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Bridging the gap: The nexus of green trust mediating role, green innovation, environmental knowledge, and consumer purchase intentions from an educational perspective

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Abstract
This paper examines the influence of environmental knowledge and green innovation on their intention to purchase green products, and the mediating role of green trust. Grounded in the Knowledge-Attitude-Behavior (KAB) model, this research explores how cognitive (environmental knowledge), contextual (green innovation), and psychological (green trust) factors interplay to shape sustainable consumption decisions. Data were collected from 369 undergraduate students at the University of Punjab via an online survey and analyzed using SEM-AMOS. The results indicate that environmental knowledge, as well as green innovation, has a direct positive and significant impact on consumer purchase intentions. In addition, green trust mediated the connection between environmental knowledge and purchase intentions, and it also mediated the connection between green innovation and purchase intentions in a partial manner. The effect of knowledge and innovation on consumer behavior partly flows through the trust that consumers put on the validity of the green claims and practices. Such findings are intended to emphasize the serious role of consumer-trust establishment and the increment of environmental awareness and creation of innovation in order to achieve practical green marketing approaches. The paper adds to the theoretical knowledge of what green consumer behaviors entail and provides practical insight on what businesses, educators and policymakers can do to support green behavior.

Keywords: Green Trust, Green Innovation, Environmental Knowledge, Consumer Purchase Intention, Knowledge-Attitude-Behavior Model, Mediation Analysis

1. Introduction

In the 21st century, environmental sustainability has emerged as one of the most pressing global issues. Rapid industrialization, urban growth, and technological progress have driven a rise in consumer demand. Although these developments have greatly enhanced the quality of life and economic growth, they have also caused severe environmental damage; consequently, more consumers are now drawn to green products. Consumers are no longer guided only by price or quality; instead, environmental awareness and ethical concerns are increasingly influencing purchasing choices (Kamalanon et al., 2022). Awareness of what leads to green product consumer behavior is critical to companies intending to achieve sustainability goals and objectives, and policymakers who want to promote green consumption. This paper reviews the green consumer behavior enrichment through exploring environmental knowledge, green innovation, and the mediating role of green trust (Long et al., 2024).

The paper refers to the Knowledge-Attitude-Behavior (KAB) model, which provides the conceptual framework of thought of green consumer behavior. As per the KAB framework, pro-environmental behaviors are conditional upon the establishment of positive attitudes towards sustainable practice that is prompted by rise in environmental knowledge. Through this model, the research investigated how these three constructs of environmental knowledge, availability of green products and green trust were compound together in influencing consumer attitudes and ultimately resulting in buying green products. According to Khan et al. (2022), green trust is the additional

predicted crucial variable in the determination of green purchase behavior. The standard term describing consumer belief in the precision and trustworthiness in green products, green brand or green statements of brands is known as green trust. However, there exists a correlation between green innovation and environmental knowledge with green purchase behaviors; all of which are mediated by green trust to help in consumer confidence in environmentally sustainable products and corporate environmental declarations. Furthermore, one of the key elements of consumer behavior is environmental knowledge, or the green innovation affects consumer behavior (Khan et al., 2022). Environmental knowledge is an important factor in consumer behavior, raising awareness of green issues, which leads to informed green buying behavior, while green innovation also plays a significant role in drawing consumers through the creation of environmentally friendly products that fit changing environmental values. Likewise, green trust is believed to play a crucial mediating role in this relationship. The same way environmental knowledge equips consumers to make informed and sustainable decisions in their purchasing, it also empowers employees to innovate green and embrace practices that are friendly to the environment at the workplace (Alshammari et al., 2023). Knowledge is very essential in providing green behavior within the organization as well as consumer markets in which knowledge improves awareness and confidence of green products. The positivity of the connection between environmental knowledge defending the extra- and in-role green behaviors is also confirmed by research as the guide to humble behaviors, which confirms that motivated and ecologically-aware workers require environmental knowledge as the guarantee to follow the intentions (Martinez-Martinez et al., 2023). On the same note, the environmental knowledge creates confidence in green claims and in buying sustainable products, about the context of consumer behavior. Environmental knowledge has a positive reinforcing process by making green action seem more effective, stimulating new green behavior to be tried again in the workplace or marketplace. Green innovation demonstrates a direct and positive relationship with consumer sustainable outcomes, as it enables organizations to develop eco-friendly products, services, and processes that not only meet evolving consumer expectations but also reinforce green trust and employee-driven environmental initiatives (Zhong & Um, 2025; Camacho et al., 2024). By embedding innovation into environmental strategies, firms stimulate both internal green behavior and external consumer engagement, creating a cohesive cycle of consumer green sustainability behavior. Furthermore, while individual variables such as knowledge, innovation, and trust have been studied extensively, their combined and interactive effects remain underexplored. Few studies have developed comprehensive models that account for the interplay between cognitive, affective, and contextual factors influencing green consumer behavior. The role of green trust as a mediator, for example, is rarely examined in the context of knowledge and innovation. Likewise, green innovation is often assumed rather than measured, leaving a gap in understanding the practical barriers that consumers face (de Sio et al., 2022). This paper serves as a contribution to the body of knowledge on green consumer behavior through consideration of psychological and situational issues within a broad framework, illustrating how outside influences, such as green product innovation and environmental information, affect the inner judgments, such as green trust, which determines final buying decisions. It is based on Knowledge-Attitude-behavior to underpin the need to engage in consumer trust-building behavior such as being transparent, employing ethical marketing and third-party certifications, as well as the significance of having the right products to assist in sustainable decision-making. To the business, this implies not only being innovative but also making green products accessible and credible. Meanwhile, policymakers can enable green consumption by enforcing prohibitions against intentionally misleading statements and promoting awareness and incentives to encourage

sustainable production. Moreover, the study explicitly considers the situation of a developing economy, thereby adding value to the international discussion on sustainability with insights that are both locally and globally applicable.

2. Literature Review

2.1 Knowledge-Attitude-behavior Model

Environmental knowledge and green innovation are going to be studied for their effects on consumer behavior using the (Hines et al., 1987) KAB model. Apart from the KAB model, it offers meaningful accounts of consumer behavior. According to the KAB model, one's knowledge (K) of a notion influences one's attitudes towards that notion, which further has an impact on one's behavior. This linear process underscores that knowledge is a precursor to attitudinal and behavioral change. Previous scholars have applied the KAB model in diverse contexts, such as environmentally friendly behavior (Khan et al., 2022; Long et al., 2024), which was focused on the link between ecologically friendly consumer behavior, attitudes, and environmental knowledge. Furthermore, Hung et al. (2024) research on green programs invites probing the difference between knowledge and behavior. The current research utilizes the KAB model in explaining how employees' green trust acts as a mediator between independent variables and dependent variables. Employees' knowledge and attitude of trust towards favorable consumer behavior, i.e., in-role and extra-role green behavior's, creates an environment of responsibility towards the environment. Thus, the KAB model provides theoretical backing to the concept that increasing the knowledge of employees about the environment, green innovation and consumer behavior necessary to build a pro-environmental workplace culture (Camacho et al., 2024).

2.2 Environmental knowledge

Environmental knowledge is an individual's awareness and comprehension of environmental problems and the resulting consequences on their behavior (Kollmuss & Agyeman, 2002). It constitutes the knowledge basis for green buying behavior and expresses consumers' ability to make knowledge-driven choices regarding environmentally friendly products. Existing literature has demonstrated a strong positive correlation between environmental knowledge and the probability of buying green products (Mostafa, 2007; Taufique et al., 2016). More specifically, Taufique et al. (2016) highlight that consumers who have higher environmental literacy are likely to embrace greenness in purchasing activities. Yet, some research warns that simple knowledge might not necessarily lead to action, referring to the widely recognized "knowledge–behavior gap" (Vermeir & Verbeke, 2006). The gap implies that consumers might signify concern for the environment and hold high-level knowledge, yet their environmental consciousness does not necessarily result in green consumption. Perceived cost, skepticism regarding green labels, or unavailability may hinder behavior. Therefore, environmental awareness is a prerequisite but insufficient in predicting green buying behavior. Given the modest levels of environmental education and public awareness campaigns in Pakistan, knowledge's role becomes even more pivotal (Ali et al., 2020).

2.3 Green Innovation

Green innovation can be defined as a loop of doing and creating products, services, and processes that are less environmentally harmful and improve sustainability. Various scholars have offered definitions of green innovation over the years (Hossain et al., 2024; Zhao & Bai, 2021). Green innovation entails creating new ideas and stimulating creativity in products, services, processes, and procedures. Green innovation strongly encourages sustainable consumption through empowering consumers to make environmentally and financially sound decisions. Yet, whether green innovation is successful in changing consumer behavior hinges on consumer awareness,

perceived credibility, and the degree to which innovations are adapted to local needs and interests. How the use of green innovation practices persuades consumers that it enhances environmental quality is an area of research that is grey. Therefore, green innovation tends to be limited to urban economies or particular sectors within developing nations, e.g., Pakistan, where infrastructure development and awareness remain in an embryonic stage (Shahbaz et al., 2025). Furthermore, green innovation acts as a catalyst for supply-side transformation and facilitator of attitudinal and behavioral changes, assuming trust, awareness, and accessibility are consistent with them.

2.4. Green Trust

Green trust refers to the willingness of consumers to trust a product or brand in anticipation of it meeting environmental requirements and assertions (Ha et al., 2022). Trust is a critical aspect of alleviating perceived risk, particularly in the case of green products where the quality and functionality will not always be self-evident. Customers usually trust outside cues like certification, reputation of the brand, and openness in labeling to determine if a product is actually green (Zhang et al., 2025). In developing nations like Pakistan, where there is less regulatory control, greenwashing—where companies overstate or misrepresent their environmental credentials—is increasingly emerging as an issue (Zhao & Bai, 2021). Therefore, trust becomes even more significant in determining consumer behavior. Green trust was, by Vinoth (2024), a mediating variable between environmental awareness and green consumption behavior. It determines whether consumers respond to their perceptions and awareness or not, translating positive attitudes into actuality. Furthermore, trust can increase the value of green innovations perceived by consumers. When customers trust a company's environmental declarations, they are more open to paying more or modifying product features, which usually come with green products (Li et al., 2023). Thus, building green trust is crucial for companies that want to place themselves in the green market effectively.

2.5 Consumer Purchase Behavior

Consumer buying behavior, the dependent variable in this research, is the choices and activities involving the choice and purchase of green products. It is determined by an array of cognitive (knowledge), affective (trust), and contextual (availability) variables. According to the KAB model, consumer buying behavior is considered to be a reaction to external stimuli (e.g., product innovation and knowledge) processed via internal evaluative processes (e.g., trust). Green consumerism in Pakistan remains in the early stages; a number of hindrances hinder the large-scale take-up of green products (Ullah et al., 2022). Price responsiveness, traditional cultures, and poor access remain the main hindrances. Recent evidence, however, points towards rising environmental consciousness, particularly among younger and urban dwellers (Ahmed & Ahmad, 2018). Knowledge of the interaction of green purchase behavior antecedents is essential to marketers and policy-makers in developing sustainable green strategies.

2.5.1 Development of Hypothesis

2.5.2Consumer Behavior and Environmental knowledge

Environmental knowledge is a building block in the construction of environmentally sound behavior. It involves the mental perception an individual possesses regarding environmental issues, their causes, effects, and possible solutions, especially in terms of consumption and lifestyle (Sadiq et al., 2021). An environmentally conscious consumer is more likely to assess the environmental footprint of their consumption behaviors, hence changing their preferences towards more environmentally friendly options. There have been several empirical studies that have shown evidence of a positive relationship between environmental knowledge and green product purchase behavior of consumers (Asif et al., 2023; Zhang et al., 2021). Alhamad et al. (2023) claim that the

consumers having greater environmental knowledge are more conscious of environmental issues like global warming, pollution, and depleting natural resources and are therefore more inclined to buy products in line with sustainable values. Likewise, Riskos et al. (2021) concluded that consumers with environmental knowledge were highly more likely to buy green products. Therefore, Moslehpour (2023) concluded that environmental knowledge highly explained attitudes and intentions for green consumerism. Nevertheless, knowing environmental degradation caused by unsustainable consumption enhanced moral duty and green consumerism. In addition, García-Salirrosas et al. (2024) pointed out that in emerging economies such as Pakistan, environmental awareness has a significant effect on green consumerism, especially among younger, educated consumers. Therefore, the research found that enhanced awareness and knowledge of environmental concerns have a major impact on consumers' intent to engage in green behaviors, especially on purchasing environmentally friendly products. Nonetheless, in the case of developing countries such as Pakistan, structural impediments like scarce green product availability and weak enforcement of regulations further complicate the situation (Ullah et al., 2021). Asif (2023) concisely summarizes that knowledge of the environment plays an important role in the formation of green purchase intentions and behavior, especially supported by facilitatory contextual factors like product trust, accessibility, and facilitatory societal norms. Hence, the following hypothesis is suggested:

H1: There is a significant and positive relationship between environmental awareness and consumer purchase Intention.

2.5.3 Green Innovation and Consumer Behavior

Consumer behavior involves the way people, groups, and organizations behave, how they purchase goods and services, and how the process satisfies their want and need (Šostar et al., 2023). The concept is essential in prompting firms to embrace green technologies and practices, hence attracting those consumers who are environmentally aware. In recent years, the growing global awareness of environmental issues, including climate change, pollution, and resource depletion, has significantly contributed to the increasing importance of green consumer behavior. Accordingly, enterprises are increasingly focusing on green innovation behaviors—such as eco-friendly product design and green marketing strategies—as these are strongly correlated with consumers' green purchase intention (Šostar et al., 2023)

Green innovation is the process undertaken by firms to reduce environmental damage by innovating in product design, manufacturing processes, and marketing approaches. Such actions tend to appeal to environmentally conscious consumers and can be a major determinant of their shopping decisions. For instance, brand activities like recyclable packaging, energy-efficient product design, or carbon-neutral manufacturing tend to promote the brand as environmentally friendly (Barbu et al., 2022). Consumers' lifestyles, traditions, trends, desires, and needs are always changing, while consumer behavior tends to be dynamic. Marketing also has an active part to play in this process. As Nassè (2021) highlights, sustainability and environmental values communicated through innovative marketing that emphasize a brand's commitment to the green can positively affect the consumer's attitude. Transparent information, certifications of environmental quality, and green brands facilitate trust and the appeal for consumers' moral values, thereby underpinning green purchasing behavior.

Thus, on both theoretical and empirical grounds, it is not unreasonable to assume that green innovation, whether in product development or marketing communications, significantly supports enhancing green consumer conduct. This presumption supports the study's first hypothesis (H1), according to which, a firm's green innovation activities have a positive impact on consumers'

purchasing intentions for ecologically friendly products. The better a brand is able to integrate and communicate green innovation strategies, the higher the possibility that consumers would exhibit higher levels of green purchase intentions. Hence, it was hypothesized that:

H2: Green innovation is positively and significantly related to consumer purchase intention.

2.5.4 Green trust, Environmental knowledge and Consumer Behavior

Green trust and environmental knowledge are both key determinants that have an impact on consumers' behavior towards green products, especially in emerging economies like Pakistan (Asif et al., 2023). Environmental knowledge provides consumers with the cognitive perception required to understand environmental concerns, evaluate the sustainability of the product, and make appropriate choices in purchasing. Consumers who know about issues like pollution, global warming, and environmental destruction are likely to choose environmentally friendly products over conventional ones (García-Salirrosas et al., 2024). However, evidence indicates that it is not just knowledge that results in action because of the recognized attitude–behavior gap or knowledge–action gap (Zhang et al., 2021). This gap is created when consumers, being informed and favorable about green products, do not pursue environmentally friendly purchases due to uncertainty regarding product credibility or a lack of supporting infrastructures. Here, green trust comes into play with an important enabling function. Green trust denotes consumers' belief that a company or product actually lives up to environmental claims and standards (Badhwar et al., 2024). Trust minimizes perceived risk and uncertainty associated with green buying, particularly in countries such as Pakistan where greenwashing occurs and environmental claim regulations are weak. Consumers are likely to translate their environmental information into action when they believe the green products are genuine, persuasive, and morally manufactured. Green trust not only enables behavior but also strengthens the effect of knowledge on choice. Therefore, in case of trust, consumers are more likely to translate knowledge about the environment into actual purchasing decisions (Alhamad et al., 2023). The relationship between knowledge and trust therefore is synergic. Knowledge of the environment shapes consumer attitudes, while green trust translates those attitudes into action. This relationship adheres to the Knowledge-Attitude-Behavior Model, where knowledge informs attitudes, and trust strengthens perceived control over behavior—two events required for creating positive green consumer behavior. For developing countries such as Pakistan, where greenwashing concerns are rife and consumer consciousness is on the rise, green trust serves as a bridge between behavior and attitudes (Ghaffar et al., 2023). Analogously, knowledge is a stimulus, trust is an internal assessment process, while consumer behavior is the reaction (Busalim et al., 2022). In Pakistan, while environmental awareness is picking up but green brand trust is still in the developing phase, both drivers (Salam et al., 2022) are very important to enhance. Brands need to focus on transparency, third-party certification, and clear environmental communication to develop trust, and policymakers need to encourage environmental education and green labelling regulations to enhance the level of consumer awareness (Zupok et al., 2025). When these factors are in line, green trust and environmental knowledge can play a crucial role in changing consumer behavior towards more eco-friendly consumption habits. Therefore, it was hypothesized that:

H3: Green trust partially mediates the relationship between environmental knowledge and consumer behavior.

2.5.5 Green trust, Green Innovation, and Consumer Behavior

Green innovation is the creation and application of new environmentally friendly goods, services, or procedures with the purpose of minimizing environmental degradation and encouraging sustainability (Testa et al., 2019). As environmental issues persist around the world, organizations

are responding by investing in green innovations to satisfy the demand for sustainable options by consumers and in line with worldwide sustainability targets. But the success of green innovations in the marketplace also depends not only on their environmental advantages but also on consumer acceptance and buying behavior (Chen, 2009).

Here, green trust comes to play a crucial role. Green trust refers to consumers' faith in the sincerity and credibility of a firm's environmental claims and its sustainability commitment (Sharma, 2020). Once customers have reason to trust a company is truly engaged in green innovation, they will trust the brand and its products more, thereby becoming more willing to purchase that green product (Paul et al., 2016). Therefore, green trust is just a psychological gap that translates the environmental activities of a company into consumer behaviour.

The mediating role of green trust between green marketing strategies and consumer behavior is favored by empirical evidence. As in the case of Sharma (2020), the authors established green trust to have a significant mediating effect of the effects of green advertising on purchase intention. Similarly, the study by Nasir and Jaber (2023) identified that green trust mediates the influence of environmental knowledge on green purchasing behavior in the Pakistani market, making it to be applicable in developing economies profoundly characterized by the lack of trust concerning the corporate environmental pledges.

This line of reasoning, which has been made based upon these conclusions, implies that green trust acts also as the intervenor between green innovation and green consumer behavior. This is the hypothesis, that, even though a green innovation is expected to influence consumer behaviors directly by providing them with more sustainable alternatives, it operates merely as an undercarriage through building consumer confidence that the brand is environmentally friendly. The two-fold mechanism is especially relevant in economies like Pakistan, where consumers have a weak belief in green statements and expect strong evidence of corporate sustainability practice (Khan et al., 2021).

H 4: The correlation between green innovation and consumer behavior is mediated partially by green trust.

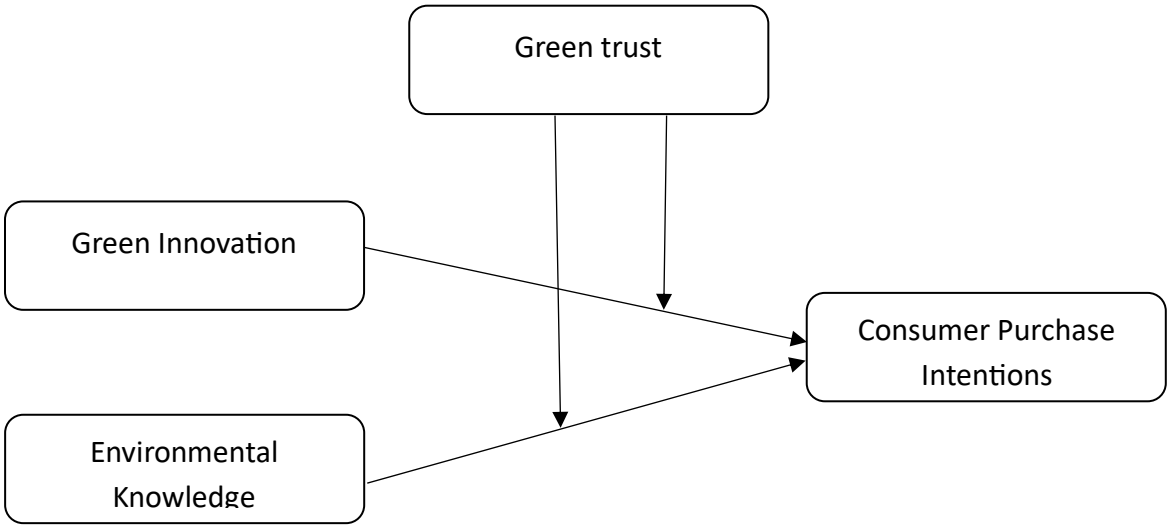

Figure 1: Conceptual Framework

2. Methodology

3.1. Sampling and data collection procedure

A convenience sampling technique was selected in the study, which suits an exploratory research design and is in line with the application of SEM-AMOS. It was an adequate approach to the studies that required perceptions and opinions that are based on large populations and non-random samples because the methods are capable of a substantive bootstrapping analysis and can help to make a better inference, even though the distribution is limited (Hair et al., 2020; Sarstedt et al., 2019). Sample measures entailed the participation of 369 undergraduate students at the University of Punjab in the period from September 2024 to December 2025 via online survey to guarantee the availability and accessibility to a large geographical spectrum (McInroy, 2016).

3.2. Variables and measurement

3.2.1 Green Trust

Chen (2010) defined "green trust" as "a willingness to depend on a product, service, or brand based on the belief or expectation resulting from its credibility, benevolence, and ability about its environmental performance". Furthermore, we refer to Chen (2010) to measure green trust, and its measurement includes five items: (1) You believe that this product's environmental image is generally reliable. (2) You think that this product's environmental functionality is generally dependable.

3.2.2 Green Innovation

Green innovation was measured by five measurement items adapted from Wong (2012). Scale items include: Our operation processes recycle, reuse and remanufacture materials or parts.

3.2.3 Environmental Knowledge

Environmental knowledge was measured using three items adapted from Vainio, Pohjanvirta, and Dahlbom (2014), assessing basic understanding of human impacts on the environment. Items covered climate change, deforestation, and recycling, with responses scored as true/false (including a "don't know" option). Correct answers were coded 1, incorrect or "don't know" coded 0, yielding a total score ranging from 0 to 3. Higher scores indicated greater environmental knowledge. The scale showed acceptable reliability (Cronbach's $\alpha = .68$) in the current sample.

3.2.4 Consumer Purchase Intention

Consumer purchase intention was measured using a 3-item scale adopted from Ma et al. (2022). The scale assesses respondents' willingness to buy a product based on its environmental or social attributes. The items are: (1) "I intend to purchase this type of product shortly," (2) "I am likely to buy this product," and (3) "I would consider this product when making a purchase." Responses were measured on a 5-point Likert scale ranging from 1 (*Strongly Disagree)* to 5 (*Strongly Agree)*. The total score was computed by averaging the three items, with higher scores indicating stronger purchase intention. The scale demonstrated high internal consistency in the present study (Cronbach's $\alpha = 0.89$), and its validity has been established in prior research on consumer behavior and sustainable consumption.

3. Results

4.1 Demographics Information

The demographic analysis reveals a young, male-dominated sample with moderate educational attainment and middle to lower-middle-class economic background. The age distribution is heavily concentrated among younger adults, with 58.81% of respondents being 30 years or younger and peak representation in the 26-30 age group (32.25%). However, there is a significant gender imbalance, with males comprising 66.40% of the sample compared to only 33.60% females, creating a nearly 2:1 ratio. Educational levels are mixed, with the majority having completed

secondary (42.55%) or higher secondary education (39.02%), while only 18.43% have graduate-level or higher qualifications. The family income distribution shows relatively even representation across lower and middle-income brackets, with 31.71% earning below 35k, 28.18% earning 36-45k, 26.83% earning 46-60k, and only 13.28% earning above 60k. This demographic profile suggests that the sample predominantly represents young working adults with moderate educational and income levels, although the significant gender imbalance and underrepresentation of older age groups may limit the generalizability of the findings to the broader population.

Table 4.1: Demographics Information

Items	Frequency	%
Age		
25 and younger	98	26.56
26–30	119	32.25
31–35	82	22.22
36–40	57	15.45
41–45	13	3.52
Gender		
Male	245	66.40
Female	124	33.60
Education		
Matric	157	42.55
Intermediate	144	39.02
Graduate and above	68	18.43
Family Income		
below than 35k	117	31.71
36-45	104	28.18
46-60	99	26.83
more than 60k	49	13.28

3.1 The results of the measurement model

The measurement model results demonstrate strong reliability and validity across all four constructs examined in this study. Internal consistency reliability is excellent for all constructs, with Cronbach's alpha values exceeding the recommended threshold of 0.70. Green Trust shows the highest internal consistency ($\alpha = 0.917$), followed by Environmental Knowledge ($\alpha = 0.885$), Consumer Purchase Intention ($\alpha = 0.847$), and Green Innovation ($\alpha = 0.851$). All item loadings are statistically significant (indicated by asterisks) and exceed the minimum acceptable threshold of 0.70, ranging from 0.822 to 0.892, which indicates that each item contributes meaningfully to its respective construct.

Convergent validity is well-established across all constructs, with Average Variance Extracted (AVE) values exceeding the recommended threshold of 0.50. Environmental Knowledge shows the strongest convergent validity (AVE = 0.757), followed by Green Innovation (AVE = 0.734), Consumer Purchase Intention (AVE = 0.730), and Green Trust (AVE = 0.728). The square root of AVE values for each construct (ranging from 0.853 to 0.870) is higher than the corresponding

inter-construct correlations, confirming discriminant validity. This thorough reliability analysis indicates that the measurement instruments are both internally consistent and valid, with all constructs demonstrating solid psychometric properties suitable for further structural equation modeling and hypothesis testing.

Table 2 Confirmatory factor analysis

Construct	Item	Loading	α	AVE	√AVE
A. Green Innovation	GI1	0.82	0.851	0.734	0.857
	GI2	0.829*			
	GI3	0.838*			
	GI4	0.822*			
	GI5	0.840*			
B. Consumer Purchase Intention	GPI1	0.831	0.847	0.73	0.854
	GPI2	0.841*			
	GPI3	0.859*			
C. Environmental Knowledge	EK1	0.824	0.885	0.757	0.87
	EK2	0.845*			
	EK3	0.822*			
D. Green Trust	GT1	0.828	0.917	0.728	0.853
	GT2	0.855*			
	GT3	0.879*			
	GT4	0.884*			
	GT5	0.892*			

4.2 Correlation Analysis

Correlation matrix indicates significant correlation among four constructs all in the expected and positive direction and with different strengths. All other variables are positively correlated with Green Trust with varying degrees of strength (moderate to strong), in particular, Environmental Knowledge ($r = 0.654$, $p < 0.01$), and Green Innovation ($r = 0.58$, $p < 0.01$). This means that when there are increased trusts in green practices, they correlate to increased environmental knowledge and innovations. There are also significant moderate relationships between Green Innovation and Environmental Knowledge ($r = 0.634$, $p < 0.01$), as well as between Green Innovation and Purchase Intention ($r = 0.583$, $p < 0.01$), which indicates that the higher the level of green innovation reported by the respondents, the more environmentally knowledgeable they are and the stronger their purchase intent. The relationship between Environmental Knowledge with Green Innovation ($r = 0.634$, $p < 0.01$) and Purchase Intention ($r = 0.591$, $p < 0.01$) are positive and strong, which corroborates the theory that higher environmental awareness levels lead to a positive perception of innovation and purchase intentions. Green Trust has the strongest correlation with Environmental Knowledge ($r = 0.654$, $p < 0.01$), which means that these two constructs might be close or even overlapping in the minds of the respondents. All three predictor variables are positively related to Purchase Intention with significant correlations ($p < 0.01$), but with a stronger correlation between Environmental Knowledge and Purchase Intention ($r = 0.591$), and then,

Green Innovation (r = 0.583) and Green Trust (r = 0.560). All correlations are statistically significant at the 0.01 level (except Green Trust-Green Innovation which is found strong correlations supporting the theorized relationships among green trust, green innovation, environmental knowledge and purchase intent correlations suggest a theoretical design where environmental knowledge is placed at one central location which will positively stimulate trust, the perception of innovation, and the purchase behavior.

Table 3 Correlation Coefficient

Variable	1	2	3	4
1. Green Trust	(0.709)			
2. Green Innovation	0.58**	(0.854)		
3. Environmental Knowledge	0.654*	0.634*	(0.781)	
4. Purchase Intention	0.560**	0.583**	0.591**	(0.89)

4.3 Hypothesis Testing

The hypothesis testing results provide strong empirical support for both proposed relationships in the research model. Hypothesis 1 (H1) examining the relationship between Environmental Knowledge (EK) and Consumer Purchase Intention (CPI) is statistically significant ($\beta = 0.334$, $t = 6.72$, $p < 0.001$). This indicates that environmental knowledge has a positive and meaningful impact on consumers' purchase intentions, with a moderate effect size. The extremely low p-value (0.000) provides strong evidence against the null hypothesis, confirming that individuals with greater environmental knowledge are significantly more likely to exhibit higher purchase intentions for green products or services.

Hypothesis 2 (H2) investigating the relationship between Green Innovation (GI) and Consumer Purchase Intention (CPI) is also statistically significant ($\beta = 0.233$, $t = 4.68$, $p < 0.001$). This demonstrates that perceptions of green innovation positively influence consumer purchase intentions, though with a smaller effect size compared to environmental knowledge. The significant t-value and p-value indicate that consumers who perceive higher levels of green innovation are substantially more likely to express stronger purchase intentions.

Both hypotheses are supported with high statistical confidence, indicating that both environmental knowledge and perceptions of green innovation are important drivers of consumer purchase intentions. Environmental knowledge emerges as the stronger predictor ($\beta = 0.334$) compared to green innovation ($\beta = 0.233$), suggesting that consumer awareness and understanding of environmental issues has a more substantial impact on their purchasing behavior than their perceptions of innovation alone. These findings provide valuable insights for marketers and policymakers seeking to promote green consumption, highlighting the importance of both education initiatives and innovation communication strategies.

Table 4 Hypothesis Testing

Hypothesis	β	t	p-value
H1: EK-CPI	0.334	6.72	0.000
H2: GI- CPI	0.233	4.68	0.000

Mediating Variables

The bias corrected bootstraps answers indicate partial mediation effect significantly through Green Trust (GT) of both pathways that reveals more into the consumer purchase intentions processes. The third hypothesis (H3) shows that there is a partial mediating relationship between Environmental Knowledge (EK) and Consumer Purchase Intention (CPI) with an indirect effect of 0.075 (LLCI = 0.037, ULCI = 0.118, $p < 0.05$) through Green Trust. This implies that environmental knowledge has both direct effect and indirect effect on purchase intentions because it has a mediating effect of green trust, meaning that the more people have knowledge on environment, the more trust they build on green consumption practices and this increases their purchase intentions.

Hypothesis 4 (H4) also demonstrates that Green Trust partially mediates the relationship between Green Innovation (GI) and Consumer Purchase Intention (CPI), and the strength of the increased indirect effect is 0.062 (LLCI = 0.029, ULCI = 0.101, $p < 0.05$). This comes out to show that attitudes of green innovation influence purchase intentions in two ways: direct and indirect effects working through green trust. Customers who feel that they experience high levels of green innovation form more trust towards green practices and consequently, this affects their buyer behavior positively. The partial mediation results indicate that while direct relationships between the independent variables and purchase intentions remain significant (as shown in previous hypothesis testing), Green Trust serves as an important intervening mechanism that explains additional variance in consumer behavior. The mediation effect is more substantial for the Environmental Knowledge pathway (0.075) compared to the Green Innovation pathway (0.062), suggesting that environmental knowledge has a more substantial indirect influence on purchase intentions through trust development.

These findings underscore the pivotal role of trust in green marketing, indicating that fostering consumer trust in green practices is crucial for translating environmental knowledge and innovation perceptions into actual purchasing behavior. For practitioners, this suggests that marketing strategies should not only focus on educating consumers or promoting innovation but also on building and maintaining trust in green credentials to maximize the impact on consumer purchase intentions.

TA BL E 5 Bias-corrected bootstrapped result

	Indirect effect	LLCI	ULCI	Result
H3: EK-GT-CPI	0.075	0.037	0.118	Partial Mediation
H4: GI- GT- CPI	0.062	0.029	0.101	Partial Mediation

5. Discussion

The findings of this study reveal significant statistics about the complex relationship between green innovation, green knowledge, consumer purchase intentions, and green trust, a mediating role, especially in terms of education. Such environmental sustainability-related innovations were also found to have a significant influence over consumer purchase intentions, as well as having a direct effect on the value of the brand or the products in the mind of the consumer in light of the sustainability factor. In line with the existing studies that emphasize the trend of consumers becoming increasingly willing to patronize environmentally responsible brands (Leonidou et al., 2019), the finding has important implications concerning green innovation. The educational institutions and schools play an important part in this process through the education on green innovation, which leaves an impression on the future purchasing behavior of students. With the help of the significance of green innovation, they should raise awareness and potentially make the students more environmentally friendly buyers in the future (Perera et al., 2021). Further, environmental awareness surfaced as the key predictor of green purchase intentions, affirming that consumers with a higher level of environmental awareness are more prone to make environmentally friendly choices (Chen et al., 2023). This reaffirms previous findings that environmental awareness improves the chances of consumers opting for green services and products, as they are better aware of the environmental consequences of their decision. The educational implications are evident: incorporating environmental education in curricula has the potential to enhance the awareness of students, provide them with sufficient knowledge to make sustainable choices, and assist in developing a sense of environmental accountability. As students are made aware of the environmental impact of their behavior, they are more inclined to make consumer choices consonant with sustainability principles and thereby create a greener consumer class (Kollmuss & Agyeman, 2022).

In addition, the research points to the central position occupied by green trust in bridging the connection between green innovation, environmental knowledge, and consumers' purchase intentions. Green trust, an indicator of consumers' trust that a business is genuinely committed to going green, was seen to be instrumental in bridging consumers' knowledge and awareness to actual buying action. This is consistent with the larger body of literature that has positioned trust as a key driver of consumer choice (Delgado-Ballester et al., 2022). In particular, when consumers are confident that a firm is genuinely committed to environmental sustainability, they are likely to rally behind the company by buying its products or services. Educational organizations can capitalize on this awareness by educating students to assess the validity of sustainability assertions presented by companies. Initiatives that promote critical scrutiny regarding environmental claims can equip consumers with the ability to differentiate between businesses that genuinely practice sustainability and those that practice greenwashing, promoting more intelligent and ethical consumer actions.

5.1 Theoretical Implications

This study has significant theoretical implications to the understanding of the connection between green innovation, environmental knowledge and the purchasing intentions of the consumers, whereby green trust becomes instrumental in mediating these relationships. The theory under which the study is based is the theory of green trust and its central role in dictating a consumer behavior. Indeed, by demonstrating the role of consumer trust in green claims as a mediating variable between environmental expertise and product purchase, the study expands the literature base on the topic of trust in sustainability and corporate social responsibility by elaborating on existing theories of consumer trust. In addition to that, it integrates green innovation into an

existing theoretical framework of a consumer behavior, e.g. the Theory of Planned Behavior (Ajzen, 1991), in such a manner, which extends the model and includes environmental issues as crucial determinants of consumer behavior. The study also contributes to growing body of literature that relates education and sustainable behavior, that showing exposure of environmental knowledge under curriculum-based education can help in creation of further education consumer who can make informed environmentally conscious buying decision. The focus on the shaping of the future actions through education gives the study a novel understanding of the role of educational institutions in shaping consumer behaviors and their attitude towards sustainability, leading to the advancement of the theories concerning environmental literacy and green consumerism. In the end, this study provides new data to the green marketing theory by emphasizing the utilization of trust as one of the mechanisms through which telling of the green innovations can actually be successful, and it proposes that the firms that will focus on transparency and authenticity would enjoy more consumer loyalty and influence purchase behavior.

5.2 Practical Implications

This study has critical practical implications regarding firms, schools, and policymakers interested in promoting sustainable motivation of consumer behavior. To the companies, the research highlights the importance of being green as an innovation aspect that is not only a product feature but also a type of weapon that will put their reputation points across to their customers. When the consumers in a consumer environment are increasingly leading towards making environmentally friendly decisions, the companies that are undertaking environmentally friendly innovations and taking a stand to promote such innovations by communicating their steps can gain a competitive momentum. This study suggests that green innovation may be paired with simple and honest communication to build the trust that positively influences the consumer buying intentions. In the case of schools, the study gives priority on curriculum in the creation of knowing environment and shaping pro environmental behaviors. The inclusion of such subjects as those dealing with sustainability in schooling and higher education can help in creating the future generation of consumers who make environmentally-conscious decisions when it comes to their buying behaviors. This may be implemented in the form of developing of courses and programs dealing with environmental concerns, green innovation, and consumer responsibility requirements in a globalized world which has to deal with environmental issues. The studies also reveal that the green marketing practices must aim at authenticity and transparency as the consumers are becoming more wary to the corporations to which greenwashing is attributed. Marketers should be worried about making sincere statements on environmental sustainability and not just another meaningless claim. Besides, this study suggests that collaboration between business organizations and educational institutions would be beneficial in making each other aware of sustainability issues to the mutual benefit of the two parties. By working together, a business will be able to influence the value system and consumer behavior around the school community, and an educational organization will be able to prepare students to become sustainable and ethical consumers who weigh into their sustainable consumer choices.

5.3 Limitations and Future Directions

Despite the valuable information, the study is associated with certain limitations, which can be solved by subsequent studies. Second, the cross-sectional type does not allow for explaining the causal relations and quantifying the long-term effects of environmental knowledge, green innovation, and green trust on consumer behavior. In future, research should assume a longitudinal design in order to determine how environmental knowledge, green trust, and green innovation

influences purchasing intention of the consumers over time and how environmental knowledge or environmental change influences consumer behavior in the long-run. Second, the sample used in the study may not be a proper representation of the entire populace since the attitudes of the consumers towards sustainability are sensitive to the location, income, and cultures. Future studies will have to use even more varied and large samples based in various geographical and demographic areas to enhance generalizability. Third, even though this study is based on a mediator of green trust, there are possible additional mediators of consumed behavior, such as perceived value, environmental concern and the personal norm. An exploration of alternative mediating variables would provide us with improved model of the effects of environmental knowledge and green innovation on consumer behavior. The study also has another restriction since the relationships discussed are general, whereas the impact of green innovation and ecological knowledge may vary significantly across industries. There might be a difference between the consumer behavior in relation to sustainable fashion, green electronics or organic food products. Additional research work could look at the implications of the same on various industries, enabling companies in certain industries to understand better how the same applies to them. Lastly, the area of future research is the contribution of social networks and online media to consumer attitudes about green innovation and the environment. Due to the increasing strength of social media and online reviews, understanding the impact of these media on consumer belief in sustainability communications would perhaps present businesses with the capability of promoting their environmental agendas and developing consumer faith through new means in addition to adding value in ways that the business had never contemplated.

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