


Exploring the green purchase intention-behavior gap among South African millennials using an expanded planned behavior model

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ABSTRACT

This study investigates the determinants of green purchase behaviour among South African millennials, drawing on a sample of 189 respondents to elucidate the most salient antecedents that drive green consumption within this demographic. Anchored in an extended Theory of Planned Behavior (TPB), the research incorporates environmental concern and personal norms as additional predictors of favourable attitudes toward green products, while also assessing whether willingness to pay a premium and perceived consumer effectiveness moderate the intention-behaviour relationship. Employing partial least squares factor-based structural equation modeling (PLSF-SEM), the analysis reveals that both environmental concern and personal norms exert a significant positive influence on consumers' attitudes, which, in turn, emerge as robust predictors of green purchase intention. Furthermore, intention was found to significantly predict actual green purchase behaviour. Contrary to expectations, subjective norms did not exert a meaningful effect on green purchase intentions, and the hypothesised moderating roles of willingness to pay and perceived consumer effectiveness were not empirically supported. These findings contribute to the growing discourse on green consumption in particular and eco-conscious behavior in general by highlighting the primacy of internalized values and attitudes over social influence or economic considerations in shaping green/eco-conscious behaviours among millennial consumers in emerging markets.

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1. Introduction

Green consumerism, defined as the purchasing of environmentally friendly and sustainably produced goods, has gained significant recognition as a key behavior in mitigating environmental degradation (Mehraj & Qureshi, 2022; Polisetty et al., 2024; Riva et al., 2022). The global urgency of sustainable practices is underscored by initiatives such as the United Nations' Sustainable Development Goals (SDGs), a framework of 17 interconnected objectives aimed at fostering a more sustainable and equitable future. Among these, SDG 12 advocates for responsible consumption and production, urging both individuals and organizations to adopt eco-conscious behaviors.

The increasing salience of green purchasing behavior in developing countries is fueled by growing environmental awareness among consumers (Sharma et al., 2020; Shehawy & Khan, 2024; Sinha & Annamdevula, 2025; Vuong & Bui, 2025). The consumption of green products is perceived as a practical and proactive means of reducing pollution and mitigating environmental crises. This perception encourages consumers to opt for eco-friendly alternatives over conventional products that pose environmental risks (Kamalanon et al., 2022; Malhotra & Srivastava, 2024; Sun et al., 2022; Wang et al., 2024). However, despite growing interest, actual market uptake often lags behind expressed consumer intentions.

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For example, White et al. (2019) reported that while 65% of respondents expressed interest in purchasing green products, only 26% translated this into action—an illustration of the well-known intention–behavior gap (Qi et al., 2020).

This study seeks to investigate the factors influencing green purchasing behavior among millennial consumers in South Africa, while also addressing the intention–behavior gap. Millennials—and young consumers more broadly—constitute a critical demographic in the Global South, often at the forefront of advocating for sustainable change when informed and engaged (Joshi & Rahman, 2019; Nguyen et al., 2018; Shehawy & Khan, 2024). The urgency is especially pronounced in Southern Africa, which is warming at nearly twice the global average (Scholes & Engelbrecht, 2021), exacerbating the region's vulnerability to climate change. This poses far-reaching implications for livelihoods, health, and economic stability (cf. Abdelzaher et al., 2020). South Africa's Department of Forestry, Fisheries, and the Environment (n.d.) similarly warns that climate change represents a critical socio-economic and environmental threat to the country.

Although green product consumption has proven benefits for climate mitigation, the persistence of the intention–behavior gap presents a major challenge. This gap—representing the disconnect between consumers' stated intentions and their actual behaviors—has been identified in existing literature but remains relatively underexplored in the context of millennial consumers in developing countries like South Africa (ElHaffar et al., 2020; Tawde et al., 2023). Thus, understanding the specific factors that drive or hinder green purchasing among this cohort is essential to fostering more sustainable consumer practices. This study also responds to scholarly calls for more empirical research on sustainable consumption and climate-friendly behavior among young consumers (Fani et al., 2023; Joshi & Rahman, 2019; Polisetty et al., 2024; Riva et al., 2022; Shehawy & Khan, 2024).

While the intention–behavior gap in green consumption has been widely acknowledged (ElHaffar et al., 2020; Shehawy & Khan, 2024; Sukumaran & Majhi, 2025; Wang et al., 2024), this research contributes to the field by identifying the behavioral antecedents of green purchase intention and exploring two additional variables—willingness to pay a premium and perceived consumer effectiveness—as potential moderators of this gap.

To guide the study, we adopt an expanded Theory of Planned Behavior (TPB) framework (Ajzen, 1991; Choi & Johnson, 2019; Feisthauer et al., 2024; Tao et al., 2021), which has proven effective in prior green consumption research and is well-suited for extension with additional constructs (see also Shehawy & Khan 2024; Sun et al., 2022; Tewari et al., 2022). Specifically, we incorporate personal norm and environmental concern, which, while theoretically relevant (Dangelico et al., 2021; Sharma et al., 2023; Vuong & Bui, 2025; Wang et al., 2022), remain under-studied in the research context.

Our application of an extended TPB model aligns with Ajzen's Ajzen (2011) own recommendations for broadening TPB to increase its contextual relevance and predictive accuracy. A survey of green consumerism literature reveals a paucity of studies that simultaneously consider the explanatory potential of willingness to pay a premium and perceived consumer effectiveness for the intention–behavior gap. Furthermore, unlike the bulk of existing research focused predominantly on Western and Asian contexts (Barbeta-Viñas, 2023; Dangelico et al., 2021; ElHaffar et al., 2020; Sharma et al., 2023; Shehawy & Khan 2024; Sinha & Annamdevula, 2025; Sun et al., 2022; Wang et al., 2024), our study investigates these dynamics among South African millennials—a demographically and contextually distinct group that remains under-represented in green purchasing research.

According to TPB, individual intentions and behaviors are shaped by three core components: attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991, 2011). This study investigates these constructs while also assessing the extent to which the intention–behavior gap is moderated by consumers' willingness to pay a premium and their perceived efficacy in contributing to pro-environmental outcomes. By doing so, we aim to provide a comprehensive understanding of green purchasing among South African millennials.

The findings yield several theoretical and practical insights. Empirically, the study demonstrates that attitudes and perceived behavioral control (H4–H5) exert stronger influences on green purchase intention than subjective norms (H3), even within a collectivist context where normative pressures are typically assumed to dominate. Additionally, both environmental concern and personal norms emerged as significant antecedents of green consumption attitudes and subsequent purchase intentions, underscoring

their relevance in shaping eco-conscious behavior. Practically, although intention remains a robust predictor of actual behavior, the study reveals that neither willingness to pay a premium nor perceived consumer effectiveness significantly moderates the intention–behavior link (H7–H8). This suggests that common strategies employed in other contexts—such as premium pricing or eco-efficacy messaging—may be less effective in the South African market. By focusing on South African millennials, the study also responds to Sharma et al. (2023) call for more research on the antecedents of green purchase intentions in diverse socioeconomic and emerging market contexts, thereby extending the applicability of green consumption theories beyond both Asian and Western settings.

In sum, this research enhances our understanding of green purchasing behavior among South African millennials by examining the psychosocial factors influencing their intentions and actual behaviors. Given the global imperative to combat climate change, promoting green consumerism among younger generations is essential for achieving sustainable development and safeguarding the environment.

2. Theoretical underpinning, conceptual framework and hypothesis development

2.1. Theory of Planned behaviour

The Theory of Planned Behavior (TPB) has long served as a foundational framework for examining environmentally sustainable practices, including green consumption (Joshi & Rahman, 2019; Sharma & Foropon, 2019; Shehawy & Khan, 2024; Sun et al., 2022; Tewari et al., 2022). Introduced by Ajzen (1991) as an extension of the Theory of Reasoned Action (TRA)—developed by Fishbein and Ajzen in the 1970s—the TPB posits that an individual's behavioral intentions are the most immediate antecedents of actual behavior, particularly when the behavior is volitional and under the individual's control (Ajzen, 1991).

At its core, the TPB suggests that the stronger an individual's intention to perform a given behavior, the more likely it is that the behavior will be enacted (Ajzen, 1991). Although widely regarded as a robust framework for predicting human behavior (Ogiemwonyi, 2022), the TPB is not without limitations. Its reliance on rational, volitional decision-making processes has prompted scholars to propose contextual extensions to improve its explanatory power, particularly in settings where structural, cultural, or economic constraints shape behavior (Choi & Johnson, 2019; Feisthauer et al., 2024; Patharia et al., 2022; Polisetty et al., 2024). Despite these critiques, the TPB remains one of the most empirically validated models for behavior prediction across diverse domains. One of its key strengths is its flexibility, which allows for the integration of additional, context-specific variables—such as environmental concern and personal norm—to enhance its relevance to contemporary sustainability challenges (see also Patharia et al., 2022; Shehawy & Khan 2024; Sun et al., 2022; Tewari et al., 2022).

This study builds on that adaptability by extending the TPB framework with two moderating variables: willingness to pay a premium for green products and perceived consumer effectiveness. These additions are particularly salient for the Global South, where economic conditions, cultural norms, and access to green alternatives may significantly alter the intention–behavior relationship.

While alternative theories such as the Norm Activation Model (NAM) and the Value-Belief-Norm (VBN) Theory have emerged in sustainability research, we argue that TPB remains particularly well-suited to this study. Its focus on attitudes, social influences, and behavioral control aligns with consumers' cognitive decision-making processes and the fact that it can accommodate additional contextually relevant factors (Ajzen, 2011) makes it all the more appealing to use in the green consumption context (Chaudhary & Bisai, 2018; Dilotsotlhe, 2021; Shehawy & Khan 2024; Sun et al., 2022). Moreover, its structured and parsimonious framework allows for clear empirical testing of psychological drivers behind green purchasing decisions (see also Choi & Johnson, 2019; Patharia et al., 2022; Sharma & Foropon, 2019). Our incorporation of moderators directly addresses its limitations by bridging the intention–behavior gap—a recurring challenge in sustainable consumption research (ElHaffar et al., 2020).

2.1.1. The intention-behaviour gap (IBG) towards green purchase

Consumer intentions are central to the enactment of behavior, particularly within the framework of the Theory of Planned Behavior (TPB), and serve as a key predictor of actual consumer behavior (Ajzen, 1991; Patharia et al., 2022; Polisetty et al., 2024; Sharma et al., 2023). However, while intentions are necessary

precursors to behavior, a persistent challenge in green consumption is that many consumers who intend to purchase environmentally friendly products fail to act on those intentions (ElHaffar et al., 2020; Sharma et al., 2023; Vu et al., 2022; White et al., 2019). This disconnect, often referred to as the intention–behavior gap, highlights a recurring shortfall in translating green purchase intentions into actual purchasing decisions (Dangelico et al., 2021; ElHaffar et al., 2020; Shehawy & Khan, 2024).

Despite the extensive literature on green consumerism, limited research has specifically interrogated the intention–behavior gap, with greater emphasis instead placed on the attitude–behavior gap (Dilotsotlhe, 2021; Sharma et al., 2023; Tawde et al., 2023). One explanation for this gap is that some individuals may only signal green intentions without genuinely holding them, a phenomenon described by Tawde et al. (2023) as intention misrepresentation, which complicates efforts to translate stated intentions into tangible action. Moreover, Sharma and Foropon (2019) argue that green behavior can occur independently of intentions, influenced instead by factors such as environmental concern and product attributes.

To address this gap, White et al. (2019) propose a practical interventionist approach, advocating for firms to create enabling environments that nudge consumers toward sustainable purchasing. They suggest leveraging social influence, habit formation, and targeted messaging—both emotional and rational—as strategies to facilitate behavioral change. In particular, by modeling pro-environmental behavior and emphasizing experiential value over material ownership, firms can promote a spillover effect, encouraging broader sustainable practices.

This perspective marks a departure from conventional green marketing, which often focuses narrowly on product features such as eco-labeling or packaging. While packaging remains influential—given that visual elements can attract consumer attention and affect purchase decisions (Ashrafi et al., 2025; Orquin et al., 2020)—a sole focus on product attributes is insufficient to bridge the intention–behavior gap.

Given the multifaceted nature of green purchasing behavior, further research is needed to clarify the determinants that effectively convert green intentions into action (Sukumaran & Majhi, 2025; Tawde et al., 2023), particularly in diverse economic and cultural contexts (see also Sharma et al., 2023). Addressing this gap remains critical for advancing both theoretical models and practical interventions in sustainable consumption.

2.2. Factors driving green purchase behaviour

From the systematic review conducted by researchers such as Sharma (2021), Sharma et al. (2023) and Zhang and Dong (2020), it was reported that consumers do not make green purchasing decisions solely based on their personal preferences. Instead, various other factors, which are a combination of external and individual factors, significantly impact the consumer's decision-making process (Sharma, 2021; Zhang & Dong, 2020). These factors include considerations such as the consumer's background and characteristics, the quality and features of the product itself, as well as the marketing strategies employed by the companies selling the green products (Barone et al., 2024; Zhang & Dong, 2020). All of these factors together play a role in influencing consumers' choices when it comes to buying green products (Sharma, 2021; Sharma et al., 2023; Vuong & Bui, 2025; Zhang & Dong, 2020).

2.2.1. Environmental concern

Choi and Johnson (2019, p. 146), drawing on prior research, define environmental concern as an 'individual's concern for the environment and environmental issues,' while Chopra and Vinayek (2013, p. 66) describe it as a set of affective traits encompassing worries, preferences, and attitudes toward the environment. Kamalanon et al. (2022) further conceptualize it as the extent to which consumers regard environmental issues as vital to societal well-being. Taken together, environmental concern reflects an individual's awareness and affective response to environmental issues. Prior research consistently highlights environmental concern as a key driver of green purchasing behavior. For instance, Dangelico et al. (2021) and Kautish and Sharma (2020) argue that a high level of environmental concern strongly influences consumers' propensity to buy green products. This is echoed by other scholars (Chaudhary & Bisai, 2018; Dlamini & Mahowa, 2024; Jaiswal & Kant, 2018; Kumar et al., 2023; Tandon et al., 2023) who find

that ecologically concerned individuals tend to hold favorable attitudes toward green products and are more likely to engage in green purchasing. Accordingly, the following hypothesis is proposed:

H1: *Environmental concern has a positive relationship with consumer's attitude toward green products.*

2.2.2. Personal norm

Following prior research, personal norm is defined as the 'moral obligations expected from an individual' (Bashir et al., 2019, p. 3). In the context of green consumption, it reflects a strong moral conviction to engage in pro-environmental behaviors, such as purchasing eco-friendly products, to mitigate environmental harm (Bashir et al., 2019; Dangelico et al., 2021). Personal norms serve as internalized principles guiding individuals' conduct in line with their beliefs (Chen et al., 2023), and violations of these norms can evoke negative self-directed emotions such as guilt (Rosenthal, 2022). As Ajzen (1991) noted, attitudes toward behavior are shaped by underlying behavioral beliefs. Similarly, Nguyen et al. (2018) and Wang et al. (2022) argue that pro-environmental behaviors are often direct expressions of personal norms grounded in moral responsibility. Sharma et al. (2023) further characterize personal norms as a self-aware choice to act in a way that entails both consequences and a sense of responsibility. Bashir et al. (2019) emphasize that personal norms transform general environmental concern into concrete action, a view supported by Dangelico et al. (2021) and Tandon et al. (2023), who find personal norms to be a significant predictor of green purchasing behavior. Additionally, Wang and Chou (2020) suggest that when consumers perceive environmentally friendly behavior as personally beneficial, it fosters more favorable attitudes toward green products. Accordingly, the following hypothesis is proposed:

H2: *Personal norm has a positive relationship with consumer's attitude toward green products.*

2.2.3. Subjective norm

Building on Ajzen's Ajzen (1991) seminal work, subjective norm refers to an individual's perception of social pressure to perform or avoid a specific behavior, shaped by the expectations of relevant reference groups and the individual's motivation to comply with them (see also Ashrafi et al., 2025; Choi & Johnson, 2019; Nguyen et al., 2018). In essence, it captures the influence of perceived societal expectations on behavioral decisions (Ajzen, 1991). This suggests that individuals often adapt their behaviors, attitudes, and beliefs to align with the norms of their social environment (Choi & Johnson, 2019; Kumar et al., 2023; Ma & Shen, 2024). Consequently, the purchase intention of green products is expected to be significantly shaped by social pressures arising from one's personal networks and reference group (see also Sun et al., 2022; Wang et al., 2022). Accordingly, the following hypothesis is proposed:

H3: *Subjective norms have a positive relationship with consumers' green purchase intentions.*

2.2.4. Perceived behavioural control

Perceived behavioral control (PBC) refers to an individual's perception of the ease or difficulty of performing a given behavior (Ajzen, 1991; Kautish et al., 2019; Tao et al., 2021). This perception plays a pivotal role in shaping an individual's sense of empowerment to act. Specifically, when consumers believe they possess the necessary resources and opportunities to purchase green products, their intention to engage in green behavior is likely to be strengthened. Several research support the view that PBC significantly influences the likelihood of engaging in environmentally responsible behaviors like the purchase intentions of green products (Chaudhary & Bisai, 2018; Patharia et al., 2022; Sun et al., 2022; Tewari et al., 2022; Wang et al., 2022). Accordingly, the following hypothesis is proposed:

H4: *Perceived behavioural control has a positive relationship with consumer's green purchase intentions.*

2.2.5. Attitude toward green products

Attitude, often conceptualized as a behavioral disposition, reflects the degree to which an individual holds a favorable or unfavorable evaluation of a given behavior (Ajzen, 1991). Research consistently highlights attitude as a critical motivator of green purchase behavior, influencing consumers' intentions to

engage in environmentally friendly consumption (Tandon et al., 2023; Wang et al., 2018, 2022). However, favorable attitudes toward green products do not always translate into actual purchases—a phenomenon commonly referred to as the green attitude–behavior gap (Sharma et al., 2023). Notably, Sharma and Foropon (2019) found the relationship between attitude and green purchase intention to be statistically insignificant, challenging the prevailing consensus in the literature. This finding contrasts with a substantial body of evidence affirming a significant and positive link between attitude and green purchase intentions or behaviors (Chaudhary & Bisai, 2018; Choi & Johnson, 2019; Dlamini & Mahowa, 2024; Jaiswal & Kant, 2018; Patharia et al., 2022; Shehawy & Khan, 2024; Tandon et al., 2023; Wang et al., 2018). Given these mixed findings, further investigation is warranted to clarify how attitude influences green purchasing behavior. Nevertheless, we argue—based on the weight of existing evidence—that pro-environmental attitudes remain a vital motivational force for green consumption. Accordingly, the following hypothesis is proposed:

H5: *Attitude toward green products positively relates to green purchase intention.*

2.2.6. Green purchase intention

Green purchase intention refers to a consumer's conscious plan or willingness to purchase environmentally friendly products (Jaiswal & Kant, 2018; Sharma et al., 2023). In other words, it represents a conscious commitment to support sustainability through consumption choices. Despite the well-documented intention-behavior gap, a substantial body of research has investigated the role of green purchase intention and consistently found it to be a strong predictor of actual green purchasing behavior (Jaiswal & Kant, 2018; Joshi & Rahman, 2019; Patharia et al., 2022; Sharma et al., 2020, 2023; Wang et al., 2024). Accordingly, the following hypothesis is proposed:

H6: *Green purchase intention has a positive relationship with green purchase behaviour.*

2.2.7. Willingness to pay a premium as a moderating variable

Willingness to pay a premium broadly refers to consumers' readiness to incur higher costs for green products. Green products typically command higher prices than conventional alternatives, sometimes up to five times more, based solely on their environmentally friendly attributes (Joshi & Rahman, 2015). Consequently, income levels and price sensitivity must be considered in understanding green purchasing behaviour. Although consumers may hold favourable attitudes toward eco-friendly products, many remain unwilling to bear the associated price premium (Kumar et al., 2023; White et al., 2019; Yang et al., 2021). Even habitual green consumers cite high costs as a barrier to purchase (Qi et al., 2020). While price sensitivity appears to deter green purchases, contrasting findings suggest otherwise. Sharma (2021) argues that price may be less relevant when perceived product quality is high. Dangelico et al. (2021) support this view, asserting that quality and performance are essential determinants of a consumer's willingness to pay more for green alternatives. Furthermore, consumer engagement appears to positively influence this willingness—even among individuals with low environmental concern (Wei et al., 2018). Similarly, Mehraj and Qureshi (2022) find that young consumers are more inclined to pay a premium if the firm is perceived as genuinely committed to sustainability. However, this willingness has limitations. While many green consumers may accept some price premium, they are unlikely to do so unconditionally (Sharma & Paço, 2021). High costs can still deter purchase behaviour, despite strong pro-environmental intentions (White et al., 2019). Sharma and Paço (2021) further emphasise that economic considerations can either facilitate or hinder green purchasing (see also Yang et al., 2021). Given the contradictory evidence and the paucity of studies in consumer markets such as Africa, it is important to explore the moderating role of willingness to pay a premium in the South African millennial context. Although limited, existing research suggests that this variable may influence the translation of intention into actual behaviour. For instance, Chaudhary and Bisai (2018) report that Indian consumers willing to pay extra for green products show a stronger intention-behaviour link. In contrast, Liu and Ly (2022) observe a weakening of the attitude–intention link among Vietnamese supermarket shoppers with higher willingness to pay more. Accordingly, the following hypothesis is proposed:

H7: *Willingness to pay a premium moderates the relationship between green purchase intentions and green purchase behavior.*

2.2.8. Perceived consumer effectiveness as a moderating variable

Perceived consumer effectiveness (PCE) is defined by Jaiswal and Kant (2018, p. 3) as ‘the measure that evaluates an individual’s subjective judgment [of] how an individual can make efforts in the solution to the environmental problems faced by society’, directly relating to one’s self-evaluation in ecological contexts. In essence, it reflects a consumer’s confidence in the meaningfulness of their personal contributions toward resolving environmental issues (Kim & Lee, 2023). Despite favourable attitudes toward green products, this often does not translate into actual purchase behaviour (Götze & Naderer, 2019). As Joshi and Rahman (2019) argue, individuals are more likely to convert positive attitudes into green purchasing when they believe their actions will have a tangible environmental impact. Their earlier work (Joshi & Rahman, 2015) further notes that consumers assess green product benefits not only based on personal utility but also on their broader social and ecological value. Moreover, PCE has been shown to influence key determinants of behaviour—attitude, subjective norms, and perceived behavioural control—thereby strengthening green purchase intentions and actions (Joshi & Rahman, 2015). However, contrasting views exist. Heo and Muralidharan (2019), for example, observe that younger millennials may remain unmotivated to act despite believing in the efficacy of their individual efforts. Cultural orientation may also play a role: in collectivist cultures, the impact of individual actions may be perceived as less significant, weakening the role of PCE (Mishal et al., 2017). Empirical findings regarding PCE’s moderating influence remain inconclusive. While Higuera-Castillo et al. (2019) demonstrate that the impact of attitude on the intention to adopt electromobility is stronger among individuals with higher PCE, other studies—particularly in Asian contexts—suggest insignificant effects (Kim, 2011; Liu & Ly, 2022). Despite these insights, to the best of our knowledge, no research has directly examined whether the intention–behaviour relationship varies under different levels of PCE, especially within a millennial segment and in underexplored non-Asian or Western contexts. Yet, extant literature acknowledges that depending on the level of PCE, individuals may either be encouraged or discouraged in their pursuit of green consumption (Joshi & Rahman, 2019; Kautish et al., 2019). Accordingly, the following hypothesis is proposed:

H8: *Perceived consumer effectiveness moderates the relationship between green purchase intention and green purchase behavior.*

Figure 1 presents a synthesized representation of the proposed research hypotheses in the form of a conceptual model.

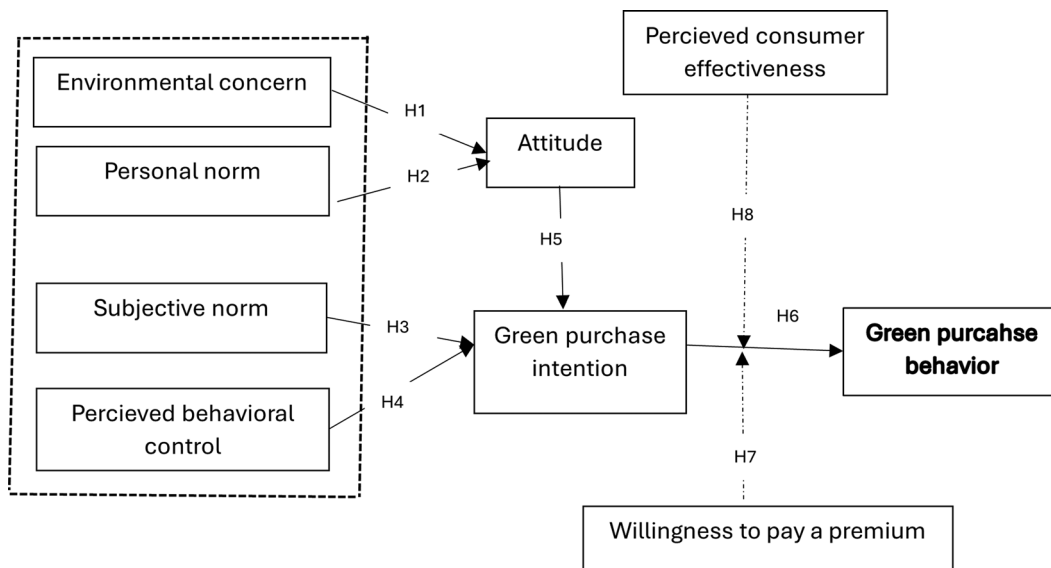


Figure 1. Expanded TPB green-model (Researchers’ own creation).

3. Methodology

3.1. Study context and sampling technique

This study adopted a deductive research approach, grounded in an extended Theory of Planned Behaviour (TPB) framework, to empirically test hypotheses derived from established literature (Saunders & Lewis, 2018). The focus was placed on South African millennials who had previously purchased at least one green product and fell within a higher Living Standard Measure (LSM) category—specifically, LSM 8 and above. These individuals are typically classified as upper-middle-class consumers.

The millennial cohort was selected due to its distinct characteristics compared to preceding generations, particularly its familiarity with digital technologies that facilitate access to product information and socially responsible choices (Kim & Park, 2020). Furthermore, millennials are reported to place greater emphasis on sustainability and ethical consumption than Generation X or Baby Boomers (McKinsey & Company, 2023). Kim and Park (2020) also note that millennials are generally more receptive to diverse cultures, languages, and lifestyles, making them a compelling demographic for examining green consumer behaviour.

While there is some variation in the literature regarding the specific birth year range that defines millennials, this study adopted the Stats SA (2020) classification, which defines millennials as individuals born between 1980 and 1999. This definition was used due to the authority and relevance of Stats SA as South Africa's official statistics agency. Accordingly, individuals within this age range served as the unit of analysis for the study.

In addition to age, the study further segmented the population based on LSM criteria to ensure that respondents possessed sufficient purchasing power to consider green alternatives. The primary objective was to investigate the factors influencing green purchase behaviour among millennials in South Africa and to offer insights into the intention–behaviour gap within this context.

A non-probabilistic quota sampling method was employed to ensure the inclusion of respondents meeting the study's eligibility criteria: millennial age range, prior green purchase experience, and minimum income/LSM threshold (Saunders & Lewis, 2018).

Ethical clearance was obtained from the respective institutional review boards of the first and second authors prior to data collection. To determine the required sample size for structural model testing, Soper's Soper (2023) sample size calculator was used, assuming a medium effect size. A minimum of 184 valid responses was required. Before launching the full survey, a pilot study was conducted with 21 respondents to evaluate construct reliability (via Cronbach's alpha) and to ensure the clarity and comprehensibility of the questionnaire. Data from the pilot study were not included in the final analysis.

For the main survey, in addition to quota sampling, we utilized judgmental and snowball sampling methods to facilitate data collection. The online questionnaire was disseminated via social media platforms and email, specifically targeting millennials aged 24 to 43 years (i.e. individuals born between 1980 and 1999) with a minimum Living Standards Measure (LSM) of 8.

A total of 223 responses were collected. After screening for eligibility—excluding incomplete responses and non-millennial participants—189 responses were retained for analysis, surpassing the minimum threshold required for robust statistical testing (Figure 1).

3.2. Descriptive statistics

Of the 189 valid responses, the sample comprised slightly more females (52.38%) than males (46.56%). The respondents were generally well-educated, with 95.77% having attained post-matric higher education. In terms of income, the largest proportion of participants (31.22%) reported a monthly net income of R60,000 or more. Age distribution revealed that the majority (70.37%) were between 31 and 40 years old. Regarding marital status, just over half of the respondents (51.32%) were married, while 3.17% were divorced; the remainder reported being single. A detailed breakdown of the demographic characteristics is provided in Table 1.

3.3. Measurement instrument

This study employed a five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree as anchors for all nine research constructs. This scale choice aligns with prior studies that have examined

Table 1. Demographic profile of respondents.

Variables	Classification	Sample (n=189)	Percentage (%)
Gender	Male	88	46.56
	Female	99	52.38
	Prefer not to say	2	1.06
Age	24–30 years	32	16.93
	31–35 years	66	34.92
	36–40 years	67	35.45
	41–43 years	24	12.70
Education	High school	8	4.23
	Graduate (Diploma & Bachelors)	76	40.21
	Postgraduate	103	54.50
	Doctorate	2	1.06
Marital status	Single	86	45.50
	Married	97	51.32
	Divorced	6	3.17
Monthly net Income level	R13 210– R19 999	30	15.87
	R20 000–R39 999	50	26.46
	R40 000–R49 999	29	15.34
	R50 000–R59 999	21	11.11
	R60 000+	59	31.22

Source: Field data, 2023.

similar constructs within the context of green consumer behaviour (Bashir et al., 2019; Heo & Muralidharan, 2019; Kumar et al., 2023; Zhang et al., 2020). Measurement items were adapted from established and validated scales in the extant literature (see Appendix A for a detailed overview of constructs and corresponding items).

Specifically, items measuring environmental concern were adapted from Kumar et al. (2023), while the personal norm construct was drawn from Bashir et al. (2019). Perceived consumer effectiveness was measured using items adapted from Heo and Muralidharan (2019), and willingness to pay a premium was assessed using the scale developed by Biswas and Roy (2015). Both subjective norm and green purchase behaviour were measured using scales from Kumar et al. (2023). It is important to note that although the original green purchase behaviour scale (referred to as actual buying behaviour in Kumar et al., 2023) comprised three items, only two were retained in this study due to relevance and context-specific appropriateness.

The perceived behavioural control construct was measured using items from Zhang et al. (2020), while attitude toward green products was assessed using the scale adapted from Vu et al. (2022). Finally, green purchase intention was measured using items adapted from Kamalanon et al. (2022).

3.4. Overcoming common method bias

According to Yang et al. (2022), the use of self-administered questionnaires can increase the risk of common method bias (CMB). To mitigate this risk, they recommend ensuring respondent anonymity and conducting Harman's single-factor (HSF) test. In line with these guidelines, this study did not collect any identifying information, thereby preserving respondent anonymity. Additionally, to reduce the risk of social desirability bias, select measurement items were reverse-coded.

From an analytical standpoint, the HSF test was conducted, with the results indicating that the first factor accounted for only 38.4% of the total variance—well below the recommended 50% threshold. Furthermore, none of the correlation coefficients among the constructs exceeded 0.8, suggesting a low likelihood of multicollinearity and further confirming the absence of CMB (Osakwe, 2019). Collectively, both the procedural and statistical controls implemented affirm that the study's findings are unlikely to be affected by common method bias.

3.5. Data analytic technique

This study employed Partial Least Squares Factor-Based Structural Equation Modeling (PLSF-SEM), an advanced variant of the traditional PLS-SEM algorithm, to analyse the hypothesised model. As noted by Kock (2022a), PLSF-SEM offers methodological advantages over alternative approaches, particularly in its

ability to effectively manage multivariate non-normality—a known limitation of covariance-based SEM. This capability constituted a primary rationale for its application in the current analysis (see also Kock, 2019). Moreover, the broader family of PLS-SEM techniques is widely recognised for its suitability in evaluating large and complex structural models (Ng et al., 2024; Sharma et al., 2020), such as the present model, which comprises nine latent constructs.

In addition, PLS-SEM is well regarded for its effectiveness in assessing theoretical extensions due to its causal–predictive orientation (Feisthauer et al., 2024; Ma & Shen, 2024; Osakwe, 2019). Given that this study extends the Theory of Planned Behavior by integrating additional antecedents and moderators, the use of PLS-SEM was considered methodologically rigorous and suitable. Accordingly, this analytical approach was adopted to ensure robust estimation of the structural relationships among the constructs. The analysis of the measurement and structural models was performed using WarpPLS 8 (Kock, 2022b). The outer model analysis was conducted using a factor-based PLS algorithm of Type CFM3, employing a bootstrapping procedure with 999 resamples to ensure robust statistical inference.

3.5.1. Statement of informed consent to participate and publication of the study

Prior to the field data collection, an ethical approval was obtained from the Ethics Committee of the University of Pretoria's Gordon Institute of Business Science, Johannesburg, South Africa 2023. The ethical reference number for this study is 04947356/2023. Evidence of the consent letter is available upon reasonable request. Again, the participants' consent for participation in the survey was obtained. Thus, a statement (written consent) was made available to these participants to accept to participate in the study or otherwise. All participants indicated their consent to participate in the survey and subsequent publication of the report after seeing that the study is for academic purpose.

4. Results

4.1. Model assessment

Following data quality checks, the reliability and validity of the measurement constructs were assessed, as summarized in Table 2. Internal consistency was evaluated using Composite reliability (CR), with values between 0.6 and 0.7 considered acceptable, and values above 0.8 indicating strong reliability. All constructs demonstrated acceptable internal consistency. Item loadings were also examined, with the majority exceeding the recommended threshold of 0.5 for exploratory research (Jun et al., 2019). While two items (PBC2 and SNO2) had loadings slightly below 0.5, both were statistically significant at $p < 0.01$, supporting their retention. Convergent validity was assessed using Average Variance Extracted (AVE), where values above 0.5 are considered acceptable (Sharma et al., 2020). All constructs met this criterion, except for PBC, which had an AVE marginally below .5. Overall, the constructs demonstrated satisfactory reliability and convergent validity, supporting the adequacy of the measurement model.

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio of correlations, following the criterion proposed by Henseler et al. (2015). As reported in Table 2, all HTMT values were below the conservative threshold of 0.85, indicating a satisfactory level of discriminant validity. This suggests

Table 2. Convergent and discriminant validity of measurement variables.

Variables	CR	AVE	1	2	3	4	5	6	7	8	9
1. ENC	0.819	0.602									
2. PNO	0.882	0.599	0.709								
3. PCE	0.790	0.652	0.293	0.214							
4. WTP	0.918	0.788	0.558	0.513	0.213						
5. SNO	0.713	0.590	0.519	0.529	0.185	0.506					
6. PBC	0.712	0.472	0.406	0.397	0.241	0.435	0.552				
7. ATT	0.886	0.662	0.749	0.721	0.390	0.558	0.581	0.587			
8. GPB	0.846	0.737	0.584	0.592	0.202	0.724	0.692	0.498	0.638		
9. GPI	0.854	0.663	0.588	0.563	0.391	0.349	0.345	0.668	0.780	0.397	

Notes: ENC: Environmental concern; PNO: personal norm; PCE: perceived consumer effectiveness; WTP: willingness to pay premium; SNO: subjective norm; PBC: perceived behavioral control; ATT: attitude; GPB: green purchase behavior; GPI: green purchase intention. Discriminant validity based on HTMT criterion.

Source: Authors' processing from WarpPLS 8 software.

that respondents were able to distinguish clearly between the constructs, thereby confirming the discriminant validity of the measurement model.

Moreover, the measurement model demonstrated acceptable fit and quality indices. Specifically, the average path coefficient (APC) was 0.324 ($p < 0.001$), the average R-squared (ARS) was 0.545 ($p < 0.001$), and the average adjusted R-squared was 0.539 ($p < 0.001$). The average full collinearity VIF (AFVIF) was 2.337, which is within the ideal criterion (≤ 3.3). Additionally, the Tenenhaus Goodness-of-Fit (GoF) index was 0.620, exceeding the benchmark for a large effect size ($\text{GoF} \geq 0.36$). The Simpson's Paradox Ratio (SPR) was 1.000 (acceptable if ≥ 0.7 ; ideally = 1), a R-squared Contribution Ratio (RSCR) of 1.000 (acceptable if ≥ 0.9 ; ideally = 1), a Statistical Suppression Ratio (SSR) of 1.000 (acceptable if ≥ 0.7), and a Nonlinear Bivariate Causality Direction Ratio (NLBCDR) of 0.875 (acceptable if ≥ 0.7). Collectively, these indices indicate that the model exhibits a good overall fit (Kock, 2022b; see also Moqbel & Kock, 2018; Osakwe et al., 2025).

4.2. Structural model results

Following the validation of the measurement model, the structural model was assessed using several key parameters. First, the model's explanatory power was evaluated through the coefficient of determination (R^2), which indicates the proportion of variance in the endogenous constructs explained by their respective predictors. According to Hair et al. (2019), R^2 values of 0.25 or lower are considered weak, although values as low as 0.10 may be acceptable depending on the research context. The results showed that Attitude had an R^2 of 0.62, meaning that 62% of its variance was explained by Environmental Concern and Personal Norm. Similarly, Green Purchase Intention yielded an R^2 of 0.78, indicating that 78% of its variance was accounted for by its predictors. While Green Purchase Behaviour had a comparatively lower R^2 of 0.23, it still represents a meaningful 23% of explained variance.

Next, the statistical significance of the path coefficients was examined using t-statistics and 95% confidence intervals. As noted by Wang et al. (2018), a t-value greater than 1.96 indicates statistical significance at the 5% level ($p < 0.05$). The hypothesis testing results, presented in Table 3 and generated using WarpPLS, revealed that all direct relationships were statistically supported, except for H3, which was not confirmed by the data. Additionally, the moderation effects included in the model were unexpectedly found to be statistically insignificant.

5. Discussion, implications and limitations

5.1. Discussion and theoretical implications

This study sought to advance understanding of the antecedents of green purchase behaviour and address the well-documented intention-behaviour gap (IBG) by developing an integrated model grounded in the Theory of Planned Behavior (TPB). Specifically, the model was extended by incorporating environmental concern and personal norm as critical antecedents of attitude toward green products. Furthermore, the study posited that willingness to pay a premium (WTP) and perceived consumer effectiveness (PCE) might serve as moderating variables capable of mitigating the IBG. In pursuit of these objectives, six direct hypotheses and two moderation hypotheses were formulated and empirically tested. As detailed in Table 3, the results provided empirical support for the majority of the proposed direct relationships. However, three of the hypothesised relationships—including both moderation effects—were not supported by the data.

As illustrated in Table 3, the findings for H1 indicate a positive and significant relationship between environmental concern and consumers' attitudes toward green products. This suggests that greater environmental concern leads to more favorable attitudes, a result consistent with prior studies such as Chaudhary and Bisai (2018), Tandon et al. (2023), and Kumar et al. (2023), which affirm the predictive role of environmental concern in shaping pro-environmental attitudes and consumption choices. This outcome is expected, as environmental concern often evokes emotional responses that motivate individuals to reduce environmental harm. Similarly, Zahan et al. (2020) found that heightened ecological awareness prompts consumers to reflect more critically on their purchasing behavior, thereby increasing

Table 3. Results of the hypothesized model.

Path/ hypotheses	Path coefficient	T-Stat	95% CI range	Results
ENC → ATT (H1)	0.468**	4.662	0.271 to 0.664	Supported
PNO → ATT (H2)	0.398**	4.033	0.205 to 0.592	Supported
SNO → GPI (H3)	0.093	1.457	−0.032 to 0.219	Not Supported
PBC → GPI (H4)	0.434**	3.156	0.165 to 0.704	Supported
ATT → GPI (H5)	0.551**	3.600	0.251 to 0.850	Supported
GPI → GPB (H6)	0.421**	4.741	0.247 to 0.594	Supported
<i>Interraction term – (Moderation testing)</i>				
Interaction Term	Path coefficient	T-Stat	95% CI Range	Results
WTP * GPI → GPB (H7)	−0.134	−0.747	−0.484 to 0.217	Not Supported
PCE * GPI → GPB (H8)	−0.093	−0.765	−0.331 to 0.145	Not Supported

Notes: EC: environmental concern; PN: personal norms; Att: attitude; SN: subjective norms; GPI: green purchase intention; PCB: perceived behavioral control; GPB: green purchase behavior; GPI: green purchase intention; WTP: willingness to pay a premium; PCE: perceived Consumer Effectiveness.

** $p < 0.001$.

their preference for green alternatives. These findings contribute to the growing body of green consumption literature by reinforcing the role of environmental concern as a key antecedent in shaping consumer attitudes within the South African millennial context.

As portrayed in Table 3, the results support H2, indicating that personal norm significantly predicts a favorable attitude toward green products. This aligns with prior findings by Wang and Chou (2020), who demonstrated that strong personal norms are associated with positive attitudes toward purchasing green products. This result is expected, given that personal norms reflect individuals' moral obligations and self-perceptions regarding responsible behavior, such as environmental protection (Bashir et al., 2019; Dangelico et al., 2021). Rosenthal (2022) further suggests that violating personal norms may induce feelings of guilt, which could motivate adherence to environmentally responsible choices—potentially explaining the strong positive correlation observed in this study. However, the current findings contrast with Shehawy and Khan (2024), who found that 'consumer self-norm' had little influence on green attitudes or purchase behavior. This study contributes to the growing body of empirical evidence supporting the role of personal norm in fostering pro-environmental attitudes. Situated within the South African millennial context, it is, to the best of the researchers' knowledge, among the first to empirically confirm personal norm as a positive antecedent of green attitudes in this demographic—offering a foundation for future research to explore this relationship further.

In contrast to the other hypotheses, H3 was not supported by the data, indicating that subjective norm does not significantly influence consumers' green purchase intentions—despite initial expectations. Although surprising, similar findings have been reported in previous studies, including Alzubaidi et al. (2021), Chaudhary and Bisai (2018), and Kumar et al. (2017), all of which found that subjective norm—or social influence—had no significant effect on green purchase intentions. This outcome is particularly notable given that these studies, like the current one, were conducted in non-Western, developing countries typically characterized by collectivist cultural values. Subjective norm is generally assumed to exert a stronger influence in collectivist societies, as suggested by Wang et al. (2022), who argue that social pressure tends to be more impactful in such contexts than in more individualistic Western cultures. However, the present findings may reflect shifting cultural dynamics among South African millennials. With comparatively high internet penetration and exposure to global values, this demographic—particularly those in the upper-middle income bracket—may be adopting more individualistic orientations, making them less susceptible to social pressure and more driven by internal factors such as personal attitudes and perceived behavioral control (for related explanation, see also de Groot et al., 2021). These findings point to the need for further research exploring how individual-level cultural orientation, particularly individualism versus collectivism, might moderate the influence of subjective norm on green consumption behavior.

Concerning H4, the findings provide strong support for perceived behavioral control as a significant and positive predictor of green purchase intention. This result aligns with previous studies (Dilotsolthe, 2021; Patharia et al., 2022; Sun et al., 2022; Vu et al., 2022), which consistently report that perceived behavioral control plays a critical role in shaping consumers' intentions to engage in green purchasing. By reaffirming these relationships within the context of South African millennials, the current study contributes to the growing body of empirical evidence highlighting the importance of perceived behavioral

control in influencing green consumption behavioral intention in particular and by extension pro-environmental consumer behaviors.

Furthermore, as shown in Table 3, attitude has a significant positive influence on green purchase intention. Among all predictors included in the hypothesized model, attitude exhibits the strongest association with green purchase intention, as indicated by the highest path coefficient. Given that attitude reflects a consumer's predisposition toward a particular behavior (Ajzen, 1991), it is reasonable to conclude that a favorable attitude toward green products leads to stronger intentions to purchase them. Thus, the support for H5 is expected and aligns with prior studies, including Dlamini and Mahowa (2024), Jaiswal and Kant (2018), Tandon et al. (2023), and Wang et al. (2018, 2024), all of which affirm the critical role of attitude in driving pro-environmental behavioral intentions. However, this finding contrasts with studies conducted in China, India, and Germany, where attitude was found to have a negligible impact on green purchase behavior (Ling et al., 2024; Mishal et al., 2017; Moser, 2015). Overall, the current results reinforce the existing body of knowledge on the central role of attitudinal formation in fostering green consumption behavior, particularly within the South African millennial context.

The finding for H6, as shown in Table 3, confirms that green purchase intention significantly predicts green purchase behavior. This is consistent with the Theory of Planned Behavior (Ajzen, 1991), which posits that stronger intentions increase the likelihood of performing the intended behavior. The result aligns with previous empirical studies (Kamalanon et al., 2022; Patharia et al., 2022; Sun et al., 2022; Wang et al., 2024), all of which demonstrate a significant relationship between green purchase intention and actual behavior. This finding reinforces the ecological validity of the TPB model, affirming intention as a robust, though not exhaustive, predictor of behavior. In this study, intention accounted for 23% of the variance in green purchase behavior, highlighting its influence while also suggesting the presence of additional factors that shape actual behavior. This further explains the rationale for examining potential moderators in the intention-behavior link, as explored further in this research.

Regarding Hypothesis 7, which posited that willingness to pay a premium moderates the relationship between green purchase intention and actual green purchase behaviour, the empirical findings did not provide support for this proposition. While the negative path coefficient suggests a potential weakening of the intention-behaviour linkage in the presence of higher willingness to pay, this effect was not statistically significant. Theoretically, it is anticipated that consumers who express a willingness to incur additional costs for environmentally friendly products are more likely to translate their intentions into action. This expectation is consistent with prior research (Akhtar et al., 2021; Biswas & Roy, 2015; Tandon et al., 2023), which posits that willingness to pay a premium reflects deeper consumer commitment and thus serves as a behavioral catalyst. However, the findings of this study diverge from those of Chaudhary and Bisai (2018), who reported a significant positive moderating effect of willingness to pay a premium among Indian students. In contrast, our results suggest that the relationship between intention and behaviour may be influenced by contextual factors that temper consumers' stated willingness to act. One plausible explanation lies in the presence of competing financial priorities or economic constraints, which can hinder the translation of intention into action—even among those who claim a readiness to pay more. Indeed, prior work by Yang et al. (2021) underscores the role of economic considerations as a persistent barrier to green purchasing, even for environmentally conscious consumers.

Additionally, the absence of a significant moderating effect may reflect a lack of perceived value-for-money among the surveyed consumers. As noted by Dangelico et al. (2021), value-for-money is a critical antecedent of consumers' willingness to pay a premium for green products. If consumers do not perceive green products as delivering commensurate value, their stated willingness may be more aspirational than actionable. Consequently, the null moderating effect observed in this study may stem from a broader scepticism regarding the economic utility or quality parity of green products in the given market context.

The findings for H8 reveal no significant moderating effect of perceived consumer effectiveness on the relationship between green purchase intention and green purchase behavior. This result is unexpected, given that perceived consumer effectiveness reflects the belief that individual actions can contribute to environmental protection—an attitude typically associated with behavior aligned to such beliefs (Higuera-Castillo et al., 2019; Kautish & Sharma, 2020). Nonetheless, the current findings are

consistent with previous studies in the Asian context, which similarly failed to establish a significant moderating effect of perceived consumer effectiveness on pro-environmental behaviors (Kim, 2011; Liu & Ly, 2022). One plausible explanation for this outcome may lie in cultural orientation. As Mishal et al. (2017) suggest, perceived consumer effectiveness is a complex construct influenced by whether individuals view themselves through an individualistic or collectivistic lens. Cultural context may therefore shape how personal efficacy beliefs translate into behavior. This implies that perceived consumer effectiveness does not uniformly moderate green purchase behavior across contexts, highlighting the importance of accounting for cultural variables in future consumer behavior research.

Another consideration for the deviation from the expected result could be the fact that perceived consumer effectiveness is a calculated variable wherein the benefits of partaking in green purchase behaviour are examined by consumers who consider how their actions can positively contribute to society and the environment (Joshi & Rahman, 2015). This suggests that if green purchases of the participants were made impulsively, the moderation impact of perceived consumer effectiveness may be negated similarly if consumers made the purchases having no choice due to load-shedding might have also circumvented this moderation. Similarly, as Heo and Muralidharan (2019) explained, younger millennials may not be driven to change their behaviour and engage in an environmentally responsible manner despite feeling confident that their actions can solve environmental challenges. This may also be a possible reason why perceived consumer effectiveness failed to moderate the relationship between green purchase intentions and green purchase behaviour. Another possible explanation for the unexpected result is that perceived consumer effectiveness is a deliberative construct, involving a cognitive evaluation of how one's actions contribute to societal and environmental outcomes (Joshi & Rahman, 2015). If participants' green purchases were made impulsively or out of necessity—such as during instances of load-shedding that limit product availability—this evaluative process may have been bypassed, thereby diminishing the moderating effect. Additionally, as Heo and Muralidharan (2019) suggest, younger millennials, despite believing in their capacity to influence environmental change, may not necessarily translate this belief into consistent behavioral change. This gap between efficacy belief and action may further explain why perceived consumer effectiveness did not significantly moderate the intention-behavior relationship in this study.

Finally, As Ajzen (1991) posits, intentions are shaped by three key factors: attitude, subjective norms, and perceived behavioral control. However, the present study demonstrates that strong behavioral intentions can emerge even when not all of these components are significantly influential. The findings affirm the relevance of the extended Theory of Planned Behavior (TPB) in understanding green consumer behavior, while also highlighting the complexity of translating intention into actual behavior—particularly when proposed moderators do not yield significant effects. These insights underscore the need for future research to further investigate the nuanced mechanisms underlying green consumption, and to expand the evidence base needed to better understand this multifaceted phenomenon.

5.2. Managerial implications

Green products, as defined by Shukla (2019), are those whose production or consumption mitigates environmental harm—an objective directly aligned with the United Nations' Sustainable Development Goal 12 on responsible consumption and production. Against this backdrop, promoting green purchase behaviour becomes critical, and the present study offers actionable insights for marketers and managers.

Consistent with White et al. (2019), firms should foster an enabling environment that supports green consumption. This includes ensuring product availability, affordability, and removing barriers that hinder consumer action. Our findings affirm the importance of perceived behavioural control—a construct that captures consumers' perceived ease or difficulty in performing a behaviour—as a positive driver of green purchase intentions. Firms should therefore focus on enhancing consumers' self-efficacy by simplifying the green purchase process, ensuring accessibility, and offering transparent information.

Importantly, the study identifies attitude as the strongest predictor of green purchase intention, itself shaped by environmental concern and personal norms. This highlights the need for targeted educational campaigns and persuasive marketing communications that strengthen these antecedents. As noted by Dangelico et al. (2021) and Heo and Muralidharan (2019), effective environmental education can deepen

concern and shift personal norms. However, firms must tread carefully to avoid greenwashing, which can erode consumer trust and undermine behavioural outcomes.

To bridge the intention–behaviour gap, firms should leverage digital tools that enhance consumer engagement and agency. For example, mobile applications featuring carbon footprint calculators, augmented-reality product demonstrations, or gamified reward systems can make green choices more visible, habitual, and intrinsically rewarding. These tools not only reinforce favourable attitudes but also strengthen perceived control—two critical levers identified in this study.

Interestingly, subjective norms—typically associated with social influence—did not significantly predict green purchase intentions in the current context. This challenges the conventional reliance on peer influence in promotional strategies. For millennial consumers in South Africa, for instance, campaigns that rely solely on normative appeals may fall flat. Instead, firms should harness user-generated content and authentic storytelling (e.g. ‘My Green Switch’ narratives) across social media to indirectly foster peer influence while reinforcing personal responsibility and autonomy—key elements in the Theory of Planned Behaviour (Ajzen, 1991; Sharma et al., 2023).

In summary, firms aiming to stimulate sustainable consumer behaviour must prioritise fostering favourable attitudes and perceived behavioural control through education, empowerment, and experience-driven engagement, rather than relying predominantly on social pressure.

5.3. Limitations and future research opportunities

While this study offers valuable insights into green purchase behavior, especially among upper-middle-income South African millennials, several limitations should be acknowledged. First, the research was confined to the South African market, and as such, the generalizability of the findings to other regions or market conditions may be limited. The sample’s homogeneity—comprising primarily upper-middle-income millennials—may not reflect the broader South African population, particularly lower-income groups who may exhibit different consumption patterns. Future research should therefore consider more diverse demographic segments, both within South Africa and across other African markets. Furthermore, given the unexpected finding that neither willingness to pay a premium nor perceived consumer effectiveness significantly explains the intention-behavior gap, a follow-up study may be beneficial. Such an investigation may help identify alternative factors driving this gap and refine the understanding of the most impactful moderating influences in the green consumption context across diverse economic settings. Additionally, as Sheng et al. (2019) argue, green buying behaviors are shaped by cultural and national contexts; hence, further research is needed to explore how ethnicity and cultural values influence green consumption in South Africa. Moreover, the use of a single quantitative method, while appropriate for the study’s objectives, may not fully capture the complexity of the intention–behavior gap in green purchasing. As noted by Sharma (2021) and Zhang and Dong (2020), consumer decision-making is influenced by a confluence of factors that may be better understood through a mixed-methods approach, including qualitative techniques such as interviews to gain deeper insights into consumer motivations. Lastly, given that behavioral change often unfolds over time, a longitudinal research design could offer a more dynamic understanding of how key determinants evolve and affect green purchasing behaviors in the long term (Sharma et al., 2023; Vu et al., 2022; White et al., 2019). These limitations do not detract from the contributions of this study but instead highlight promising avenues for future research to enrich our understanding of sustainable consumer behavior in emerging markets.

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Although this work was initially copyedited by a competent professional, there were a few instances we used ChatGPT to further improve its fluency.

Authors' contributions

CRediT: **Boitumelo Mabaso**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing; **Christian Nedu Osakwe**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing; **Abdul Bashiru Jibril**: Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – review & editing.

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Data availability statement

The data that support the findings of this study are available from the first author [BM], upon reasonable request.

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Appendix A

Appendix A: Constructs and measurement items.

Constructs	Items
Environmental concern adapted from (Kumar et al., 2023)	I purchase green products considering the environment. Green products are better for environment than traditional products. Green product purchase improve the state of Environment.
Personal norm adapted from Bashir et al. (2019)	Using environment friendly products would make me a better person. Instead of a conventional product, buying green products will make me feel as a morally obliged person. Saving the environment should be the first priority for a person like me. Regardless of what other people do, I feel buying green products as a moral obligation. Saving energy as much as possible is my personal obligation.
Perceived consumer effectiveness adopted from Heo and Muralidharan (2019)	It is worthless for the individual consumer to do anything about pollution (R). Since one person cannot have any effect upon pollution and natural resource problems, it doesn't make any difference what I do (R). Each consumer's behaviour can have a positive effect on society by purchasing products sold by socially responsible companies*.
Willingness to pay a premium Adapted from Biswas and Roy (2015)	To me, it is worth purchasing green products despite their premium pricing. I am willing to purchase green products at a higher price for their environmental benefits. I am willing to pay more money to purchase green products.
Subjective norm adapted from (Kumar et al., 2023)	My close friends and family consume green products. My loved ones expect me to purchase more green products for them.
Perceived behavioural control adapted from Zhang et al. (2020)	Whether or not I purchase green products is completely up to me. I have resources, time, and opportunities to purchase green products. I am confident that if I want to, I can purchase green products.
Attitude toward green products adopted from Vu et al. (2022)	Environmental protection is important to me when making product purchases. I believe that green products help to reduce pollution (water, air, etc.). I believe that green products help to save nature and its resources. Given a choice, I will prefer a green product over a conventional product.
Green purchase behavior adapted from (Kumar et al., 2023)	I have been a regular buyer of green products. I still buy green products even though conventional alternatives are on sale.
Green purchase intentions adapted from (Kamalanon et al., 2022)	I am willing to buy green products. If prices are not different from others, I may purchase green products. If qualities are not different from others, I may purchase green products.

Note: R denotes reverse-coded items.

*indicates item dropped from analysis due to very low loading.