stern (2000) indicate that environmental concern and personal norms strongly motivate pro-environmental purchasing behavior. In the case of electric motorcycles, heightened awareness of environmental issues such as air pollution and carbon emissions encourages consumers to choose sustainable transportation alternatives.

Overall, the findings of this study suggest that purchase intention toward electric motorcycles is influenced by both technological and psychological factors. This result aligns with previous research highlighting that the adoption of green technology depends not only on functional innovation but also on environmental values and beliefs (Wang et al., 2021). Technological innovation helps reduce performance-related uncertainty, while environmental awareness strengthens consumers' moral responsibility toward sustainability. Therefore, this study reinforces the importance of integrating continuous technological development with environmental education to accelerate the adoption of electric motorcycles.

Price significantly influences purchase decisions. This finding is in accordance with the research conducted by (Fahmi, 2023) that price has a significant negative influence on buying interest, meaning that the higher the price offered, the less interest consumers have in buying an electric bicycle. Therefore this result aligns with previous research conducted by (Septianto & Andriyati, 2023 that price significantly influences purchase intention, but does not affect product differences.

CONCLUSIONS AND SUGGESTIONS

Based on the study results, it can be concluded that, partially, technological innovation has a significant effect on the purchase intention of electric motorcycles. Likewise, environmental awareness also positively affects consumers' purchase intention, and price significantly influences purchase decisions. Simultaneously, technological innovation, environmental awareness, and price collectively have a significant effect on purchase intention, indicating that these factors are important determinants of consumer behavior. Therefore, companies are recommended to focus on continuous technological innovation, promote environmentally

friendly features, and implement fair and competitive pricing strategies. By managing these factors in an integrated manner, companies can enhance both the functional and emotional value perceived by consumers, thereby increasing overall purchase intention.

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