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Linking Environmental Knowledge, Concern, and Behavior to Green Product Preferences through Perceived Value: Evidence from Saudi Arabia

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ABSTRACT

The increased environmental challenges require deeper insight into the factors that determine sustainable consumption. This study investigates how environmental knowledge, concern, and behavior influence green product preferences within the framework of Saudi Arabia's Vision 2030. The research investigates the influence of these factors on green product preference through the mediating role of perceived value. A quantitative, cross-sectional design was used for the collection of data from 472 Saudi consumers. The analysis was done using Structural Equation Modeling-AMOS, Confirmatory Factor Analysis, and model fit indices. Environmental concern and personal environmental behavior are significantly enhancing perceived value, which is strongly predictive of green product preference, whereas environmental knowledge is showing a weaker positive effect. Perceived value plays the role of a cognitive–evaluative bridge between environmental orientation and sustainable choice, providing theoretical and managerial insights for promoting green consumption.

Keywords: Environmental knowledge, Environmental concern, Personal environmental behavior, Perceived value, Green product.

INTRODUCTION

Addressing global environmental challenges has emerged as one of the defining priorities of the twenty-first century. Climate change, biodiversity loss, and resource depletion pose serious threats to human well-being and ecological stability. In response, governments, corporations, and civil society increasingly promote sustainable production and consumption as central pathways toward environmental resilience. An integral part of that transformation is the promotion of green products: goods and services designed to minimize ecological harm while delivering functional and symbolic value to consumers (Peattie & Crane, 2005; Dangelico & Vocalelli, 2017). Beyond their technological innovation, green products signify a cultural and ethical shift in consumption where purchase decisions increasingly integrate environmental and moral considerations with traditional cost–benefit assessments (Chen & Chang, 2012; Biswas & Roy, 2015).

Despite increasing global momentum, the adoption of green products remains uneven. Mature economies show relatively stable green purchasing behavior; however, demand in developing and emerging economies is inconsistent (Joshi & Rahman, 2019; Saraireh, 2023). The majority of researchers also assert that adoption differentials cannot be ascribed wholly to economic and/or demographic issues. Behavioral and psychological dimensions, such as environmental concern, knowledge, and individual pro-environmental behavior, regulate sustainable consumption (Mostafa, 2024; Zsóka et al., 2013; Yadav & Pathak, 2016). These factors help determine whether consumers consider green alternatives, but they also influence the perceived value attached to such products, which links environmental attitudes and behavioral action (Chen & Chang, 2013; Zhang et al., 2024).

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Perceived value is defined as consumers' overall assessment of the respective benefits and sacrifices that come along with a product. In the case of green consumption, it encompasses functional quality, emotional satisfaction, and moral alignment. Classic theories of consumer value emphasize that decisions to purchase should be based on balancing perceived benefits and perceived costs. Green products, however, extend perceived benefits beyond utility and performance and into the realms of environmental and social dimensions, such as ethical alignment and symbolic self-expression. Due to the fact that many green products carry price premiums, the adoption of such products by consumers depends on whether they perceive sufficient long-term or non-monetary benefits that could compensate for higher costs. Thus, the antecedents of perceived value include environmental knowledge, concern, and behavior; this will make it easier to explain why some consumers adopt green products while others remain skeptical. Environmental knowledge serves as the cognitive basis for assessing ecological impacts and thus differentiating between sustainable and non-sustainable options. Empirical evidence has demonstrated that a consumer who is more environmentally literate is willing to pay more for green products (Mostafa 2024; Taufique et al., 2016; Zhang et al., 2024). By contrast, environmental concern expresses an emotional and moral stance toward environmental protection and personal responsibility (Dunlap & Van Liere 1978; Hoang & Tung, 2024). Those showing more concern about environmental issues are likely to match their consumption patterns with ecological values and sustainability principles accordingly. Personal environmental behavior refers to a set of habitual pro-environmental actions, such as recycling, energy-saving, and reducing waste, which together symbolize an ecologically oriented lifestyle (Kaiser & Wilson, 2004; Lee, 2008). These behaviors are a pragmatic manifestation of environmentally friendly attitudes, promoting coherence between personal values and consumption choices (Biswas & Roy, 2015).

The theoretical basis of the present study relies on two complementary frameworks: the TPB by Ajzen (1991) and the VBN theory of Stern (2000). According to TPB, human behavior is motivated by attitudes, subjective norms, and perceived behavioral control-factors that conceptually correspond to environmental concern, knowledge, and behavior as drivers of intention. The VBN framework further proposes that environmental values and ecological worldviews activate personal moral norms that in turn motivate pro-environmental conduct. The two theories jointly provide a coherent explanation for the ways through which the cognitive, attitudinal, and behavioral dimensions interact in shaping sustainable consumption decisions.

Despite extensive global research, a critical gap remains in the emerging economies, specifically within the Middle East, where green consumer behavior remains underexplored. Ghanem & Alamri, 2022; Manley et al., 2023 present a compelling case for Saudi Arabia, which is undergoing intense socio-economic transformation under its Vision 2030, anchored on economic diversification and sustainability. National commitments to ecological transition are made explicit through initiatives such as the Saudi Green Initiative and extended renewable energy programs. Khorsheed, 2016; Vision, 2030, 2021. However, empirical research on how Saudi consumers perceive, value, and adopt green products remains scant. This limitation constrains the generalizability of existing theories, which largely evolved in Western contexts, and poses practical challenges for policymakers and firms seeking to align sustainability strategies with local consumer motivations. Therefore, understanding how environmental knowledge, concern, and behavior shape perceived value and preference for green products among Saudi consumers is both a theoretical and practical priority. Theoretically, it contributes to extending sustainability and consumer behavior frameworks to non-Western cultural contexts, enhancing cross-cultural validity. Practically, it offers actionable insights for policymakers and marketers that seek to foster sustainable consumption and promote green product adoption in line with Saudi Arabia's national goals on sustainability. Accordingly, the present study develops and empirically tests an integrated model linking environmental knowledge, environmental concern, and personal environmental behavior with green product preference through perceived value as the mediating mechanism. In so doing, the study addresses calls by scholars for comprehensive models that integrate cognitive, attitudinal, and behavioral drivers of sustainable consumer behavior (Joshi & Rahman, 2015; Yadav & Pathak, 2016). The findings are expected to enhance the evidence base linking individual psychological processes with national and global sustainability agendas.

LITERATURE REVIEW

Overview of the Research Domain

Research on green consumer behavior takes an ever-more prominent position in marketing, psychology, and sustainability studies. Since early arguments over "ecologically responsible consumption" during the 1970s and 1980s, research has progressed from descriptive analyses of environmental concerns to deeper analyses of antecedents and mechanisms of sustainable consumption (Peattie, 2010; Gleim et al., 2013). This is commensurate with wider societal trends: institutionalization of environmental policy regimes, globalization of environmental campaigns, and mainstreaming of sustainability as a business and consumer discourse. International programs like

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the United Nations' Sustainable Development Goals (SDGs) set out explicitly to transform consumption behaviors (United Nations, 2015). Companies now see sustainability as a matter of corporate conscience but equally as a source of competitive advantage (Porter & Kramer, 2019; Andersen et al., 2023).

Consumer studies mirror this pattern. Many initial studies represented green consumers as a niche group of buyers, yet growing evidence proves sustainability tastes transcend segments, albeit with differing strength and modes of expression (White et al., 2019; Grankvist & Biel, 2007). Green buying is increasingly explored as much beyond buying greener labeled products as being an extension of a comprehensive lifestyle combining ethical, social, and ecological concerns (Johnstone & Tan, 2015). Note importantly for researchers, sustainable consumption entails difficult trade-offs: buyers need to balance environmental ideals with trade-off constraints like greater prices to pay, scarce accessibility, or uncertainty regarding a product's performance (Almohammadi & Abdulghaffar, 2023; Kumar et al., 2021). The key research challenge is therefore explaining cognitive, affective, and behavioral motivators necessary to help buyers choose and follow environmentally friendly consumption habits.

Theoretical Perspectives

The theoretical panorama accounting for green consumer behavior is wide and mirrors the multi-faceted character of sustainability. Cognitive-behavioral ones like the Theory of Reasoned Action (TRA) by Fishbein & Ajzen (1975) and Theory of Planned Behavior (TPB) by Ajzen (1991) take center stage. They highlight how attitudes and subjective norms and perceived behavioral control are key predictors of intentions and behaviors and have frequently been utilized to research green consumption. The empirical evidence repeatedly documents pro-environment attitudes and injunctive norms stimulate green buying intentions, while perceived behavioral control accounts for differences in whether intentions are carried out through actual behavior (Han, 2020; Paul et al., 2016). In addition to rational-choice perspectives, norm and value-based viewpoints bring with them crucial moral and ethical facets. The Norm Activation Model by Schwartz (1977) and Value-Belief-Norm theory by Stern et al., 1999 set forth that environmental consequences awareness and moral obligations stimulate personal norms to direct environment-behaviorally significant actions. They point out that beyond economic rationality, pro-environment consumption is frequently stimulated by altruistic, biospheric, or moral reasons (Vania, C., & Ruslim, 2023; Thøgersen & Crompton, 2009). More recent research relies upon Self-Determination Theory (SDT) by Deci & Ryan (2000) to account for intrinsic driving factors and suggests consumption has embraced sustainable practices because it yields personal satisfaction and identity clarity and not necessarily owing to external demands (Li, 2025). Likewise, there has been work employing Identity Theory and Self-congruity Theory to account for how consumption integrates green consumption with its conception of self and augments the symbolism of consumption decisions (Kautish & Sharma, 2019; Barbarossa & De Pelsmacker, 2016). Third, Consumer Value Theory by Sheth et al. (1991) is useful to appraise how functional, emotional, social, epistemic, and conditional values drive consumer choices towards green products by Choi and Johnson (2019). This multi-dimensional framework is germane to explaining how consumers appraise green products' perceived value—a crucial construct for this research.

These theoretical accounts all propose that sustainable consumption is a consequence of cognitive evaluation interactions, moral norms, intrinsic motivations, and value judgments. This sort of complete framework is therefore needed to combine these elements as opposed to separately evaluating them.

Key Constructs and Definitions

A coherent understanding of the present study necessitates clear conceptualization of the constructs underpinning green product preference. The key variables—environmental concern, environmental knowledge, personal environmental behavior, and perceived value of green products—are defined and contextualized below in alignment with established theoretical and empirical literature.

Environmental Concern: Environmental concern refers to a degree of emotional attachment, moral responsibility, and attitudinal commitment towards preserving the natural environment. It is essentially an ecological orientation that involves both an affective sensitivity and cognitive awareness of environmental issues (Milfont & Duckitt, 2010; Vania & Ruslim, 2023). Individuals with higher levels of environmental concern tend to be more aware of ecological degradation and more motivated to conduct sustainable consumption. Empirical research shows a constantly positive relation between environmental concern and the intention to buy environmentally friendly products, although its magnitude often varies across cultural and socio-economic contexts (Alenazi, 2024). In this context, environmental concern is viewed as a value-based emotional concept that serves as the psychological base for pro-environmental attitude and behavior.

Environmental Knowledge: Environmental knowledge refers to the degree of cognitive awareness and understanding that individuals possess regarding environmental problems, their causes, and potential solutions. It comprises both objective knowledge (factual understanding of environmental processes) and subjective knowledge

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(self-perceived comprehension of environmental issues) (Bamberg & Möser, 2007; Akehurst et al., 2012). Consumers with higher environmental literacy are more capable of critically assessing eco-labels, identifying misleading greenwashing practices, and making informed consumption decisions that balance ecological and personal benefits (Yusof et al., 2013; Pagiaslis & Krystallis, 2014). Hence, environmental knowledge functions as a cognitive antecedent that facilitates rational evaluation and enhances the perceived authenticity of green products, thereby influencing sustainable purchasing behavior.

Personal Environmental Behavior: Personal environmental behavior encompasses voluntary actions and lifestyle practices undertaken by individuals to minimize their ecological footprint, such as recycling, energy conservation, sustainable transportation use, and avoidance of environmentally harmful products. These actions reflect an integration of personal values, moral norms, and habitual routines that manifest environmental commitment in daily life (Grimmer & Woolley, 2014; Jaiswal & Kant, 2018). Importantly, consistent engagement in pro-environmental behavior reinforces an individual's self-identity as an environmentally responsible consumer, generating attitudinal-behavioral congruence that strengthens willingness to purchase green products. Empirical studies (e.g., Geng et al., 2017) demonstrate that such behavioral consistency fosters a perceived moral satisfaction that enhances both preference for and willingness to pay for eco-friendly alternatives.

Perceived Value of Green Products: Perceived value of green products is therefore the consumer's overall assessment of the net benefits derived from buying environmentally friendly products in relation to conventional alternatives. This is a multi-dimensional construct composed of several evaluative dimensions, including functional utility, reflecting product quality and performance; economic value, which reflects perceived cost versus benefit; emotional satisfaction, referring to feelings of pride, responsibility, and personal fulfillment; and moral alignment, reflecting consistency with individual ethical standards and pro-sustainability values. Such a construct therefore captures the integrative cognitive process by which consumers synthesize both tangible and intangible benefits to form judgments about the desirability of the product. Empirical evidence reveals that perceived value acts as an important mediating mechanism in linking cognitive and attitudinal antecedents-specifically, environmental knowledge, concern, and pro-environmental behavior-to behavioral outcomes such as preference and purchase of green products. Hence, perceived value acts as the cognitive-evaluative conduit through which consumers' environmental orientations are translated into concrete sustainability-oriented purchasing actions.

Empirical Studies and Findings

Empirical evidence across regions consistently supports the importance of environmental knowledge. Studies in Europe and Asia demonstrate that knowledgeable consumers exhibit stronger preferences for eco-labeled products and are more resilient to price premiums (Aman et al., 2012; Yusof et al., 2013). For example, Pagiaslis and Krystallis (2014) found that environmental knowledge significantly increased intention to purchase hybrid vehicles, mediated by perceived consumer effectiveness. Personal environmental behavior has also been shown to enhance green product adoption. Geng et al. (2017) reported that Chinese consumers who practiced recycling and waste reduction were more likely to purchase eco-friendly goods. Similarly, Jaiswal and Kant (2018) found in India that environmentally active consumers demonstrated a stronger willingness to pay for organic food, highlighting the role of behavioral consistency. Environmental concern remains one of the most robust predictors of green consumption. Alenazi, (2024) found that concern positively influenced green purchase intentions among young Vietnamese consumers, moderated by social norms. Barbarossa et al. (2015) showed that moral obligation mediated the link between concern and willingness to buy sustainable products in European contexts. Perceived value emerges repeatedly as a decisive factor. Saraireh (2023) demonstrated that green perceived value strongly predicted purchase intention in the hospitality industry, while Bonelli et al. (2024) confirmed its mediating role between environmental attitudes and green product choice in China. Yet, empirical studies reveal cultural contingencies: while European consumers often emphasize altruistic values, Asian and emerging-market consumers are more sensitive to functional and economic dimensions of perceived value (Khan & Mohsin, 2017; Joshi & Rahman, 2017).

Methodological Limitations in Existing Research

Despite these advances, however, there are yet some limitations. Firstly, there is yet over-dependence upon self-reported surveys with questions regarding social desirability bias and attitudes-behavior gaps (Auger & Devinney, 2007; Johnstone & Tan, 2015). Secondly, research is all too commonly carried out through cross-sectional designs and therefore excluding longitudinal investigation of transformations in attitudes and behaviors (Alenazi, 2024). Thirdly, research is yet geographically biased with Western countries and East Asia being disproportionately represented and Middle East, African, and Latin American environments being relatively neglected (Alhamdi et al., 2024; Goh & Balaji, 2016). Fourthly, there is yet conceptual fragmentation with studies all too often isolating an individual or dual construct rather than integrating differing antecedents with comprehensive models (White et al., 2019; Kautish & Sharma, 2019). Lastly, whilst advanced methods such as

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structural equation modeling (SEM) and multilevel analysis are increasingly being applied, research still relies upon regression-based methods that are poor at operationalizing mediating and moderating procedures with any richness and depth (Almohammadi & Abdulghaffar, 2023).

Conceptual Framework and Hypothesis Development

Consumer behavior towards green products is determined by the interaction of cognitive, attitudinal, and behavioral antecedents that collectively shape how people appraise green options. Elaborating on Theory of Planned Behavior (Ajzen, 1991), Value-Belief-Norm framework (Stern et al., 1999), and Consumer Value Theory (Sheth et al., 1991), this research puts forth an integrated model (see Figure 1) whereby environmental knowledge, environmental concern, and individual ecological behavior are antecedents to perceived value driving consumer preference for green products. Cognitive antecedents like environmental knowledge form the information foundation for evaluating benefits and claims of products. Attitudinal antecedents like environmental concern raise ecological issues to a state of heightened salience, while behavioral antecedents like pro-environmental behavior create consistency with sustainable lifestyles and consumption through practiced commitment to consumption lifestyles aligned with ecological concerns. These antecedents all converge to determine perceived value as the evaluating link connecting individual-level antecedents with green product preference. Herein lies consumers' willingness to embrace environmentally friendly products based on how much they see those products to provide superior functional, emotional, and moral benefits relative to traditional products (Lin & Huang, 2012; Haws et al., 2014). In locating perceived value at its core, the framework redresses fragmentation in previous research whereby concerns, knowledge, and behavior have frequently been decontextualized and separately explored. It places the analysis amidst Saudi Arabia, a setting experiencing fast-tracked change pursuant to Vision 2030, whereby sustainability goals meet changing consumer culture and transforming consumption culture.

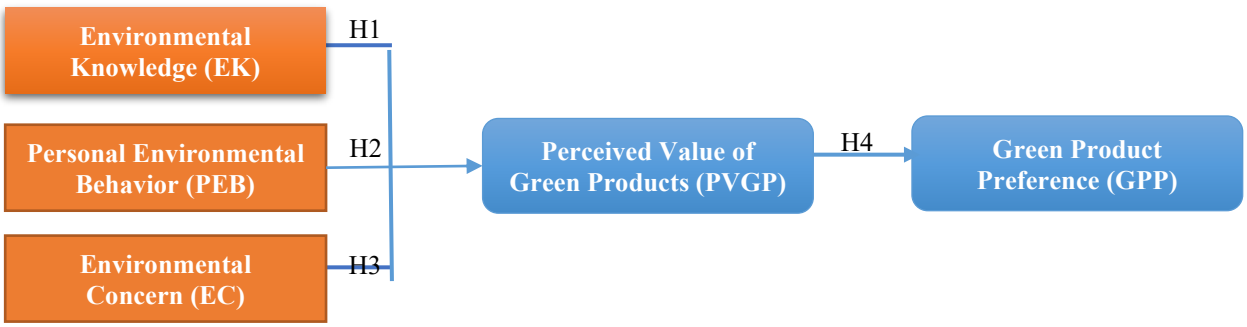

Figure 1. Conceptual model.

Source: Prepared by the author, 2025.

Environmental Knowledge and Perceived Value

Environmental knowledge is a cognitive antecedent to pro-environmental behavior. It gives individuals adequate awareness to grasp ecological issues and make assessments of consumption decisions' environmental implications (Bamberg & Möser, 2007). Studies identify objective and subjective knowledge (consumers' perception of their knowledge) by influencing product evaluation (Akehurst et al., 2012; Ellen et al., 1991). Various studies show that educated consumers find green products to be more valuable and credible. For example, Aman et al. (2012) discovered Malaysian consumers with greater environmental knowledge to embrace eco-products with positive value perceptions. Correspondingly, Yusof et al. (2013) documented ecological knowledge to affect car-buying decisions by augmenting perceived vehicle value. In Western cultures, Barber et al. (2009) illustrated wine buyers with high environmental knowledge assigned greater value to eco-certified wines regardless of premium price. Pagiaslis and Krystallis (2014) further substantiated environmental knowledge to create perceived consumer effectiveness and augment the perceived utility of green products. Moreover, knowledge makes individuals less prone to fall prey to greenwashing by allowing critical examination of marketing communications (Testa et al., 2015). Consumers with high knowledge hold greater credibility for eco-labels and render greater perceived value (Taufique et al., 2016). Various studies conducted throughout Europe and Asia (Kumar et al., 2017; Chen & Chang, 2013) invariably document informed consumers to hold greater attitudes and value perceptions with respect to eco-products. Hence, environmental knowledge determines the process of evaluation by alleviating uncertainty, trustworthiness, and illuminating long-term benefits to enhance perceived value of green products.

- *H1: Customers' environmental knowledge has a critical relationship with customer-perceived value at green products.*

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Environmental Concern and Perceived Value

Environmental concern reflects individuals' affective engagement with ecological issues and their willingness to contribute to environmental protection (Cruz & Manata, 2020; Milfont & Duckitt, 2010). It represents both generalized ecological worldviews and specific concerns over issues such as pollution or climate change. Concerned consumers are motivated to assign value to products that align with their ecological values, as these products reduce cognitive dissonance between attitudes and behavior (Hansla et al., 2008). Empirical findings confirm the role of concern in shaping value perceptions. Vermeir and Verbeke (2008) demonstrated that environmental concern increased the perceived benefits of organic food among Belgian consumers. Barbarossa et al. (2015) found that moral obligation linked concern to the perceived value of sustainable goods in Europe. Han et al. (2010) revealed that environmental concern significantly influenced the perceived value of eco-friendly hotels, with concerned consumers reporting higher willingness to pay. Concern also enhances the symbolic and emotional dimensions of perceived value. Grankvist and Biel (2007) demonstrated that environmentally concerned consumers attribute greater symbolic value to eco-labeled products, while Straughan and Roberts (1999) showed that concern predicted socially responsible consumption behaviors in U.S. samples. More recent studies by Alenazi, (2024) and Zhao et al. (2014) confirmed that environmental concern positively affects value perceptions in emerging markets such as Vietnam and China. Overall, concern strengthens the evaluative weight of ecological attributes, leading consumers to assign higher functional, emotional, and symbolic value to green products.

- *H2: Environmental concern has a positive relationship with perceived value for green products.*

Personal Environmental Behavior and Perceived Value

Personal environmental behavior refers to the extent to which individuals engage in sustainable practices in their everyday lives, such as recycling, energy conservation, and waste reduction (Stern, 2000). These behaviors are often expressions of identity and commitment to sustainability (Thøgersen, 2005). Consumers who actively practice green behaviors are more likely to evaluate eco-friendly products positively because such products align with their lifestyle and reinforce identity consistency (Grimmer & Woolley, 2014; Jaiswal & Kant, 2018). Empirical studies support this connection. Geng et al. (2017) found that Chinese adolescents who engaged in pro-environmental behaviors perceived greater value in green products. Jaiswal and Kant (2018) observed that environmentally active Indian consumers attributed higher value to organic foods. Similarly, Biswas and Roy (2015) confirmed that sustainable practices increased the perceived value of eco-friendly products among urban Indian consumers. Engaging in environmentally friendly behaviors also generates psychological reinforcement: individuals perceive eco-friendly products as congruent with their values, thereby reducing dissonance and enhancing satisfaction (Kautish & Sharma, 2019). Saraireh (2023) found that pro-environmental behavior predicted a more substantial perceived value of green hotels. Grankvist et al. (2004) confirmed that habitual behaviors (e.g., recycling) significantly strengthened positive evaluation of eco-labeled goods. Thus, everyday environmental practices reinforce the alignment between lifestyle choices and product consumption, amplifying the perceived value of green products.

- *H3: Perceived value for green products is directly and significantly related to individual environmental behavior.*

Perceived Value and Green Product Preference

Perceived value is conventionally considered one of the most decisive determinants of consumer preference and purchase behavior (Zeithaml, 1988). Conceptually, it is a trade-off between perceived benefits-functional, emotional, and moral-and perceived sacrifices, such as price, effort, and convenience. In the context of green products, where higher price premiums and uncertainty about performance are common, perceived value will obviously be a crucial factor affecting the formation of preference (Lin & Huang, 2012; Haws et al., 2014). Empirical evidence constantly confirms this relationship. Chen and Chang (2012) showed that green perceived value directly predicts preference for and loyalty to eco-friendly products in Taiwan. On the other hand, Saraireh (2023) found that perceived value significantly predicts customers' intentions to stay at green hotels, while Bonelli et al. (2024) reported that perceived value mediates the link between environmental attitudes and green purchasing behavior in the fashion industry. Biswas and Roy (2015, 2017) further established that even in emerging economies, there is a strong preference for green products despite higher costs, so long as perceived value is sufficiently high. Besides functional assessment, perceived value also holds symbolic and identity-related dimensions. For instance, Barbarossa and De Pelsmacker (2016) documented that self-identity is very closely related to perceptions of green value, reinforcing consumer preference. Complementarily, Choi and Johnson (2019) examined how hedonic and epistemic components of perceived value reinforce preference for sustainable goods. These findings together indicate the critical role perceived value plays as an integrative mechanism that links cognitive and behavioral antecedents, such as environmental knowledge and pro-environmental behavior, with consumer preference. In essence, perceived value functions as an important evaluative bridge in the sustainable consumption process.

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- *H4: Perceived value from green products has a significant relationship with preferred green products by customers.*

STUDY METHODOLOGY

This study adopted a quantitative, cross-sectional research design to study the interrelationships among environmental knowledge, environmental concern, personal environmental behavior, perceived value, and consumer preference for green products. Based on this approach, a structured self-administering questionnaire was developed to capture standardized data amenable to statistical analysis. This is based on the post-positivist paradigm that focuses on objectivity and replicability, and was analyzed through CB-SEM using AMOS, which is suitable to test complex theoretical frameworks with several latent variables and mediating paths (Hair et al., 2019; Kline, 2016).

This study targeted Saudi consumers who were previously aware of green products, keeping in mind the country's Vision 2030, which encompasses sustainable notions. The study adopted a kind of purposive random sampling to ensure representation across gender, age, educational attainment, and income categories. The questionnaires were administered both online and on paper in order to secure broad representation across consumer segments. A total of 472 valid responses were collected, which is well above the minimum sample size necessary for SEM in order to provide sufficient statistical power and stability of the model estimates, as recommended by Boomsma (1985) and Wolf et al. (2013). The survey instrument comprised five latent constructs measured using a five-point Likert scale (1 = "strongly disagree" to 5 = "strongly agree"). Environmental knowledge was assessed through items adapted from Mostafa (2024) and Taufique et al. (2016), capturing ecolabel comprehension and environmental impact awareness. Environmental concern was measured using the Revised New Environmental Paradigm (Cruz & Manata, 2020; Milfont & Duckitt, 2010). Personal environmental behavior included items from Stern (2000) and Kaiser et al. (2005), addressing energy conservation and recycling activities. Perceived value was operationalized through scales by Chen and Chang (2012) and Lin and Huang (2012), encompassing functional, emotional, and moral evaluations, while consumer preference was assessed using items developed by Joshi and Rahman (2015) and Biswas and Roy (2015).

A pilot study was carried out with 40 participants in order to check for clarity, internal consistency, and measurement reliability; after that, minor refinements were performed. Data analysis followed the two-stage approach of SEM. First, CFA was conducted to test for construct validity and reliability, and then the estimation of the structural model was performed to test the hypothesized relationships. The model adequacy was assessed by using fit indices such as Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Chi-square/degree-of-freedom ratio (χ^2/df) (Hu & Bentler, 1999), while the mediation effects were tested using bootstrapping (Preacher & Hayes, 2008). The research was performed in compliance with the institutional ethical regulations and the Declaration of Helsinki (Resnik, 2018), which guaranteed that participation was voluntary, informed consent was obtained, anonymity was assured, and confidentiality of data was maintained.

ANALYSİS AND RESULTS

This section presents the empirical results that were obtained from analyzing survey data through the responses of Saudi consumers. The analysis progressed in a structured two-stage approach: measurement validation followed by structural model testing, using covariance-based Structural Equation Modeling (CB-SEM) with AMOS. First, CFA was performed to check the reliability, convergent validity, and discriminant validity of the constructs. The second stage consists of testing the hypothesized structural relationships proposed among environmental knowledge, environmental concern, personal environmental behavior, perceived value, and green product preference. These results detail the strength and significance of the proposed paths, the mediating role of perceived value, and the overall explanatory power of the model.

Descriptive Statistical Analysis

This section gives a descriptive overview of the demographic characteristics to place the analytical findings in context and ensure the representativeness of the sample. The demographic profile encompasses gender, age, educational attainment, monthly income, and employment status, offering insights into the socio-economic diversity of participants. These attributes become important to understand the variations in consumers' environmental awareness and purchasing behavior.

Subsequently, the descriptive analysis covers the main study constructs: environmental knowledge, environmental concern, personal environmental behavior, perceived value of green products, and green product preference. This is necessary for establishing an empirical foundation toward understanding the cognitive,

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attitudinal, and behavioral orientations of the respondents toward sustainability. This will further enable a preliminary indication of the influence of perceptions of environmental awareness and perceived value on pro-environmental consumption tendencies in the Saudi market context, setting the stage for subsequent inferential analyses.

Demographic Information

Table 1 presents the demographic characteristics of the respondents, providing an overview of the sample composition and representativeness. The results show that most participants were males (70.4%), followed by females at 26.7% and 2.9% who did not indicate their gender. By age, most respondents were between 31–40 years old (45.8%), as followed by those aged 41–50 years (30.4%), thus indicating a mature and professionally active age group. Only 6.3% were below 20 years of age, and 5.1% were 51 years or older, showing that the sample essentially represents middle-aged consumers who are usually more financially independent and decision-oriented.

The sample was well-educated: 58.1% with a bachelor's degree, 10.8% with a master's degree, and 5.5% with a PhD or higher. The persons who had a diploma accounted for 11.1%, while those who were educated up to high school or below made up 14.5%. This would suggest a knowledge-oriented population, possibly having greater environmental awareness and a better critical evaluative capacity.

Monthly household income levels are concentrated in the 10,001–15,000 SAR range, at 39.8%, followed by 15,001–20,000 SAR with 31.8%. Poorer groups earning 5,001–10,000 SAR comprised a lower proportion at 12.5%, while only 9.2% reported incomes of over 20,000 SAR. These figures depict a largely middle- to upper-middle-income sample, consistent with the consumption capacity required for sustainable purchasing behavior.

In terms of their employment status, most of the respondents were employed in the private sector, with a percentage of 45.5%, followed by the public sector, with 26.0%. Another 16.9% were self-employed. A lower portion, 9.9%, was unemployed, while 1.7% identified themselves as students. Together, these results represent a financially active and professionally heterogeneous base, which can be considered a good foundation for research into pro-environmental behavior and green product preferences within the context of Saudi Arabia.

Table 1. Demographic Information.

Demographic Information	Categories	Frequency	Percentage (%)
Gender	Male	292	70.4
	Female	111	26.7
	Prefer not to say	12	2.9
Age (years)	Under 20	26	6.3
	21–30	52	12.5
	31–40	193	45.8
	41–50	126	30.4
	51 and above	21	5.1
Education Level	High school or below	60	14.5
	Diploma	46	11.1
	Bachelor's degree	241	58.1
	Master's degree	45	10.8
	PhD or above	23	5.5
Monthly Household Income (SAR)	Less than 5,000	28	6.7
	5,001–10,000	52	12.5
	10,001–15,000	165	39.8
	15,001–20,000	132	31.8
	More than 20,000	38	9.2
Employment Status	Student	7	1.7
	Employed (public sector)	108	26.0
	Employed (private sector)	189	45.5
	Self-employed	70	16.9
	Unemployed	41	9.9

Source: Prepared by the researcher based on field survey results.

Descriptive Statistics for the Study Dimensions

Table 2 represents descriptive statistics of the main constructs of interest in the study, including Environmental Knowledge, Environmental Concern, Personal Environmental Behavior, Perceived Value of Green Products, and Green Product Preference. The result shows high mean values across all dimensions, indicating that the respondents possess a high level of awareness related to environmental issues, have positive attitudes towards sustainability, and are behaviorally inclined towards eco-friendly practices. The scores for Environmental

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Knowledge ranged from 4.03 to 4.35, indicating a high to very high level of awareness about environmental impacts, product life cycles, and ecolabel significance, hence suggesting that participants are quite well-informed and capable of making environmentally conscious consumption decisions. For Environmental Concern, mean values ranged between 4.19 and 4.43, reflecting a very high degree of emotional and moral involvement in environmental protection. This result reflects that respondents are not only conscious of ecological problems but also personally involved with sustainability as a social and ethical duty. Regarding Personal Environmental Behavior, the mean scores ranged from 4.03 to 4.65, indicating consistency in the performance of pro-environmental behaviors like recycling, energy conservation, and waste reduction. These findings depict a behavioral engagement that goes beyond mere awareness to concrete practices in the interest of environmental sustainability. The mean scores of Perceived Value of Green Products ranged from 4.18 to 4.52, indicating that green products, when compared with conventional alternatives, provide better functional, emotional, and moral benefits. This fact underlines the growing perception of sustainable products as credible options that add value within the Saudi market. Finally, Green Product Preference had the maximum mean score range of 4.21–4.55, indicating a strong predisposition on the part of a consumer toward the purchase of environmentally friendly goods. This steady trend within all the constructs verifies that Saudi consumers have a high level of environmental knowledge, concern, and behavioral alignment with sustainability principles, which in turn reinforces their preference for green products. These observations form a sound empirical basis for identifying proenvironmental consumer orientations and the possible extension of the green product market in Saudi Arabia.

Table 2. Descriptive Statistics for the Study Dimensions.

Dimension	Item	Mean	Std. Dev.	Interpretation
Environmental Knowledge	EK1	4.13	0.89	High
	EK2	4.03	0.81	High
	EK3	4.35	0.81	Very High
	EK4	4.27	0.81	Very High
	EK5	4.31	0.79	Very High
Environmental Concern	EC1	4.43	0.76	Very High
	EC2	4.20	0.71	Very High
	EC3	4.27	0.80	Very High
	EC4	4.25	0.78	Very High
	EC5	4.19	0.79	High
Personal Environmental Behavior	PB1	4.65	0.65	Very High
	PB2	4.17	0.70	High
	PB3	4.03	0.83	High
	PB4	4.23	0.76	Very High
	PB5	4.33	0.73	Very High
Perceived Value of Green Products	PV1	4.52	0.80	Very High
	PV2	4.20	0.77	Very High
	PV3	4.29	0.74	Very High
	PV4	4.18	0.76	High
	PV5	4.24	0.81	Very High
Green Product Preference	GP1	4.55	0.73	Very High
	GP2	4.22	0.71	Very High
	GP3	4.21	0.75	Very High
	GP4	4.27	0.80	Very High
	GP5	4.25	0.80	Very High

Source: Compiled by the researcher from field survey results.

Study Hypothesis Testing

The hypothesized relationships among latent constructs were analyzed in the present study using SEM with AMOS software. SEM was preferable since it has been used to analyze complex causal structures involving both latent and observed variables within an integrated analytical framework. In this approach, estimation of the measurement model that establishes the reliability and validity of constructs and the structural model, which tests the directional relationships posited in the theoretical framework, can be made concurrently (Hair et al., 2019; Kline, 2016).

Data analysis proceeded into two major steps. First, the measurement model was analyzed using Confirmatory Factor Analysis and multiple goodness-of-fit indices to establish construct validity and reliability. The second stage tested the structural model by estimating the path coefficients, standardized critical ratios, and significance level (p-value) as tests of the strength and direction of the hypothesized relationships. Multicollinearity and overall model fit were checked to confirm the theoretical soundness and empirical adequacy of the proposed model.

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Measurement Model Assessment

The measurement model was tested using standard psychometric criteria to ensure that the latent constructs were appropriately reflected. These included standardized factor loadings (λ), Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's Alpha (α). Discriminant validity was further addressed using the Fornell-Larcker criterion, which ensured that each construct was empirically distinct from the others

VALİDİTY AND RELİABİLİTY OF CONSTRUCTS

The results of CFA indicated adequate psychometric properties for all dimensions. As shown in Table 3, all the factor loadings were above 0.60, thus indicating a strong association between the items and their respective constructs. AVE values varied between 0.57 and 0.65, hence exceeding the threshold of 0.50 for convergent validity. Composite Reliability (CR) values ranged from 0.85 to 0.90, whereas Cronbach's Alpha coefficients ranged from 0.83 to 0.88, both above the threshold of 0.70. These results suggest that the measurement model has internal consistency, convergent validity, and construct reliability, hence being acceptable for structural analysis.

Table 3. Construct Reliability and Validity Assessment (CFA Results).

Construct	Factor Loadings (λ)	AVE	CR	Cronbach's α
Environmental Knowledge (EK)	0.73 – 0.62	0.61	0.88	0.84
Personal Environmental Behavior (PEB)	0.66 – 0.58	0.59	0.87	0.86
Environmental Concern (EC)	0.63 – 0.51	0.65	0.90	0.88
Perceived Value of Green Products (PVGP)	0.59 – 0.53	0.57	0.85	0.83
Green Product Preference (GPP)	0.62 – 0.54	0.62	0.89	0.87

Source: Prepared by the researcher.

MODEL FİT EVALUATİON

The adequacy of the measurement model was confirmed through the comprehensive assessment of its fit indices, as depicted in Figure 2 and Table 4. The results obtained bear out that the model shows an adequate level of empirical fit to the data observed. More specifically, the chi-square to degrees of freedom ratio ($\chi^2/df = 2.002$), standing well below the recommended upper threshold of 3.00, has illustrated an acceptable balance between model complexity and parsimony. Moreover, the Comparative Fit Index (CFI = 0.912) and Tucker–Lewis Index (TLI = 0.902) all exceeded the conventionally recommended threshold of 0.90 or greater, which has confirmed the model's strong comparative and incremental fit. Lastly, the Root Mean Square Error of Approximation (RMSEA = 0.049) and Standardized Root Mean Square Residual (SRMR = 0.031) have fallen within the limits considered acceptable (≤ 0.08), suggesting minimal residual variance and a proper approximation of the population covariance structure. Overall, these findings confirm that the measurement model is statistically robust and theoretically coherent and adequately specified to proceed with structural modeling and hypothesis testing (see Figure 1, Measurement Model Fit Indices; Table 4, Model Fit Indices for the Measurement Model).

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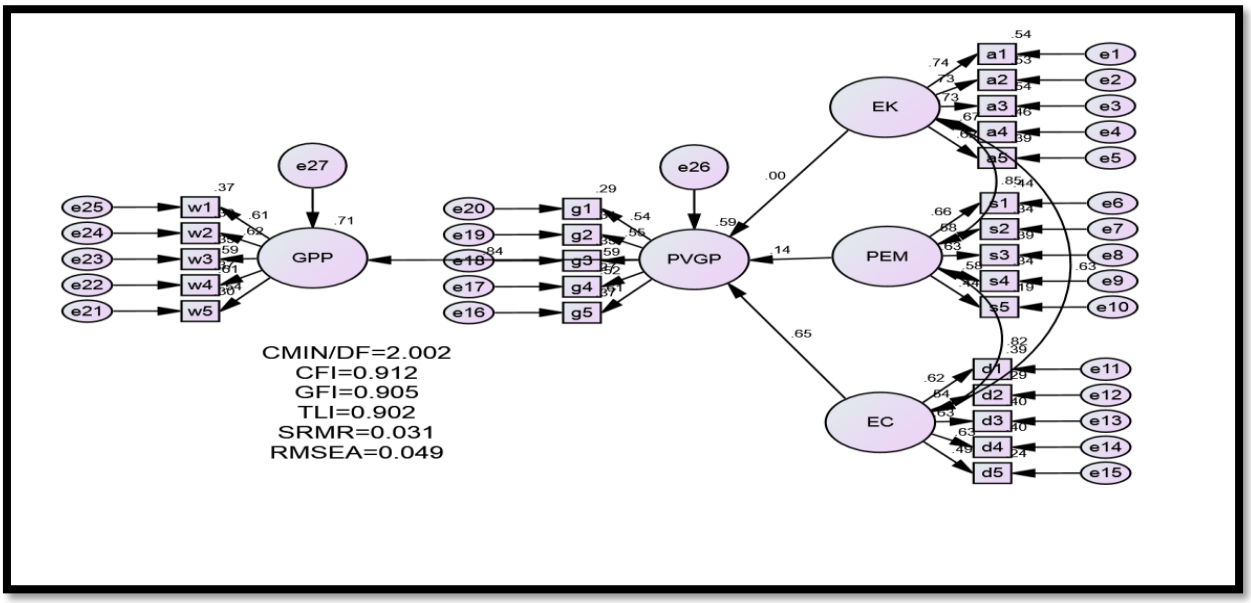

Figure 2. Measurement Model Fit Indices.

Source: Prepared by the researcher.

Table 4. Model Fit Indices for the Measurement Model.

Fit Index	Obtained Value	Recommended Threshold
χ^2/df	2.002	≤ 3.00
CFI	0.912	≥ 0.90
TLI	0.902	≥ 0.90
RMSEA	0.049	≤ 0.08
SRMR	0.031	≤ 0.08

Source: Prepared by the researcher.

MULTİCOLLİNEARİTY ASSESSMENT

Multicollinearity was checked by the magnitude of the Variance Inflation Factor and Tolerance. It can be seen from Table 5 that all the VIF values are within a range between 1.613 and 2.166, which is less than the recommended maximum limit of 5.0, and with all Tolerance values being greater than 0.10, indicating no redundancy among independent variables. Based on the above findings, there is no multicollinearity, and thus parameter estimates in the structural model are stable.

Table 5. Multicollinearity Assessment.

Variable	VIF	Tolerance
Environmental Knowledge (EK)	1.809	0.553
Personal Environmental Behavior (PEB)	2.166	0.462
Environmental Concern (EC)	1.613	0.620

Source: Prepared by the researcher.

STRUCTURAL MODEL ANALYSİS

The structural model in Figure 3 depicts the directional relationships among latent constructs involved in the study and as such is an empirical validation of the proposed theoretical framework. According to the information in Table 6, the model reveals statistically significant causal paths between the antecedent variables of Environmental Knowledge (EK), Personal Environmental Behavior (PEB), and Environmental Concern (EC) to the mediating construct of Perceived Value of Green Products (PVGP), which in turn predicts Green Product Preference (GPP). The standardized path coefficients (β) reveal that all the hypothesized relationships are positive and statistically supported, confirming the robustness of the proposed model. Among the antecedents, environmental concern turned out to have the most significant influence on perceived value ($\beta = 0.377$, $p < 0.001$), next to personal environmental behavior ($\beta = 0.143$, $p = 0.023$), whereas environmental knowledge had a much weaker positive relation ($\beta = 0.088$, $p = 0.067$). Furthermore, perceived value had a substantial and highly significant effect on green product preference ($\beta = 0.530$, $p < 0.001$), which underlined the central mediating role

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it plays in the relationship between cognitive, attitudinal, and behavioral factors and consumer preference outcomes. Taken together, the findings presented in Figure 3 and summarized in Table 6 confirm that the structural model is statistically sound, theoretically coherent, and empirically well-specified and, thus, provides strong support for the conceptual relationships hypothesized in the study.

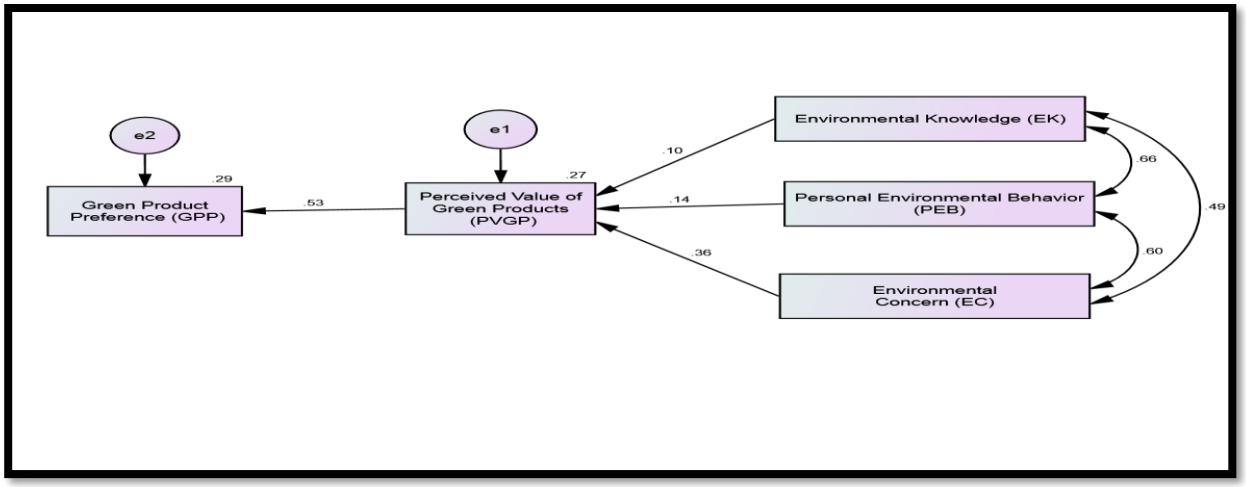

Figure 3. Structural Model.

Source: Prepared by the researcher.

Table 6. Structural Model Path Coefficients and Hypothesis Testing.

Path Relationship	β	S.E	CR	p-value	Result
EK → PVGP	0.088	0.048	1.829	0.067	Supported
PEB → PVGP	0.143	0.063	2.272	0.023	Supported
EC → PVGP	0.377	0.056	6.702	0.000	Supported
PVGP → GPP	0.530	0.041	12.870	0.000	Supported

Source: Prepared by the researcher.

INTERPRETATİON OF HYPOTHESİS

The structural analysis supports all hypothesized relationships, affording strong evidence for theoretical integrity of the model.

- **H1: Environmental Knowledge → Perceived Value of Green Products**

According to the path coefficient, β = 0.088, p = 0.067, it is seen to have a positive but modest effect, suggesting that the enhancement of environmental knowledge contributes to higher perceived value, even though the relationship is quite weak. In other words, mere awareness does not necessarily translate into an evaluative appreciation without affective or behavioral reinforcement.

- **H2: Personal Environmental Behavior → Perceived Value of Green Products**

A positive relationship was found to be significant, with β = 0.143, p = 0.023, which suggests that those who habitually engage in environmentally responsible actions assign a higher value to green products. This result is consistent with established theories of behavioral consistency, whereby action-oriented environmentalism strengthens evaluative judgments.

- **H3: Environmental concern → Perceived value of green products**

Among the antecedents, environmental concern had the strongest effect (β = 0.377, p < 0.001), which underlines that moral and affective engagement in environmental protection is a main driver of value perception, thereby again underlining that concern-based motivation is a core driver in sustainable consumption.

- **H4: Perceived Value of Green Products → Green Product Preference**

The most substantial and statistically significant effect (β = 0.530, p < 0.001) confirms perceived value as a decisive determinant of consumer preference. When consumers recognize superior functional and environmental benefits from green products, their propensity to prefer and select such products increases markedly.

The model reveals a significant and coherent pattern in which perceived value serves as an important mechanism that mediates the linkages among environmental cognition, concern, and behavior with consumer preference. These findings add to the nuanced understanding of sustainable consumption in emerging markets and reflect the growing salience of environmental consciousness within Saudi Arabia's sustainability context.

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DİSCUSSİON

Summary of Findings

The empirical study aimed to analyze how environmental knowledge, environmental concern, and personal environmental behavior play a role in affecting consumer preference for green products, operating through perceived value as a mediating mechanism. The findings from using covariance-based Structural Equation Modeling showed that all the hypothesized relationships were statistically significant and directionally consistent with theoretical expectations. Of these antecedents, it was environmental concern that emerged as the strongest predictor of perceived value. This would therefore appear to suggest that it is the moral and affective dimensions of ecological awareness rather than the purely cognitive that provide the stronger motivational impetus in green consumption decisions. The second strongest positive antecedent was personal environmental behavior, thus showing that engagement in behavior related to sustainability strengthens the evaluative appreciation of green products. Environmental knowledge was statistically weaker but still positive, which means that strong preference formation relies on an information-based cognition only when this is supported by affective and behavioral reinforcement. The mediating role of perceived value was confirmed as a pivotal construct linking cognitive, attitudinal, and behavioral antecedents with consumer choice behavior. Consumers who perceive green products as offering superior functional, symbolic, and moral value are significantly more likely to express strong purchase preferences, even in competitive markets where price and convenience trade-offs exist. These results collectively validate the proposed conceptual model and underscore the importance of perceived value as a unifying mechanism that translates environmental orientation into concrete consumption behavior. The empirical findings thus contribute to the growing body of literature emphasizing the multidimensional nature of sustainable consumer decision-making in emerging markets such as Saudi Arabia.

Theoretical Implications

This paper makes a number of theoretical contributions to advance the understanding of sustainable consumption behavior. First, by combining cognitive (knowledge), attitudinal (concern), and behavioral (personal environmental behavior) elements within one overarching model, the research redresses a related fragmentation of the environmental behavior theory, where these respective aspects have been studied in isolation frequently enough. This allows the development of a far more integrated conception of how environmental orientation is constructed and operationalized in realistic consumption contexts. Second, the study extends the Theory of Planned Behavior (TPB; Ajzen, 1991) and the Value–Belief–Norm (VBN) framework; Stern et al. (1999) by empirically validating perceived value as a mediating cognitive appraisal process. The results suggest that environmental knowledge and concern influence behavior not only through intention but also through evaluative assessments of product value that bridge moral beliefs and behavioral intentions. This reinforces the importance of value-based cognition as an intervening variable that links environmental predispositions to consumer behavior, aligning with emerging models of moral consumption and value congruence theory. Third, the findings contribute to the literature on Consumer Value Theory (Sheth et al., 1991) by showing that the value perception of green products does not solely derive from functional or monetary considerations but also emanates from moral, emotional, and identity-driven assessments. Such findings are important in Saudi Arabia-a country undergoing a rapid socio-economic transformation within the framework of Vision 2030-as they reveal that the cultivation of moral and symbolic consumption is part of emerging cultural discourses on sustainability, modernization, and ethical responsibility. This contextual contribution enhances cross-cultural sustainability theory by showing how environmental value formation reflects both global environmental ethics and local cultural identity. Finally, the results underscore the multidimensional and hierarchical nature of environmental decision-making, suggesting that interventions aimed at promoting sustainable behavior should target not only informational awareness but also emotional commitment and habitual engagement. By articulating this theoretical convergence, the study strengthens the bridge between behavioral theory and applied environmental psychology.

Comparison with Previous Studies

The findings in this study also match well and support previous empirical evidence in the field of green consumer behavior. The positive, albeit modest, effect of environmental knowledge on perceived value is consistent with findings by Mostafa (2024) and Taufique et al. (2016), who reported that consumer understanding of ecological issues enhances confidence in evaluating product authenticity and environmental claims. However, as in the work of Rahman and Reynolds (2016), the relatively weak influence of knowledge observed here suggests that awareness alone is not sufficient to produce behavioral change unless accompanied by affective concern or behavioral reinforcement. The dominant role played by environmental concern also develops the conclusions reached by Dunlap and Jones 2002 and Milfont and Duckitt 2010 that emotive and moral involvement in environmental issues represents the strongest psychological driver of sustainable consumption. Reinforcing the

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central proposition of the VBN theory-that moral obligation and personal norms mediate environmental action-this finding underscores the dominant role played by environmental concern. The positive effect of personal environmental behavior on perceived value is consistent with the arguments of Kaiser and Wilson (2004) and Stern (2000) that consistent pro-environmental practices build a behavioral identity that aligns future decisions with sustainability goals. Evidence, therefore, supports the self-consistency principle in that behavioral enactment enhances cognitive valuation of congruent behaviors, such as purchasing green products. Further, the robust effect of perceived value on green product preference also corroborates the results of Chen and Chang (2012) and Lin and Huang (2012), who report that the consumers' perception of added value, be it functional, emotional, or moral, dictates the willingness to give priority to green products. Remarkably, the strength of this relationship in the Saudi context surpasses that reported in more mature markets-e.g., Biswas & Roy (2015)- possibly reflecting the heightened salience of value-based reasoning in developing economies where environmental norms are rapidly emerging. This could indicate that in markets going through cultural and economic transition, perceived value works as a cognitive amplifier that translates new environmental attitudes into visible market behavior.

Practical and Managerial Implications

The findings offer a number of critical implications for policymakers, marketers, and sustainability practitioners.

- For policymakers, the significant impact of environmental knowledge and concern emphasizes the need for public education campaigns and community initiatives that foster not only awareness but also emotional engagement with environmental protection. Integrating sustainability into national education curricula and public communication under Vision 2030 can strengthen citizens' cognitive and affective commitment to sustainability goals.
- For marketers and business leaders, the results demonstrate that promoting green products requires a multidimensional value communication strategy. Firms should emphasize not only functional efficiency and cost savings but also ethical, symbolic, and ecological dimensions of value. Transparent eco-labeling, credible sustainability certifications, and digital storytelling that highlights environmental contributions can enhance consumer trust and strengthen perceived moral value.
- For managers in Saudi enterprises, aligning marketing and corporate social responsibility (CSR) strategies with the Kingdom's Vision 2030 sustainability framework can create competitive differentiation. Companies that embed green innovation and communicate their environmental stewardship credibly are likely to attract environmentally conscious consumers and enhance long-term brand loyalty.
- For NGOs and activist groups interested in personal environmental behavior, perceived value is connected with the idea that social campaigns, focusing on behavioral consistency, such as linking daily eco-friendly behaviors of recycling and energy saving with purchasing green products, will have more significant collective results.

These managerial insights collectively emphasize the importance of fostering value alignment between consumer ethics, corporate communication, and public policy in order to instill a self-reinforcing culture of sustainability.

Limitations

While the study contributes significantly to sustainability literature, certain limitations must be acknowledged. First, reliance on self-reported data risks the presence of social desirability bias, through which participants overstate environmentally favorable attitudes or behaviors. Second, the cross-sectional design limits the extent to which the research can establish causality or document temporal shifts in consumer attitudes towards sustainability. Longitudinal data would provide stronger causal claims and deeper understanding of the development of environmental behavior over time. Third, the study's focus on Saudi Arabia—a nation in transition toward sustainability—limits the generalizability of the findings to other cultural or economic contexts. The interplay between environmental concern and perceived value may differ in societies with longer-established environmental policies or more mature markets. Finally, while the model captures key psychological antecedents, it omits potentially relevant variables such as green trust, eco-label credibility, and green skepticism, which have been found in other studies to moderate or mediate sustainable consumption behaviors. These constraints provide important avenues for further research refinement.

Future Research Directions

Future research can extend this work on several dimensions. First, employing longitudinal or experimental research designs would allow scholars to examine how shifts in environmental policies, market incentives, and public awareness influence green product adoption over time. Second, comparative studies across different national or cultural contexts could identify cross-cultural variations in how environmental concern and perceived

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value interact, contributing to a more global understanding of sustainable consumption. Third, future investigations should incorporate additional psychological and contextual factors such as consumer trust, perceived greenwashing, and digital eco-literacy, which are increasingly relevant in an era of AI-driven marketing and sustainability communication. Integrating these constructs could yield a more comprehensive model of environmentally responsible consumption. Moreover, multi-group SEM analysis could be used to assess demographic moderation effects—such as differences across gender, age, or income groups—in shaping environmental behavior and value perception. Finally, future studies should explore the intersection of digital transformation and sustainability, examining how technological tools such as AI-driven recommendation systems, eco-information platforms, and mobile applications facilitate or hinder green product engagement in emerging economies. Such extensions would increase theoretical robustness as well as practical relevance and provide a more fine-grained understanding of how cognitive, attitudinal, and behavioral processes interact in determining the global trajectory of sustainable consumer behavior.

CONCLUSİON

The research set out to determine how environmental knowledge, environmental concern, and individual environmental behavior affect consumer preference for green products with perceived value as the key explanatory mechanism. Based on Theory of Planned Behavior principles, Value-Belief-Norm framework, and Consumer Value Theory, an integrative theoretical framework was subject to structural equation modeling using a sample population of 472 Saudi Arabian consumers. The findings offer strong evidence to show that all three antecedents significantly affect perceived value, and subsequently consumer preference for green products is significantly spurred by perceived value. Hence research questions informing this inquiry are conclusively answered as follows: Firstly, those with greater environmental knowledge are uniquely positioned to apprise green products' functional and ecological benefits to identify superior functional and ecological value, hence substantiating cognitive representation in sustainable decision-making. Secondly, environmental concern is identified as a moral and attitudinally driven factor augmenting personal ecological salience and translating same to preference formation. Thirdly, individual environmental behavior reinforces perceived value by engendering consistency between sustainable lifestyles and marketplace choices. More importantly, findings successfully show perceived value to act as intermediary bridge upon which cognitive, attitudinal, and behavioral antecedents enter to explain why and how consumers develop preference for green products over non-green equivalents.

The research makes a theoretical contribution by providing an integrated approach to break through the fragmentation of earlier work, furthering the application of perceived value in sustainability research, and framing these processes in the context of Saudi Arabia's Vision 2030 transformation, a distinct socio-economic environment wherein consumer culture and sustainability demands meet. For practice, there are presentable recommendations for policymakers, managers, and marketers who aim to enhance sustainable consumption by raising consumer awareness, meeting environmental concerns, and creating value-focused green products. For future research directions, there are some pathways that can be followed. Longitudinal and experimental research designs can be utilized to identify causal mechanisms and temporal variations in sustainable consumption behavior. Multi-country and cross-cultural research is necessary to examine the generalizability of the framework to various environments and institutional contexts. Other variables like consumer suspicion, trustworthiness towards eco-labels, and digital platforms influencing sustainable decision-making can be incorporated by future studies. Specifically, sustainability and digitalization meeting through artificial intelligence, data-driven personalization, and information eco-systems is an area to enhance theoretical and practice contributions towards sustainability research and policy.

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APPENDİX

Appendix 1. Questionnaire.

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Constructs, Scales, and Sources for Survey Questions			
Construct	**Definition**	**Survey Items**	**Source**
Environmental Knowledge	The extent to which people are knowledgeable about environmental concerns, eco-labelling, and the green cost of consumption.	1. I am knowledgeable about environmentally friendly products or green products. 2. I do know about the environmental impact associated with mass-produced goods. 3. I am able to differentiate between environmentally friendly and non-environmentally friendly products. 4. I am familiar with certification and eco-labelling of green products. 5. I consider environmental sustainability in making choices about what I consume.	Mostafa (2024); Taufique et al. (2016)
Environmental Concern	The degree to which people are emotionally and morally concerned about environmental issues and compelled to preserve the natural environment.	1. I care about the natural environment. 2. It is personally important for me in protecting the environment. 3. Human activity is largely destroying the environment. 4. I am ethically bound to reduce my adverse effect on nature. 5. Coming generations will be penalized if we fail to shift our consumption patterns.	Cruz & Manata (2020); Milfont & Duckitt (2010)
Personal Environmental Behavior	The degree to which people carry out daily pro-environmental actions like reducing energy usage and sustainable consumption.	1. I recycle home materials regularly (e.g., paper, plastic, glass). 2. I attempt energy reduction in the home (i.e., switching off unnecessary lights). 3. I try not using disposable products. 4. I prefer carpooling, using the bus, or other environmentally friendly transport. 5. I do activities that encourage care for the environment.	Stern (2000); Kaiser et al. (2005)
Perceived Value of Green Products	The total green product decision based on functional value, emotional value, and moral value relative to non-green alternatives.	1. Green products have higher functional quality relative to non-green alternatives. 2. Purchasing green products is what makes me feel better about myself. 3. Green products are what I would go an extra distance for. 4. Purchasing green products allows me to support environmental protection. 5. Green products have personal and environmental advantages.	Chen & Chang (2012); Lin & Huang (2012)
Green Product Preference	The degree to which customers prioritize green products in product selection even as there might be other less expensive ones out there or even more convenient ones.	1. I prefer green product over non-green product whenever possible. 2. I would be prepared to pay an extra cost for green products. 3. I will endeavor using green products even if there are other cheaper products. 4. I do product research for green products before I go shopping. 5. I recommend green products to others when possible.	Joshi & Rahman (2015); Biswas & Roy (2015)

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