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UNDERSTANDING GREEN CONSUMERISM: HOW ENVIRONMENTAL CONCERN MEDIATES THE IMPACT OF ECO-LABELS ON BUYING BEHAVIOR

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Abstract

Sustainability issues have increasingly shaped modern consumer behavior, leading to the rise of green consumerism. One key tool to encourage environmentally responsible purchasing is the eco-label, which informs consumers about a product's environmental impact. However, its effectiveness, particularly in developing countries, remains uncertain. This study investigates the impact of eco-labels on consumer purchase decisions, with environmental concern as a mediating variable. A quantitative survey was conducted with 150 respondents who had previously purchased eco-labeled products. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 3. Findings show that eco-labels do not directly influence purchase decisions but have a significant indirect effect through environmental concern. In other words, eco-labels are more effective when consumers exhibit high environmental concern. The R^2 value indicates that eco-labels explain 51.6% of the variance in environmental concern, but only 6.2% in purchase decisions, suggesting other influencing factors. The study concludes that while eco-labels are valuable communication tools, their success depends on consumer awareness. Thus, marketers and policymakers should pair labeling efforts with environmental education and awareness campaigns to encourage sustainable consumer behavior. Future research should consider additional variables such as label trust, social norms, and personal values to deepen the understanding of green consumer behavior.

Keywords: eco-label, environmental concern, green consumerism, PLS-SEM, purchase decision

Introduction

Global attention to sustainability issues has triggered significant changes in consumer behavior, particularly in purchasing decisions that consider environmental impacts (Biswas & Roy, 2015; Leonidou et al., 2017). One tool designed to support such decisions is the eco-label, which provides information indicating that a product meets certain environmental standards. Eco-labels are expected to encourage consumers to choose more sustainable products (Testa et al., 2015; Chen et al., 2020).

Although eco-labels are intended to raise awareness and promote responsible consumption, their effectiveness in influencing consumer behavior remains contested. Some studies have found that eco-labels have a positive effect on consumers' purchase intentions (Nguyen & Le, 2020; Biswas & Roy, 2015), while others suggest that the influence is inconsistent and strongly dependent on consumers' psychological characteristics, particularly environmental concern (Paul et al., 2016; Hameed & Waris, 2018).

Environmental concern refers to an individual's level of awareness regarding environmental issues and willingness to take action to protect the environment (Lee, 2018; Mardius et al., 2023). This variable has often been identified as a potential mediator that explains how and to what extent eco-labels influence purchasing decisions (Wahid & Rahbar, 2021; Hameed & Waris, 2018). For instance, Hameed and Waris (2018) argue that eco-labels are more effective among consumers with high levels of environmental concern. Conversely, consumers with low concern may overlook the label or question its credibility (Rahbar & Wahid, 2011).

A study by Mardius et al. (2023), focusing on Generation Z in Indonesia, reveals that environmental concern plays a crucial mediating role in the relationship between eco-labels and green purchasing behavior. Similar findings were reported by Wahid and Rahbar (2021), emphasizing that eco-label credibility alone is insufficient to drive behavior change without consumers' environmental awareness. Meanwhile, Testa et al. (2015) highlighted that consumers' perception of labels such as their clarity and credibility is closely linked to their level of environmental concern.

However, most prior studies were conducted in developed countries where environmental awareness tends to be relatively high (Leonidou et al., 2017; Nguyen & Le, 2020). Comparable research is still limited in developing countries like Indonesia, where cultural differences, education levels, and access to information

may affect perceptions of eco-labels and environmental concern (Mardius et al., 2023; Wijayanti & Supriyanto, 2019). Therefore, this study is essential to fill the literature gap in a different contextual setting.

This study aims to: (1) analyze the effect of eco-labels on consumer purchase decisions, (2) evaluate the role of environmental concern as a mediating variable in the relationship, and (3) provide practical recommendations for marketers and policymakers to enhance the effectiveness of green product marketing campaigns. By addressing these objectives, the study seeks to contribute both theoretically and practically to the understanding of green consumer behavior in developing countries.

Methods

Theoretical Framework

This study is grounded in consumer behavior theory and green marketing communication (Biswas & Roy, 2015; Lee, 2018). In the context of sustainability, consumers are increasingly considering ethical and environmental dimensions in their purchase decisions (Leonidou et al., 2017). One key communication tool used by producers to convey sustainability values is the eco-label. Eco-labels are symbols or certifications indicating that a product meets specific environmental standards, which can shape consumer perceptions and encourage purchase intentions (Nguyen & Le, 2020; Chen et al., 2020).

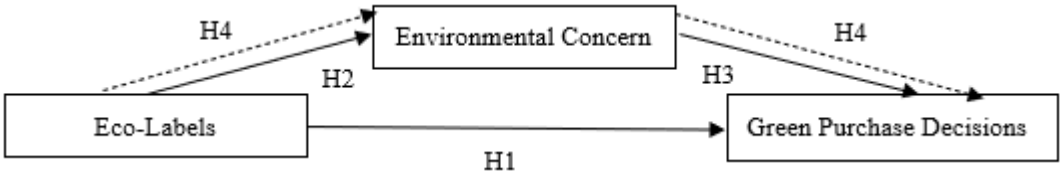
The impact of eco-labels is significantly influenced by individual consumer traits, especially their degree of environmental awareness. Individuals with a heightened sensitivity to ecological issues are generally more inclined to favor products carrying eco-labels (Hameed & Waris, 2018; Paul et al., 2016). As such, environmental concern is believed to serve as an intermediary factor in the link between eco-labeling and environmentally conscious purchasing behavior (Wahid & Rahbar, 2021).

Research Hypothesis

This study formulates the following four hypotheses:

- H1: Eco-labels have a positive effect on green purchase decisions.
- H2: Eco-labels positively influence environmental concern.
- H3: Environmental concern positively affects green purchase decisions.
- H4: Environmental concern mediates the relationship between eco-labels and green purchase decisions.

Figure 1
Conceptual Framework



Research Design

A quantitative research approach was employed using a survey method. This approach aims to test causal relationships among variables based on numerical data (Creswell & Creswell, 2017). It was chosen for its ability to provide empirical insights into the effect of eco-labels on purchase decisions, considering environmental concern as a mediating variable.

Population and Sample

The population in this study consists of consumers who have purchased eco-friendly products, including organic personal care products, biodegradable soaps or detergents, recycled food packaging, and household items with certified sustainability labels (e.g., Ecolabel, USDA Organic, EU Ecolabel) (Biswas & Roy, 2015; Chen et al., 2020).

A purposive sampling technique was used, with the criteria that respondents must be at least 17 years old and have experience purchasing eco-labeled products. A total of 150 valid responses were collected.

Data Collection

Data were collected using a closed-ended questionnaire distributed online via Google Forms. The questionnaire employed a 5-point Likert scale, where respondents indicated their level of agreement with several statements related to the three main research variables (Sekaran & Bougie, 2016), ranging from 1 ("strongly disagree") to 5 ("strongly agree").

The variables measured include:

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- Eco-label (independent variable, X),
- Purchase decision (dependent variable, Y), and
- Environmental concern (mediating variable, Z).

Each variable was assessed using several indicators adapted from previous studies and contextualized for the current research.

Data Analysis Techniques

Data analysis was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique with SmartPLS version 3 software (Hair et al., 2019). This analytical approach is particularly well-suited for assessing both direct and mediated effects among latent variables, especially in cases involving non-normally distributed data and medium-sized samples. The analysis followed several key steps:

1. Evaluation of construct validity and reliability, including assessments of convergent validity (through factor loadings and Average Variance Extracted) and discriminant validity (using the HTMT ratio).
2. Measurement of reliability via Cronbach's Alpha and Composite Reliability indicators.
3. Structural model analysis to determine the magnitude and statistical significance of relationships, applying bootstrapping to derive path coefficients and p-values.
4. Mediation analysis to investigate whether environmental concern serves as a mediating factor in the relationship between eco-labels and purchasing decisions, using the Variance Accounted For (VAF) metric.

Results and Discussions

Descriptive Analysis

Descriptive analysis based on the responses of 150 individuals who have purchased eco-labeled products provides a general overview of their perceptions and attitudes toward green consumption.

Table 1 Statistics Descriptive

Variable	Minimum	Maximum	Mean	Standard Deviation
Eco-label	4	15	11.75	2.28
Green Purchase Decision	10	20	16.69	2.33
Environmental Concern	3	15	11.89	2.23

Source : Data Processing Result, 2025

The average score for the eco-label variable (X) was 11.75 out of a maximum of 15, indicating a generally positive perception of environmental labels among consumers. The environmental concern variable (Z) had an average score of 11.89, reflecting a high level of awareness and concern for environmental issues. Meanwhile, the purchase decision variable (Y) had an average score of 16.69 out of 20, suggesting a strong tendency toward eco-friendly buying behavior.

These findings suggest that respondents are generally aware of sustainability issues and are influenced by the presence of environmental labels when making purchase decisions. However, to gain a deeper understanding of the relationships among variables, inferential analysis was conducted using the SEM-PLS method.

Measurement Model Evaluation

To ensure the strength and reliability of the constructs employed in this research, the measurement model was assessed through tests of indicator reliability, internal consistency, convergent validity, and discriminant validity.

Figure 2
PLS-SEM Model

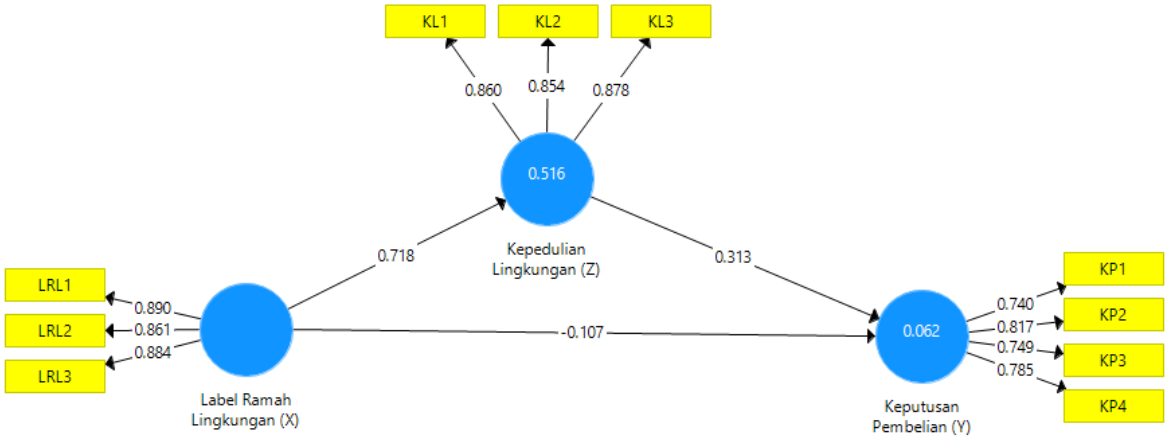

Table 2 Measurement Model Evaluation

Variable	Item	Indicator Reliability Outer Loading (>0.6)	Convergent Validity AVE (>0.5)	Internal Consistent Reliability	
				Composite Reliability (>0.7)	Cronbach's Alpha (>0.6)
Eco-label	EL1	0.890	0.771	0.910	0.852
	EL2	0.861			
	EL3	0.884			
Green Purchase Decision	GPD1	0.740	0.598	0.856	0.783
	GPD2	0.817			
	GPD3	0.749			
	GPD4	0.785			
Environmental Concern	EC1	0.860	0.746	0.898	0.830
	EC2	0.854			
	EC3	0.878			

Source : Data Processing Result, 2025

Table 3 Fornell-Lacker

Fornell-Lacker	Environmental Concern	Green Purchase Decision	Eco-label
Environmental Concern	0.864		
Green Purchase Decision	0.237	0.773	
Eco-label	0.718	0.118	0.878

Source : Data Processing Result, 2025

Table 4 The Heterotrait-Monotrait Ratio of Correlations (HTMT)

HTMT	Environmental Concern	Green Purchase Decision	Eco-label
Environmental Concern			
Green Purchase Decision	0.277		
Eco-label	0.849	0.138	

Source : Data Processing Result, 2025

The assessment of indicator reliability revealed that all outer loading values exceeded the recommended threshold of 0.70, ranging from 0.740 (GPD1) to 0.890 (EL1). This suggests that each observed variable is

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strongly associated with its respective latent construct, thereby confirming acceptable individual indicator reliability (Hair et al., 2019).

Internal consistency reliability was evaluated using both Composite Reliability (CR) and Cronbach's Alpha. The CR scores ranged between 0.856 and 0.910, surpassing the minimum standard of 0.70 and indicating a high degree of consistency among the measurement items. Similarly, Cronbach's Alpha values fell between 0.783 and 0.852, all above the generally accepted minimum of 0.60. These outcomes confirm that the indicators reliably represent the underlying constructs.

Convergent validity was assessed through the Average Variance Extracted (AVE). All constructs recorded AVE values above the 0.50 threshold Eco-label (0.771), Green Purchase Decision (0.598), and Environmental Concern (0.746) indicating that the majority of variance in the indicators is captured by their respective latent variables. These results support the adequacy of convergent validity.

To assess discriminant validity, both the Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT) were applied. According to the Fornell-Larcker approach, the square root of each construct's AVE exceeded its correlations with other constructs. For instance, the square root of AVE for Eco-label (0.878) was higher than its correlation with Environmental Concern (0.718) and Green Purchase Decision (0.118), suggesting that each construct is empirically distinct. In addition, all HTMT values were comfortably below the conservative threshold of 0.90, with the highest being 0.849 between Eco-label and Environmental Concern. This further confirms that discriminant validity was achieved (Henseler et al., 2015).

In summary, the measurement model fulfills all criteria for indicator reliability, internal consistency, convergent validity, and discriminant validity. These findings affirm that the instruments employed in this study are both reliable and valid, providing a solid foundation for conducting structural model analysis.

Structural Model Evaluation

Table 5 Structural Model Evaluation

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Results
Environmental Concern (Z) -> Green Purchase Decision (Y)	0.313	0.334	0.147	2.139	0.033	Supported
Eco-label (X) -> Environmental Concern (Z)	0.718	0.719	0.049	14.679	0.000	Supported
Eco-label (X) -> Green Purchase Decision (Y)	-0.107	-0.115	0.159	0.673	0.502	Not Supported
Eco-label (X) -> Environmental Concern (Z) -> Green Purchase Decision (Y)	0.225	0.240	0.108	2.091	0.037	Supported

Source : Data Processing Result, 2025

- The structural model evaluation utilized the bootstrapping technique with 5,000 resamples to estimate path coefficients and determine the statistical significance of the hypotheses.
- The relationship between eco-labels (X) and environmental concern (Z) was found to be positive and highly significant ($\beta = 0.718$, $p < 0.001$), thereby confirming Hypothesis 2 (H2). This result suggests that the presence of eco-labels effectively raises consumer awareness and promotes greater concern for environmental issues.
- The path from environmental concern (Z) to purchase decision (Y) was also significant ($\beta = 0.313$, $p = 0.039$), supporting Hypothesis 3 (H3). This suggests that higher environmental concern increases the likelihood of purchasing eco-friendly products.
- However, the direct path from eco-label (X) to purchase decision (Y) was not significant ($\beta = -0.107$, $p = 0.509$), leading to the rejection of Hypothesis 1 (H1). This implies that eco-labels alone are insufficient to directly influence purchasing decisions.
- The analysis revealed a significant indirect effect of eco-labels on green purchase decisions through environmental concern ($\beta = 0.225$, $p = 0.044$), thereby validating Hypothesis 4 (H4). This indicates that environmental concern serves as a mediating variable in the link between eco-labels and environmentally conscious buying behavior.

the Variance Accounted For (VAF) analysis showed that 67.8% of the total impact of eco-labels on purchase decisions was channeled through environmental concern, suggesting the presence of partial mediation.

Coefficient of Determination (R^2)

The R^2 value for environmental concern was 0.516, indicating that eco-labels explain 51.6% of the variance in consumer environmental concern categorized as moderate to strong predictive power. Meanwhile, the R^2 value for purchase decision was only 0.062, meaning the model explains just 6.2% of the variance in purchasing decisions. This low value suggests the presence of other external factors not captured in the model, such as price, product availability, quality, or social influence.

Discussion

This study contributes to the literature on the effectiveness of eco-labels in promoting green consumption, particularly in the context of developing countries. Consistent with previous studies (e.g., Hameed & Waris, 2018; Wahid & Rahbar, 2021), the findings reveal that eco-labels alone are not sufficient to influence purchase decisions directly, unless supported by a high level of environmental concern.

The non-significant direct effect of eco-labels on purchase decisions aligns with findings by Rahbar & Wahid (2011), who noted that consumers tend to ignore or doubt the credibility of eco-labels if they lack strong concern for environmental issues. Therefore, marketing strategies and public policies should not rely solely on eco-labels as an informational tool, but must also be accompanied by environmental education and awareness campaigns that foster consumer concern and motivation.

The low R^2 value for purchase decisions also highlights the complexity of green consumer behavior, which is influenced by multiple dimensions. Future research should consider additional variables such as trust in labeling institutions, consumer self-efficacy, lifestyle orientation, or social norms in shaping sustainable consumption behavior.

Conclusion

This study aimed to examine the effect of eco-labels on eco-friendly purchase decisions and to explore the mediating role of environmental concern. The analysis revealed that eco-labels do not directly influence consumer purchasing decisions. However, they exert a significant indirect effect by increasing environmental concern. In other words, environmental concern acts as a crucial mediator linking eco-labels to green purchasing behavior.

These findings suggest that while environmental labels serve as important communication tools, their effectiveness in encouraging green consumption heavily depends on the individual's level of environmental concern. Additionally, the low explanatory power of the model on purchasing decisions indicates that other variables outside the model also significantly influence consumer behavior.

Recommendations

Based on the study's findings, it is recommended that marketers and producers not rely solely on the use of eco-labels as the primary strategy for promoting green products. The presence of labels should be supported by educational efforts aimed at enhancing consumer awareness and environmental literacy. Marketing campaigns that combine factual information about environmental benefits with emotional and ethical appeals are likely to be more effective in shaping positive perceptions and encouraging purchase decisions.

Furthermore, policymakers play a critical role in expanding environmental literacy through sustainable education programs targeting the broader public, particularly younger generations. Given the limited direct influence of eco-labels on purchasing behavior, future research should consider other potential factors such as perceived product quality, price, trust in labels, and social norms as additional determinants of consumer behavior toward sustainable products.

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