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The Study of Determinant Factors in the Electric Bike Purchase Decision-Making Process

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Abstract

This research aims to analyze the determinant factors in the decision process to purchase an electric bicycle. The research method applied is causal with a quantitative approach. The main focus of the research is on product design, product quality, and price as key factors in purchasing decisions. Data was obtained through a questionnaire distributed to 72 respondents randomly. Data analysis shows that product design, product quality, and price have a partial and joint positive impact on the decision to purchase an electric bicycle. The multicollinearity test did not show any indication of significant multicollinearity in the model. The F test confirms that the overall model is significant in explaining variation in purchasing decisions.

The results of the determination test state that around 83.3% of the variation in purchasing decisions can be explained by the model. This research provides important insights for electric bicycle manufacturers and marketers, confirming the crucial role of product design, product quality, and price in the consumer purchasing decision-making process regarding electric bicycles. Still makes a significant contribution to understanding the factors that influence consumer behavior in the context of electric bicycles.

Keywords— Purchasing decisions, Product design, Product quality, Price, Electric bicycles.

INTRODUCTION

Along with developments in technology and concern for the environment, electric bicycles are becoming an increasingly popular choice among consumers. This research aims to explore the determinant factors that influence the consumer purchasing decision process regarding electric bicycles. This phenomenon is important considering the shift in consumer preferences from conventional motorbikes to environmentally friendly electric bicycles.

In this context, this research focuses attention on the main factors that can influence the decision to purchase an electric bicycle. Product design, product quality, and price are identified as key variables that may play a central role in consumer decision making. Product design includes elements of aesthetics and practicality, product quality includes performance and reliability, while price considers value relative to the benefits offered.

A causal research method with a quantitative approach was chosen to collect and analyze data. A total of 72 respondents were randomly selected and asked to fill out a questionnaire specifically designed for this research. Data analysis was carried out by evaluating the impact of product design, product quality and price variables partially and jointly on purchasing decisions.

The results of this research are expected to provide in-depth insight to electric bicycle manufacturers and marketers, validating the crucial role of product design, product quality and price in the context of consumer purchasing decisions. By understanding the dynamics of these

factors, it is hoped that we can formulate more effective marketing strategies and increase the competitiveness of electric bicycles in the market. This research not only discusses the latest consumer trends but also makes a significant contribution to our understanding of purchasing behavior in the era of electric bicycles.

LITERATURE REVIEW

Electric Bike

Electric bikes, or e-bikes, represent an innovative variation of traditional bicycles, powered primarily by electricity. Equipped with an electric motor and a rechargeable battery, these bikes offer riders the option to either pedal with assistance from the motor or rely entirely on electric propulsion. The electric motor can augment the rider's pedaling efforts or even completely replace them, making e-bikes an eco-friendly and efficient solution for urban mobility. Additionally, the rechargeable battery allows for repeated use, providing flexibility for longer journeys. The adoption of electric bikes is seen as a positive contribution to reducing greenhouse gas emissions and improving transportation accessibility in various urban environments. While still in the developmental stage, electric bikes are gaining increasing attention as a promising alternative for achieving sustainable mobility.

RESEARCH METHODS

This research is a causal study which aims to assess the cause-and-effect relationship between product design, product quality and price on the decision to purchase an electric bicycle. This research method uses a quantitative approach and is based on research design, expert ideas and researcher understanding. The following are details of the research methods used:

1. Population and Sample:
   - Population: 255 electric bicycles
   - Sample: 72 respondents were selected randomly using the random sampling method. This is done to ensure good representation of the population.

2. Data Collection:
   - Data Collection Tool: A questionnaire with a list of statements using a Likert scale was used to collect data from respondents.
   - Data Collection Process: Respondents were interviewed or given questionnaires to measure their perceptions about product design, product quality, price, and purchasing decisions for electric bicycles.

3. Data Analysis:
   - The collected data will be analyzed using SPSS version 23 statistical software.
   - The data analysis process involves grouping data based on type and types of respondents, calculating statistics to answer research questions, and testing hypotheses proposed in the research.
   - The results of data analysis will provide a summary and interpretation of how product design, product quality, and price influence purchasing decisions.

4. Research Quality:
   - Quality of research materials: Pay attention to the reliability and validity of data collection tools (questionnaires).
   - Data collection quality: Data quality is maintained through accurate and structured data collection methods.

- This research uses a quantitative approach and statistical analysis methods to answer research questions. Thus, it is hoped that this research can provide deeper insight into the factors that influence the decision to purchase an electric bicycle.

RESULTS AND DISCUSSION

Based on the data collected and analyzed using statistical analysis tools, the results of this research can be concluded as follows. After data processing, including validity tests for each variable, it was found that the calculated r-value (0.232) was greater than the relevant r-table. This indicates that the data used in this research is valid and reliable. In carrying out reliability tests for each type of variable, it was found that the Cronbach Alpha value for each variable was greater than 0.60. This shows that the data used has a high level of reliability. Thus, the data used in this research can be considered reliable and consistent in measuring the concepts studied.

Table 1 Multicollinearity Test Results

Model		Collinearity Statistics	
		Tolerance	VIF
1	Product Design	.758	1.520
	Product quality	.593	2.028
	Price	.698	1.672

Table 1 is the results of the multicollinearity test for Model 1, which involves three independent variables: Product Design, Product Quality, and Price. In multicollinearity analysis, the two main statistics used are Tolerance and VIF (Variance Inflation Factor). Tolerance is the opposite measure of VIF, indicating the extent to which the three independent variables are uncorrelated with each other. The closer to 1, the lower the level of multicollinearity. In this case, the Tolerance value for the three variables is quite high, with the highest value being 0.758, indicating that they have a low level of multicollinearity. Additionally, the VIF for each variable was also less than 5, which is a common threshold for an acceptable level of multicollinearity. Therefore, based on the results of this multicollinearity test, there is no strong indication of multicollinearity in Model 1, which allows us to analyze the effect of each independent variable on the dependent variable more precisely.

Table 2 T Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.513	3.812		3.282	.001
	Product Design	.809	.190	.615	8.887	.000
	Product quality	.321	.179	.311	3.795	.006
	Price	.420	.174	.396	5.314	.000

a. Dependent Variable: Buying decision

Table 2 is the result of the t test which measures the significance of the coefficients in Model 1, which analyzes the relationship between the independent variables (Product Design, Product Quality and Price) and the dependent variable (Purchase Decision).

In this table, the "Unstandardized Coefficients (B)" column shows the regression coefficients for each independent variable. It describes how much change in the dependent

variable is associated with a one-unit change in the independent variable in unstandardized units.

The "Standardized Coefficients (Beta)" column presents standardized regression coefficients, allowing a relative comparison between the influence of the independent variable on the dependent variable.

Additionally, column “t” is the value of the t statistic, which is used to test the significance of the coefficient. The larger the "t" value, the more significant the contribution of the independent variable to the dependent variable.

Lastly, the column "Sig." (Significance) indicates the level of statistical significance t. The value "Sig." that is smaller than the specified significance level (usually 0.05) indicates that the coefficient is statistically significant. In this context, all independent variables (Product Design, Product Quality, and Price) have the value "Sig." which is very small (less than 0.05), indicating that they have a significant contribution to Purchasing Decisions.

Table 3. F Test Results

ANOVA[a]

Model	Sum of Squares		df	Mean Square	F	Sig.
1	Regression	1563.262	3	521.087	87.096	.000[b]
	Residual	568.374	69	5.983		
	Total	2131.636	72			

a. Dependent Variable: Buying decision
b. Predictors: (Constant), Price, Product Design, Product Quality

Source: Primary data processed

Table 3 is the results of the F test, which is a component of ANOVA (Analysis of Variance) analysis. The purpose of this table is to assess whether the regression model (Model 1) which includes independent variables (Price, Product Design, and Product Quality) has a significant influence on the dependent variable (Purchase Decision). In the column "Sum of Squares," we see two main components, namely "Regression" and "Residual." “Regression” measures the degree to which variability in the data is explained by the regression model, while “Residual” measures the variability not explained by the model. In this case, the sum of squares for "Regression" is 1563.262, which indicates that the regression model has a good ability to explain variations in Purchase Decisions.

Next, the "df" (degree of freedom) column measures the degrees of freedom, namely the amount of data minus one. In this case, “Regression” has 3 degrees of freedom, while “Residual” has 69 degrees of freedom. The "Mean Square" column is the mean of squares, calculated by dividing the sum of squares by the corresponding degrees of freedom.

The results of the F test are in column "F," which is the test statistic used to assess whether the overall regression model is significant. The F value of 87.096 indicates that the regression model significantly explains variations in Purchasing Decisions. A high F value is an indicator of the strength of the relationship between the independent variable and the dependent variable. Lastly, the column "Sig." indicates the level of significance of the F test. The value "Sig." which is very small (0.000) indicates that the F test results are statistically significant, so we can conclude that this regression model significantly influences Purchasing Decisions.

Table 4. Determination Test Results

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.956[a]	.833	.825	3.44599

a. Predictors: (Constant), Price, Product Design, Product Quality
b. Dependent Variable: Buying decision

Source: Processed Primary Data

Table 4 is the result of a determination test that provides insight into the extent to which the regression model (Model 1) fits the observed data. The R Square (R^2) value of 0.833 indicates that around 83.3% of the variation in the dependent variable, namely Purchase Decisions, can be explained by the independent variables in the model (Price, Product Design, and Product Quality). This indicates that the model is able to explain most of the variation in Purchase Decisions, indicating a good fit between the model and observational data. The high R (Pearson correlation) value, around 0.956, also indicates a strong relationship between the independent and dependent variables in the model. Therefore, this model appears to be successful in describing the relationships between the variables involved in this analysis.

Product design has a positive influence on the decision to purchase an electric bicycle. This is caused by the ability of PT. x in meeting customer expectations with electric bicycle products that have attractive designs and suit consumer preferences. Apart from that, PT. x also offers various product features that can meet various consumer needs.

Product quality also has a positive impact on the decision to purchase an electric bicycle. This is due to the commitment of PT. x in providing high quality products and meeting customer preferences. Expertise in fulfilling consumer desires is one of the determining factors in making purchasing decisions.

Price also has a positive influence on the decision to purchase an electric bicycle. Consumers get competitive prices from PT. x, with a price offer that is commensurate with the quality of the products offered. The suitability of price and product quality is an important factor in making purchasing decisions.

Overall, product design, product quality, and price have a positive impact simultaneously on the decision to purchase an electric bicycle. In this research, these factors work synergistically to influence purchasing decisions.

CONCLUSION

The conclusion of this research is that product design, product quality and price have a positive and significant influence on the decision to purchase an electric bicycle. This research indicates that consumers tend to choose electric bicycles when they are faced with attractive product designs, high product quality, and competitive prices.

Data analysis revealed that the three independent variables together explained approximately 83.3% of the variation in purchasing decisions. The statistical test results show the positive significance of each independent variable, with product design having the most significant impact followed by price and product quality.

This research provides important insights for electric bicycle manufacturers and marketers, helping them understand the extent to which these factors influence consumer purchasing behavior. By understanding the importance of product design, product quality, and

price in purchasing decisions, companies can develop more effective marketing strategies and better meet customer preferences.

SUGGESTION

Following are suggestions for further research:

1. Consider contextual variables such as geographic location, consumer demographics, or market trends that may influence the electric bicycle purchasing decision.
2. Comparing the factors that influence electric bicycle purchasing decisions can provide a more comprehensive understanding of consumer preferences.
3. Conduct research that tracks changes in consumer purchasing behavior over time to understand trends and changes in consumer preferences.
4. Deepen understanding of psychological factors, such as consumer perceptions of brands or emotional associations with products, that can influence purchasing decisions.

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