

Green Marketing and Consumer Buying Behavior in Ethiopia: The Role of Environmental Knowledge and Environmental Concern

Dawit Tekletsadik Hailemanuel ^{1, 2, ✉}, Bharat Bhushan Singla ¹

1. School of Management Studies, Punjabi University, Patiala, IND

2. Management, Kotebe University of Education, Addis Ababa, ETH

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Abstract

Green marketing has become a significant tool for fostering sustainable consumption; yet, the psychological mechanisms by which it affects consumer behavior are not fully comprehended, especially in emerging markets. This study investigates the impact of green marketing on customer purchasing behavior by including environmental knowledge and concern within an expanded Theory of Planned Behavior framework. Green marketing is defined as a higher-order construct that includes eco-labeling and green branding. Data were gathered via a survey of university consumers in Ethiopia and analyzed utilizing Partial Least Squares Structural Equation Modeling. The findings indicate that green marketing has a substantial impact on consumer purchasing behavior, both directly and indirectly. Environmental knowledge is a robust predictor of purchasing behavior and functions as the principal mediating mechanism, whereas environmental concern has a lesser yet still notable mediating influence. These findings underscore the significance of cognitive mechanisms rather than solely attitudinal considerations in influencing green purchase decisions within emerging market situations. The research enhances theoretical understanding by distinguishing between knowledge-based and concern-based pathways within the Theory of Planned Behavior and enriches green marketing literature by elucidating the combined function of informational and symbolic marketing techniques.

Categories: Consumer Behavior, Marketing and Market Issues in Business, Sustainable Marketing

Keywords: green marketing, consumer buying behavior, environmental knowledge, environmental concern, theory of planned behavior (tpb)

Introduction

The transition toward sustainable consumption has become a global priority as environmental degradation, climate change, and resource depletion increasingly shape economic and social agendas (Kumar et al., 2024), and (Yahia et al., 2024). In response, organizations are adopting green marketing practices such as eco-labeling and green branding to signal environmental responsibility and influence consumer decisions (Li, 2025). Although a substantial body of research suggests that green marketing can positively affect purchasing behavior, findings remain inconsistent, particularly across different economic and institutional contexts (Baca and Reshidi, 2025).

Most empirical evidence originates from developed economies where environmental awareness is relatively high, regulatory systems are stronger, and eco-certification frameworks are institutionalized. (Arfaoui, 2017) (Roxas, 2022). Under such conditions, consumers are more familiar with sustainability claims and trust labeling systems. In contrast, developing economies often face different market realities: environmental literacy varies, eco-label standardization is

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limited, and consumers are more price sensitive (Kaur et al., 2024). These contextual differences raise an important question: Do the mechanisms through which green marketing influences consumer behavior operate differently in emerging markets?

A further challenge in green marketing research concerns the psychological processes linking marketing efforts to actual purchasing behavior. Many studies focus on direct effects, overlooking how green marketing translates into action through cognitive and attitudinal pathways (Mercade Mele et al., 2019) (Taufique, 2020). While environmental concern reflects pro-environmental values, the well-documented attitude behavior gap shows that concern alone does not guarantee green purchasing. Consumers may care about environmental issues but fail to act due to limited knowledge, lack of trust, or structural constraints (Gazi et al., 2024).

Environmental knowledge, on the other hand, represents a cognitive resource that enables consumers to interpret environmental claims and make informed choices. However, its mediating role between green marketing and purchasing behavior remains underexplored, particularly in contexts where environmental education and certification systems are still developing.

Green marketing itself is often treated as a single construct (Das et al., 2024), despite consisting of distinct practices. Eco-labeling functions primarily as an informational cue that reduces uncertainty, while green branding operates through symbolic and emotional associations that build trust and identity alignment. Their relative effectiveness under conditions of emerging environmental literacy has received limited empirical attention (Hnatyuk et al., 2024).

Ethiopia provides a relevant setting for examining these dynamics. The country faces increasing environmental pressures alongside expanding consumer markets, as evidenced by annual forest losses of over 140,000-280,000 hectares due to deforestation and land degradation, contributing to roughly 25% of land classified as degraded and costing up to USD 4.3 billion annually (about 1.5% of GDP) (Megerssa and Bekere, 2019), while the economy continues to grow at around 8% per year, indicating rising consumer demand and market expansion; yet environmental knowledge, formal eco-label frameworks, and institutional trust are still evolving. In such contexts, consumers may rely more on brand credibility and understandable environmental information than on technical labels or general environmental concern. Studying this environment, therefore, offers an opportunity to understand how green marketing operates when cognitive and trust-based mechanisms may be more decisive than attitudinal predisposition

Research gap and study purpose

Despite growing interest in green marketing, three gaps remain. First, limited research distinguishes between informational mechanisms (eco-labeling) and symbolic trust-based mechanisms (green branding). Second, the mediating roles of environmental knowledge and environmental concern remain theoretically unresolved, particularly regarding whether knowledge plays a stronger role than concern in emerging markets. Third, existing findings are heavily concentrated in developed economies, leaving uncertainty about how green marketing functions under different institutional and literacy conditions.

To address these gaps, this study examines how green marketing influences consumer buying behavior in Ethiopia, distinguishing eco-labeling and green branding and investigating the mediating roles of environmental knowledge and environmental concern within an extended Theory of Planned Behavior (TPB) framework. By clarifying the psychological pathways linking green marketing to behavior in an emerging economy context, the study contributes to theory and offers practical insight for firms and policymakers seeking to promote sustainable consumption.

Literature review

Theoretical Framework

This study is primarily grounded in the TPB (Ajzen, 1991), one of the most widely applied frameworks for explaining pro-environmental and green purchasing behavior. TPB posits that behavior is shaped by beliefs that form attitudes, which in turn influence intentions and actions (Ajzen, 2002). The model has demonstrated strong explanatory power across

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sustainability-related domains, including waste management, renewable energy adoption, health behavior, and tourism decision-making. Its structured linkage between beliefs and behavior makes it suitable for understanding consumer responses to green marketing practices.

However, despite its predictive strength, TPB has recognized limitations in sustainability contexts. (Hsu and Huang, 2010). The theory emphasizes attitudes, subjective norms, and perceived behavioral control but does not explicitly account for environmental knowledge, which is essential for interpreting environmental claims (Alam et al., 2020). Consumers cannot act on sustainability intentions if they lack the cognitive ability to evaluate environmental information. Furthermore, TPB assumes that favorable attitudes lead to behavior, yet the well-established attitude behavior gap suggests that positive environmental concern does not always translate into purchasing action, particularly when structural or informational barriers exist (Recio-Román et al., 2024).

To address these limitations, this study extends TPB by integrating cognitive factors, specifically environmental knowledge and environmental concern. Environmental knowledge represents the consumer's understanding of environmental issues and product impacts, functioning as a cognitive enabler that allows individuals to process green marketing information effectively (Nguyen et al., 2025). Environmental concern, in contrast, reflects an attitudinal disposition toward environmental protection. Distinguishing these constructs allows examination of whether behavior is driven more by understanding or by general pro-environmental sentiment (Nabivi, 2025).

This extension aligns with behavioral research that incorporates cognitive determinants into TPB to improve explanatory power in green consumption contexts (Baltaci et al., 2024). Prior studies show (Antczak, 2024) (Baltaci et al., 2024) (Lopes et al., 2023) that knowledge can directly influence behavior or operate as a mediating mechanism between marketing stimuli and purchasing decisions. At the same time, evidence indicates (Carrete et al., 2012) that environmental concern may fail to produce behavioral change when consumers face economic constraints, limited product availability, or uncertainty about claim credibility conditions often present in emerging markets.

While other theories such as the value-belief-norm theory and social cognitive theory emphasize values, norms, and reciprocal determinism, this study does not treat them as parallel frameworks. Instead, insights from these perspectives inform the recognition that personal cognitive factors interact with environmental information in shaping behavior. Thus, TPB remains the core theoretical structure, with cognitive extensions enhancing its relevance for green marketing research.

Accordingly, green marketing practices are conceptualized as external informational and symbolic cues that shape consumer beliefs. Eco-labeling provides structured environmental information that reduces uncertainty, while green branding builds credibility and identity alignment. These cues are expected to influence behavior directly and indirectly through environmental knowledge and concern.

By positioning TPB as the primary framework and incorporating cognitive extensions, the study develops a coherent model explaining how green marketing translates into consumer buying behavior, particularly in contexts where environmental literacy and institutional trust are still evolving.

Hypotheses development

Green Marketing and Consumer Buying Behavior

Green marketing serves as a strategic tool through which firms communicate the environmental attributes of their products and practices. Within the TPB, marketing information shapes behavioral beliefs by influencing how consumers perceive the environmental benefits and consequences of their purchasing decisions. Eco-labeling provides structured information that reduces uncertainty about product environmental performance, while green branding builds broader perceptions of corporate environmental responsibility and trustworthiness. Both mechanisms can strengthen positive evaluations of green products and motivate environmentally responsible purchasing decisions. Prior research (Ali, 2021) (Das et al., 2024) generally reports a positive relationship between green marketing practices and green purchasing behavior, suggesting that when environmental signals are credible and understandable, consumers are more likely to act accordingly. Hence, the hypothesis formulated is as follows:

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H1: Green marketing positively influences consumer buying behavior.

Green Marketing and Environmental Knowledge

Environmental knowledge refers to a consumer's understanding of environmental issues and the ecological impact of products (Kim and Lee, 2023). Marketing communications, including eco-labels, environmental claims, and brand narratives, function as informational sources that educate consumers about environmental consequences. From a cognitive perspective, exposure to green marketing can enhance consumers' ability to recognize environmentally friendly products and evaluate their environmental performance (Das et al., 2024). In contexts where formal environmental education may be limited, marketing messages can play an important role in shaping environmental understanding. Hence, the hypothesis formulated is as follows:

H2: Green marketing positively influences environmental knowledge.

Environmental Knowledge and Consumer Buying Behavior

Within an extended TPB framework, knowledge acts as a cognitive enabler that supports informed decision-making (Ewe and Tjiptono, 2023). Consumers who understand environmental issues and product impacts are better equipped to translate environmental intentions into purchasing actions. According to Vijay et al. (Vijay et al., 2026), knowledge reduces ambiguity, increases perceived behavioral control, and strengthens confidence in selecting green alternatives. Empirical studies (Das et al., 2024) (Li, 2025) frequently identify environmental knowledge as a significant predictor of green purchasing behavior, particularly where consumers must rely on their own interpretation of environmental information. Hence, the hypothesis formulated is as follows:

H3: Environmental knowledge positively influences consumer buying behavior.

Environmental Concern and Consumer Buying Behavior

Environmental concern reflects an individual's awareness of environmental problems and emotional involvement in environmental protection (Nabivi, 2025). It represents an attitudinal orientation consistent with pro-environmental values. TPB suggests that favorable attitudes should lead to behavioral intentions; however, sustainability research highlights an attitude-behavior gap. According to Wijekoon and Sabri (Wijekoon and Sabri, 2021), consumers may express concern but fail to translate it into action due to price constraints, limited availability of green products, or uncertainty about claim credibility. Nevertheless, concern remains an important motivational factor that may encourage environmentally responsible purchasing under supportive conditions. Hence, the hypothesis formulated is as follows:

H4: Environmental concern positively influences consumer buying behavior.

Mediating Role of Environmental Knowledge

Green marketing may not influence behavior directly alone but also indirectly by enhancing consumers' environmental knowledge. When marketing communications increase understanding of environmental issues and product impacts, consumers become more capable of making informed purchasing decisions (Abbas et al., 2024). Knowledge therefore functions as a mechanism through which green marketing translates into behavior. Hence, the hypothesis formulated is as follows:

H5: Environmental knowledge mediates the relationship between green marketing and consumer buying behavior.

Mediating Role of Environmental Concern

Green marketing may also influence consumer behavior by stimulating concern for environmental issues. According to Reddy et al. (Reddy et al., 2023), environmental messages can heighten awareness of environmental problems and strengthen pro-environmental attitudes, which in turn encourage green purchasing behavior. Thus, concern can operate as an attitudinal pathway linking green marketing to behavior. Hence, the hypothesis formulated is as follows:

H6: Environmental concern mediates the relationship between green marketing and consumer buying behavior.

Conceptual Model

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Based on the theoretical foundation and hypothesis development, this study proposes a model that explains how green marketing influences consumer buying behavior through cognitive and attitudinal mechanisms. The model is grounded in TPB and extends it by incorporating environmental knowledge and concern as key psychological processes.

Green marketing is conceptualized as a higher-order construct composed of two distinct but related practices: ecolabeling and green branding. Eco-labeling is an informational mechanism that provides structured environmental information and reduces uncertainty regarding the environmental performance of products. In contrast, green branding represents a symbolic mechanism that builds perceptions of corporate environmental responsibility, credibility, and identity alignment.

The model proposes both direct and indirect pathways to achieve this. First, green marketing is expected to directly influence consumer buying behavior by shaping their beliefs about environmental benefits and strengthening their positive evaluations of green products. Second, green marketing is expected to influence behavior indirectly through two mediators. The first mediator, environmental knowledge, represents the cognitive pathway. Exposure to green marketing communications enhances consumers’ understanding of environmental issues and product impacts, enabling more informed and confident purchasing decisions to be made. The second mediator, environmental concern, represents an attitudinal approach. Green marketing messages may heighten awareness of environmental problems and strengthen pro-environmental values, which can motivate purchasing behaviors.

Thus, the conceptual model distinguishes between knowledge-based cognitive mechanisms and concern-based attitudinal mechanisms through which green marketing operates. By differentiating these pathways, the model allows for an examination of whether consumer behavior in an emerging market context is driven more by an understanding of environmental information or by general environmental concern.

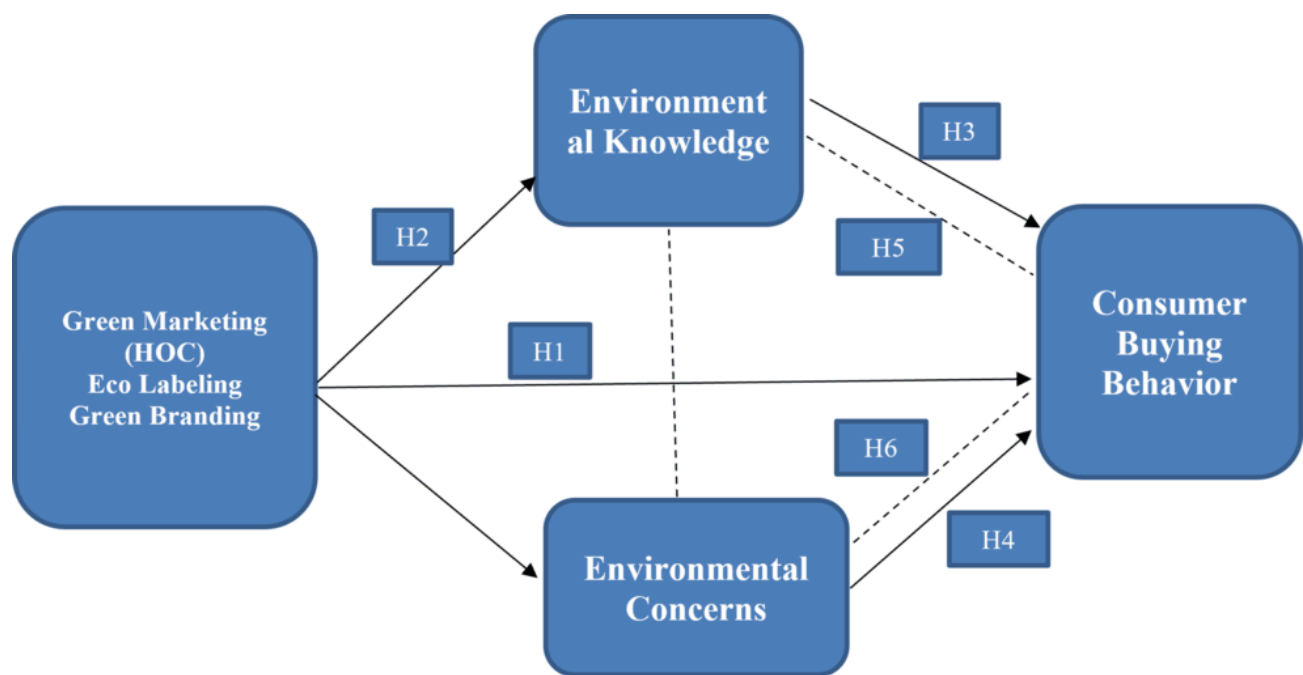


FIGURE 1: Conceptual framework of the study

Figure 1 illustrates the proposed conceptual framework, where green marketing influences consumer buying behavior directly and indirectly through environmental knowledge and concerns.

Research Method

Empirical framework

Research Design

This study employed a quantitative, cross-sectional survey design to examine the relationships among green marketing, environmental knowledge, environmental concern, and consumer buying behaviors. A survey approach was appropriate because this study investigated perceptions, cognitive factors, and self-reported behavioral tendencies, which are best captured through structured questionnaires.

Population and Sample

Data were collected from respondents from four universities in Addis Ababa, Ethiopia. University populations were selected as a theoretically relevant consumer segment rather than as representatives of the Ethiopian population. Educated urban consumers are more likely to encounter green marketing communications, possess baseline environmental awareness, and engage in formal market transactions, making them suitable for examining the cognitive mediation mechanisms in green purchasing behavior.

This study focuses on higher education institutions in Addis Ababa, Ethiopia's capital, given their greater awareness of the subject and of environmental pollution in the region. In this context, all university-level institutions, specifically four public entities, were selected. As the country continues to develop its economy and education system, people remain poorly informed about green marketing. People in Addis Ababa, on the other hand, are thought to be more aware of current climate change and the efforts made to address it, as they have access to global knowledge and technology.

In addition, being in the capital city and having connections to higher education can help students learn more about what is going on in the world, particularly in the city. Attending various local and international idea-exchange forums, workshops, and academic events has a positive effect in raising awareness of the environmental problems the planet faces. As Ma et al. demonstrated, educated individuals should be aware of environmentally friendly products and have greater knowledge of ecological matters (Ma et al., 2023). Consequently, this study focuses on the academic personnel at public universities in Addis Ababa. Addis Ababa University, Civil Service University, Addis Ababa Science and Technology University, and Kotebe University of Education are among the four universities in Addis Ababa. The evidence presented above prompted the researcher to focus on the academic staff at specific higher education institutions. The researcher contacted the human resources offices of each university to ascertain the size of their respective staffs, determining the total population of the study.

A total of 450 questionnaires were distributed using purposive sampling methods. Of these, 420 were returned, and 400 valid responses were retained after screening for completeness, resulting in a usable response rate of 88.9%. The sample size satisfies the recommended thresholds for Partial Least Squares Structural Equation Modeling (PLS-SEM), which requires adequate cases relative to model complexity. This study did not require formal Institutional Review Board (IRB) approval, as it did not involve clinical trials, vulnerable populations, or sensitive personal data. The research followed standard ethical research practices, including voluntary participation, informed consent, and confidentiality of responses. Informed consent was obtained from all participants prior to data collection. Participants were informed about the purpose of the study, their voluntary participation, and their right to withdraw at any time. Confidentiality and anonymity were strictly maintained throughout the study.

Measurement of Constructs

All constructs were measured using multi-item scales adapted from previously validated studies in the green marketing and consumer behavior literature. Minor wording adjustments were made to ensure the clarity of the context. All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Green marketing was modeled as a second-order construct composed of two first-order dimensions.

Eco-labeling-representing informational cues related to environmental certification and labeling.

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Green branding-representing perceptions of brand-level environmental responsibility and credibility.

Environmental knowledge captured respondents' understanding of environmental issues and product impacts, whereas environmental concern measured attitudinal concern about environmental protection. Consumer buying behavior reflects respondents' tendency to purchase environmentally friendly products.

Data Collection Procedure

The questionnaire was self-administered by the participants themselves. Participation was voluntary, and respondents were informed that the survey was conducted for academic purposes. Anonymity and confidentiality were assured to reduce the social desirability bias. Data were collected within a defined timeframe to maintain consistency in responses.

Common Method Bias

Because data for all constructs were collected from the same respondents at one point in time, common method bias was assessed. Harman's single-factor test was conducted, and the first factor accounted for less than 50% of the total variance, suggesting that common method bias is unlikely to threaten the validity of the findings.

Demographic Characteristics of Respondents

Descriptive statistics were used to summarize the demographic profile of the respondents. The demographic variables included gender, age, educational qualification, work experience, and marital status.

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Characteristic	Category	n	%
Gender	Male	330	82.5
	Female	70	17.5
Age (years)	24–34	130	32.5
	35–45	240	60
	45–55	30	7.5
Educational Level	MA/MSc	281	70.3
	PhD/Assistant Professor	119	29.7
Monthly Income (Birr)	5,000–10,000	49	12.3
	10,001–15,000	231	57.7
	15,001–20,000	66	16.5
	20,001–25,000	14	3.5
	Above 25,000	40	10
Marital Status	Married	286	71.5
	Single	93	23.3
	Widowed	21	5.2

TABLE 1: Demographic Characteristics of the Respondents (N = 400)

Source: Developed by the authors based on survey data.

According to Table 1, it indicates the gender distribution, indicating that the majority of respondents were male, accounting for 330 participants (82.5%), while female respondents constituted 70 participants (17.5%). This shows a clear dominance of male participants in the sample. Regarding age, most respondents were between 35 and 45 years old, representing 240 individuals (60%). This was followed by those aged 24–34 years, accounting for 130 respondents (32.5%). A smaller proportion, 30 respondents (7.5%), were in the 45–55 age category. This suggests that the sample largely consists of mid-career professionals. In terms of educational attainment, the majority of respondents held a master's degree (MA/MSc), comprising 281 participants (70.3%), while 119 respondents (29.7%) held a PhD or were at the rank of assistant professor. This indicates that the sample is highly educated, which is typical for studies involving academic or professional populations. The income distribution shows that most respondents earned between 10,001 and 15,000 Birr per month, accounting for 231 individuals (57.7%). This was followed by those earning between 15,001 and 20,000 Birr (66 respondents, 16.5%). Respondents earning between 5,000 and 10,000 Birr accounted for 49 individuals

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(12.3%), while 40 respondents (10%) reported earnings above 25,000 Birr. A smaller proportion, 14 respondents (3.5%), earned between 20,001 and 25,000 Birr. This indicates that the majority fall within the middle-income category. Regarding marital status, most respondents were married, accounting for 286 individuals (71.5%). Single respondents represented 93 individuals (23.3%), while 21 respondents (5.2%) were widowed. This suggests that the majority of participants were married.

Measurement model assessment

PLS-SEM was employed using a two-step approach, beginning with the evaluation of the measurement model before assessing the structural relationships.

Reliability

Internal consistency reliability was assessed using Cronbach's alpha and composite reliability (CR). All constructs exceeded the recommended threshold of 0.70, indicating an acceptable reliability.

Convergent validity

Convergent validity was evaluated using factor loadings and Average Variance Extracted (AVE). According to Table 2, all item loadings were above 0.70, and AVE values exceeded 0.50, demonstrating that the constructs explained a substantial portion of the variance in their indicators.

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Construct	Items	Loadings	Cronbach's Alpha	Composite Reliability (CR)	AVE
Eco-labeling	EL1	0.78	0.84	0.89	0.67
	EL2	0.82			
	EL3	0.85			
Green Branding	GB1	0.80	0.86	0.90	0.69
	GB2	0.83			
	GB3	0.86			
Environmental Knowledge	EK1	0.81	0.85	0.90	0.68
	EK2	0.84			
	EK3	0.82			
Environmental Concern	EC1	0.88	0.83	0.88	0.69
	EC2	0.81			
	EC3	0.83			
Consumer Buying Behavior	CBB1	0.82	0.87	0.91	0.71
	CBB2	0.86			
	CBB3	0.84			

TABLE 2: Construct Measurement and Reliability Thresholds: Loadings > 0.70, CR > 0.70, AVE > 0.50

Source: Developed by the authors based on survey data. AVE, Average Variance Extracted

Discriminant Validity

Discriminant validity was examined using both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. Tables 3 and 4 indicate that the square roots of the AVE for each construct were greater than the inter-construct correlations, and the HTMT values were below 0.85, confirming adequate discriminant validity.

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Construct	EL	GB	EK	EC	CBB
Eco-labeling (EL)	0.82				
Green Branding (GB)	0.58	0.83			
Environmental Knowledge (EK)	0.61	0.64	0.82		
Environmental Concern (EC)	0.49	0.53	0.56	0.80	
Consumer Buying Behavior (CBB)	0.62	0.66	0.71	0.59	0.84

TABLE 3: Discriminant Validity (Fornell–Larcker Criterion) Diagonal values = $\sqrt{AVE}$

Source: Generated by the authors using SmartPLS 4 from the study data. AVE, Average Variance Extracted

Constructs	HTMT Value
EL – GB	0.72
EL – EK	0.75
EL – EC	0.63
GB – EK	0.78
GB – CBB	0.81
EK – CBB	0.82

TABLE 4: HTMT Ratio Threshold: HTMT < 0.85

Source: Generated by the authors using SmartPLS 4 from the study data. HTMT, Heterotrait-Monotrait

Higher-Order Construct Assessment

Green marketing was specified as a higher-order construct formed by eco-labeling and branding. The loadings of these first-order constructs onto green marketing were significant, supporting the validity of higher-order constructs.

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Results And Discussion

Structural model assessment

After confirming the adequacy of the measurement model, the structural model was evaluated using PLS-SEM. The assessment focused on the path coefficients, explanatory power (R^2), effect sizes (f^2), predictive relevance (Q^2), and mediation effects.

Collinearity Assessment

Before testing the structural relationships, collinearity among the predictor constructs was examined using the Variance Inflation Factor (VIF) values. Table 5 indicates that all VIF values were below the recommended threshold of 5, indicating that multicollinearity did not threaten the estimation of the path relationships.

Path	VIF
GM → EK	2.10
GM → EC	2.05
GM → CBB	2.34
EK → CBB	2.18
EC → CBB	1.96
Threshold: VIF < 5	

TABLE 5: Collinearity Assessment

Source: Generated by the authors using SmartPLS 4 from the study data. VIF, Variance Inflation Factor

Path Coefficients and Hypothesis Testing

Bootstrapping with 5,000 resamples was used to evaluate the significance of the path coefficients.

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Hypothesis	Path	β	t-value	p-value	Result
H1	GM $\rightarrow$ CBB	0.32	5.41	<0.001	Supported
H2	GM $\rightarrow$ EK	0.61	12.08	<0.001	Supported
H3	EK $\rightarrow$ CBB	0.41	7.66	<0.001	Supported
H4	EC $\rightarrow$ CBB	0.19	3.24	0.001	Supported

TABLE 6: Structural Path Results

Source: Generated by the authors using SmartPLS 4 from the study data.

Table 6 shows that green marketing has a significant positive effect on consumer buying behavior, supporting H1. This indicates that eco-labeling and green branding together strengthen consumers' tendency to purchase environmentally friendly products.

Green marketing also had a significant positive influence on environmental knowledge, supporting H2. This confirms that green marketing communication acts as an informational tool that enhances consumers' understanding of environmental issues and product impacts.

Environmental knowledge has a significant positive effect on consumer buying behavior, supporting H3. This suggests that knowledgeable consumers are better able to translate their environmental understanding into purchasing decisions.

Environmental concern was also positively related to consumer buying behavior, supporting H4. However, the magnitude of this effect was smaller than that of environmental knowledge, indicating an attitude-behavior gap.

Coefficient of Determination (R^2)

Based on Table 7, the model explains a substantial proportion of the variance in the endogenous constructs. Green marketing accounts for meaningful variance in environmental knowledge, whereas green marketing, environmental knowledge, and environmental concern jointly explain a moderate level of variance in consumer buying behavior. These values indicate an acceptable explanatory power for behavioral research.

Endogenous Construct	R^2	Interpretation
Environmental Knowledge	0.37	Moderate
Consumer Buying Behavior	0.58	Substantial

TABLE 7: Coefficient of Determination (R^2)

Source: Generated by the authors using SmartPLS 4 from the study data.

Effect Size (f^2)

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Table 8 indicates that green marketing has a strong effect on environmental knowledge and a moderate effect on consumer buying behavior. Environmental knowledge has a moderate effect on consumer buying behavior, whereas environmental concern has a small but meaningful effect. This pattern reinforces the importance of cognitive factors over purely attitudinal factors in this study's context.

Path	f^2	Effect Size
GM → EK	0.58	Large
GM → CBB	0.14	Moderate
EK → CBB	0.22	Moderate
EC → CBB	0.06	Small

TABLE 8: Effect Size (f^2)

Source: Generated by the authors using SmartPLS 4 from the study data.

Predictive Relevance (Q^2)

According to Table 9, the blindfolding procedures produced Q^2 values greater than zero for all endogenous constructs, confirming that the model has predictive relevance.

Construct	Q^2
Environmental Knowledge	0.24
Consumer Buying Behavior	0.31

TABLE 9: Predictive Relevance (Q^2) $Q^2 > 0$ indicates predictive relevance

Source: Generated by the authors using SmartPLS 4 from the study data.

Mediation analysis

The mediating roles of environmental knowledge and concern were examined using bootstrapping procedures to test indirect effects.

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Hypothesis	Indirect Path	β	t-value	p-value	Mediation Type
H5	GM $\rightarrow$ EK $\rightarrow$ CBB	0.25	6.10	<0.001	Partial
H6	GM $\rightarrow$ EC $\rightarrow$ CBB	0.12	2.98	0.003	Partial

TABLE 10: Indirect Effects

Source: Generated by the authors using SmartPLS 4 from the study data.

Mediation through Environmental Knowledge

Based on Table 10, the indirect effect of green marketing on consumer buying behavior through environmental knowledge was significant, supporting H5. As both the direct and indirect effects remained significant, environmental knowledge served as a partial mediator. This indicates that green marketing influences behavior not only directly but also by enhancing consumers' understanding of environmental issues. This finding highlights that knowledge is a key mechanism through which green marketing strategies translate into purchasing behavior.

Mediation through Environmental Concern

Similarly, Table 10 shows that the indirect effect of green marketing on consumer buying behavior, via environmental concern, is significant, supporting H6. However, the strength of this mediation is weaker than that of the knowledge pathway. Therefore, environmental concerns function as a secondary attitudinal mechanism linking green marketing to behavior.

Type of Mediation

As both mediators transmit part of the effect while the direct path remains significant, the model demonstrates complementary partial mediation. As per Table 11, green marketing influences behavior both directly and indirectly through cognitive and attitudinal pathways.

Path	Direct Effect	Indirect Effect	Total Effect
GM $\rightarrow$ CBB	0.32	0.37	0.69

TABLE 11: Total Effects

Source: Generated by the authors using SmartPLS 4 from the study data.

Discussion

This study examined how green marketing influences consumer buying behavior through cognitive and attitudinal mechanisms in an emerging market. The findings confirm that green marketing, represented by eco-labeling and green branding, plays a significant role in shaping environmentally responsible purchase behavior. This supports earlier research showing that environmental marketing signals reduce information asymmetry and increase consumer trust in

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green products (Dangelico and Vocalelli, 2017) (Papadas et al., 2017). Similar positive effects of green marketing on purchasing behavior have been observed in both developed and developing economies (Joshi and Rahman, 2019) (Ogiemwonyi, 2022).

A key finding of this study is the significant role of environmental knowledge. Green marketing significantly enhances consumers' understanding of environmental issues, and this knowledge strongly predicts their buying behavior. This aligns with studies identifying knowledge as a critical driver of green consumption, as it improves consumers' ability to evaluate environmental claims (Antczak, 2024), (Baltaci et al., 2024), and (Lopes et al., 2024). The results also support TPB extensions, suggesting that cognitive awareness strengthens perceived behavioral control and improves the translation of intention into behavior (Khalid et al., 2022).

Environmental concerns also influence consumer buying behavior, but their effect is weaker than that of environmental knowledge. This finding is consistent with the well-documented attitude-behavior gap in sustainability research (Joshi and Rahman, 2019) (Johnstone and Lindh, 2018). Many consumers express environmental concerns but fail to act because of price barriers, lack of trust, or limited product availability (De Canio et al., 2021). Similar patterns have been reported in emerging markets, where concerns exist, but purchasing decisions remain economically driven (De Canio et al., 2021). Mediation analysis further clarifies these mechanisms. Environmental knowledge is the primary pathway through which green marketing translates into consumer behavior. This finding supports research emphasizing the informational role of eco-labels and environmental communication (Jaiswal et al., 2021) (Vijay et al., 2026). In contrast, environmental concern serves as a secondary pathway, aligning with studies showing that emotional or value-based appeals alone are insufficient to ensure green purchasing (Schwartz et al., 2020). Overall, the results suggest that consumers respond more strongly to clear information than to general environmental appeals in emerging market contexts.

Theoretical Contributions

This study makes several important theoretical contributions to the literature. First, it extends TPB by incorporating environmental knowledge and concern as distinct psychological mechanisms. The findings demonstrate that cognitive (knowledge) and attitudinal (concern) factors do not operate equally, offering a more nuanced understanding of green purchasing behavior. Second, this study differentiates between the informational (eco-labeling) and symbolic (green branding) dimensions of green marketing within a higher-order construct. This study contributes to the green marketing literature by clarifying how different marketing tools jointly influence consumer psychology. Third, this study provides empirical evidence from an emerging market context, which remains underrepresented in sustainability research. The findings show that cognitive mechanisms are particularly important in developing environmental literacy and institutional trust.

Practical Implications

The results offer clear guidance for managers and policymakers. Organizations should prioritize clarity of information in green marketing. Eco-labels must be credible, easy to understand, and supported by transparent claims. Overly technical or ambiguous labels may reduce their effectiveness. Green branding strategies should focus on building long-term environmental credibility rather than short-term promotional claims. The consistency between corporate environmental actions and marketing messages is critical to avoid consumer skepticism. For policymakers, the findings highlight the need to strengthen environmental education and standardized labeling systems. Regulatory frameworks that verify environmental claims can increase consumer trust and improve the effectiveness of green marketing. Universities and other educational institutions can also play a role by integrating sustainability education into their curricula and strengthening the knowledge base supporting sustainable consumption.

Limitations and future research

This study has some limitations. First, data were collected from university populations, which may limit the generalizability of the findings to the broader population. Future studies should also include diverse demographic groups and rural consumers. Second, the cross-sectional design prevented the examination of behavioral changes over

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time. Longitudinal research could provide deeper insights into how green marketing influences behavior over the long term. Third, self-reported measures may be affected by a social desirability bias. Future research could incorporate experimental designs or actual purchase data to address this limitation. Finally, additional psychological and contextual factors, such as price sensitivity, product availability, and trust in environmental claims, should be integrated into future models to more comprehensively explain the attitude-behavior gap.

Conclusions

This study investigated how green marketing influences consumer buying behavior by examining the mediating roles of environmental knowledge and environmental concern within an extended TPB framework. The findings demonstrate that green marketing, through eco-labeling and green branding, significantly shapes consumer purchasing behavior both directly and indirectly. A key conclusion is that environmental knowledge plays a stronger role than environmental concern in driving green purchasing behavior. While consumers may express concern for environmental issues, it is their understanding of environmental information that more effectively translates into action. This highlights the importance of cognitive mechanisms in sustainable consumption, particularly in emerging market contexts where environmental literacy and institutional trust are still developing. The study confirms that green marketing is not merely a promotional tool but an educational mechanism that can shape consumer awareness and decision-making. By distinguishing between informational and attitudinal pathways, the research provides a more refined explanation of how marketing communication contributes to sustainable consumption behavior.

Overall, the findings emphasize that promoting sustainable consumption requires more than emotional appeals; it requires credible, clear, and informative communication that enhances consumers' environmental knowledge. Strengthening these informational mechanisms can help bridge the gap between environmental concern and actual purchasing behavior.

Appendices

Questionnaire

Dear respondent,

This survey is designed for a research project investigating the relationship between "Green Marketing Practices" and consumer buying behavior in Ethiopia. The study examines the role of environmental knowledge and environmental concern as a mediator. The answers you provide to the questions are vital for the study to possess value. Please be aware that your responses to the inquiries are exclusively intended for academic purposes and will be handled with confidentiality. Finally, I want to express my deep gratitude for your consistent cooperation.

General guidelines

- No need of writing your name.
- Please put a tick mark "X" inside the box you think reflects your opinion
- Don't hesitate to contact the researcher for any doubt you may face while filing the questionnaire.

Definitions of Phrases in Practical use:

Kindly be aware that the below terminology is employed within a specific context and are defined as follows.

1. **Green Marketing:** is the development and promotion of products that are presumed to be environmentally safe (i.e., designed to minimize negative effects on the physical environment or to improve its quality) (AMA 2023).
2. **Green products:** that has been designed to have a minimal impact on the environment (AMA 2023).
3. **Environment:** refers to the air, water, and land on which people, animals and plants live.

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Thank you once again!!

Part I: Demographic Details of Respondents

1. Gender

☐ Male ☐ Female

2. Age Group

☐ 24-34 years

☐ 35-45 years

☐ 45-55 years

☐ 55 years and above

3. Monthly Income (Birr)

☐ 5,000-10,000 Birr

☐ 10,001-15,000 Birr

☐ 15,001-20,000 Birr

☐ 20,001-25,000 Birr

☐ Above 25,000 Birr

4. Highest Educational Qualification

☐ BA/BSc

☐ MA/MSc

☐ PhD/Assistant Professor

☐ Above PhD/Assistant Professor

5. Marital Status

☐ Married

☐ Single

☐ Divorced

☐ Widowed

Part II: General Information

The subsequent inquiries have been prepared to evaluate the factors being examined in this study. Each question is evaluated using a 5-point Likert scale, where 1 signifies strong disagreement, 2 indicates disagreement, 3 represents neutrality, 4 indicates agreement, and 5 represents strong agreement. Please indicate your level of agreement with the following statements by inserting a check (✓) mark in front of the statement that most accurately represents your opinion.

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S. No.	ITEM	Level of Agreement				
	ECO-LABELING (EL)	1	2	3	4	5
EL1	I always buy eco-labeled products					
EL2	I always notice whether the product carries eco-labels or not					
EL3	If an eco-label product is not available, I postpone my purchase					
	GREEN BRANDING (GB)	1	2	3	4	5
GB1	I can quickly recall the green image of green brands					
GB2	Green brands are safe for the environment					
GB3	Green Brands provide better quality than other brands					
	ENVIRONMENTAL CONCERN (EC)	1	2	3	4	5
EC1	Ethiopia's environment is my major concern					

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EC2	I would say I am emotionally involved in environmental protection issues in Ethiopia					
EC3	I am worried about the worsening quality of environment in Ethiopia					
	ENVIRONMENTAL KNOWLEDGE (EK)	1	2	3	4	5
EK1	I am very knowledgeable about environmental issues					
EK2	I know how to select products and packages that reduce the amount of landfill waste					
EK3	I understand the environmental phrases and symbols on product package					
	CONSUMER PURCHASING BEHAVIOR (CPB)	1	2	3	4	5
CPB1	When I learn about the negative and harmful impact a product has in					

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	the environment, I stop buying it					
CPB2	In case there is an alternative, I prefer products which cause less pollution.					
CPB3	Choosing between two products, I always buy the one which has the minimum impact on people and the environment					

TABLE 12: Questionnaire

1. Please provide some more details regarding the universities chosen for the sample size.

This study focuses on higher education institutions in Addis Ababa, Ethiopia’s capital, given their greater awareness of the subject and of environmental pollution in the region. In this context, all university-level institutions, specifically four public entities, were selected. As the country continues to develop its economy and education system, people remain poorly informed about green marketing. People in Addis Ababa, on the other hand, are thought to be more aware of current climate change and the efforts made to address it, as they have access to global knowledge and technology.

In addition, being in the capital city and having connections to higher education can help students learn more about what is going on in the world, particularly in the city. Attending various local and international idea-exchange forums, workshops, and academic events has a positive effect in raising awareness of the environmental problems the planet faces. As Ma et al. (Ma et al., 2023) demonstrated, educated individuals should be aware of environmentally friendly products and have greater knowledge of ecological matters. Consequently, this study focuses on the academic personnel at public universities in Addis Ababa. Addis Ababa University, Civil Service University, Addis Ababa Science and Technology University, and Kotebe University of Education are among the four universities in Addis Ababa.

The evidence presented above prompted the researcher to focus on the academic staff at specific higher education institutions. The researcher contacted the human resources offices of each university to ascertain the size of their respective staffs, determining that the total population of the study.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Acquisition, analysis, or interpretation of data: Dawit Tekletsadik Haileamanuel

Drafting of the manuscript: Dawit Tekletsadik Hailemanuel, Bharat Bhushan Singla

Critical review of the manuscript for important intellectual content: Dawit Tekletsadik Hailemanuel, Bharat Bhushan Singla

Concept and design: Bharat Bhushan Singla

Supervision: Bharat Bhushan Singla

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. **Animal subjects:** All authors have confirmed that this study did not involve animal subjects or tissue. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Data Availability Statements

The datasets (and/or code) supporting this study are available from the corresponding author upon reasonable request.

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