Article

Pathways to Green Purchase: Pro-Environmental Behavior and Concern in Bali Tourism

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Abstract

The current study aims to address the research gap regarding inconsistent findings on the effect of environmental knowledge (EK) in enhancing green purchase intention (GPI) by incorporating pro-environmental behavior (PEB) and environmental concern (EC) as factors to leverage green purchase intention. Five hypotheses were developed and tested using a sample of 300 respondents in Indonesia. Survey data from 300 respondents were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings demonstrate the pivotal role of pro-environmental behavior in two ways. First, pro-environmental behavior mediates the relationship between environmental knowledge and green purchase intention. Second, while pro-environmental behavior enhances environmental concern, it is insufficient to fully strengthen green purchase intention; additional factors, such as the activation of ethical values of concern, are needed to reinforce this intention further. However, the limitations include reliance on quantitative cross-sectional data and focus on Bali, suggesting a need for longitudinal and cross-cultural studies. Practical recommendations include incorporating local communities in eco-tourism programs to ensure social acceptance and sustainability. In general, the results contribute theoretically by integrating knowledge, concern, and behavior into a cohesive model explaining green consumer intentions in tourism. This comprehensive approach supports efforts to transform individual values and behavior, which are critical alongside systemic or policy changes in advancing sustainable tourism.

Keywords: environmental knowledge; pro-environmental behavior; environmental concern; green purchase intention; sustainable tourism

1. Introduction

The global tourism sector has rapidly grown into one of the world's largest industries, contributing significantly to the Gross Domestic Product (GDP) of many countries and creating millions of jobs. However, this massive growth has various significant consequences. The increase in tourist numbers, supporting infrastructure, and resource consumption has led to serious environmental and social impacts, such as heightened carbon emissions, water and air pollution, degradation of natural ecosystems, as well as pressure on local cultures and communities (Kapoor & Singh, 2025; Kaur et al., 2025; Talukder & Khan, 2025). To address these challenges, the concept of sustainable tourism has been proposed as a key

paradigm, promoting practices that minimize negative impacts while maximizing economic and social benefits for local communities (Sapkota et al., 2024). The essence of sustainable tourism is to foster more responsible behavior from all stakeholders, including tourists. In this context, Green Purchase Intention (GPI) is a crucial indicator of an individual's commitment to more responsible consumption and environmental conservation efforts. Global trends show increasing consumer awareness of environmental issues, with surveys suggesting that more individuals are searching for sustainable product and service options (Gulzar et al., 2024; Patiño et al., 2024). However, translating this awareness into consistent purchase intentions remains a complex and multidimensional challenge.

Although awareness of environmental issues continues to increase globally, there is significant inconsistency in the literature regarding the influence of Environmental Knowledge (EK) on purchase intentions for green products. Intuitively, it is assumed that individuals with a greater understanding of environmental issues tend to adopt environmentally friendly behavior, including purchasing decisions (Cooray et al., 2024; Pardeshi et al., 2024). Several studies support this view, reporting a positive and significant relationship between EK and GPI (Cooray et al., 2024; Cui et al., 2024; Simanjuntak et al., 2023). However, other studies have found that the effect of EK on GPI was insignificant or even minimal (Indriani et al., 2019; Simanjuntak et al., 2023). This shows a gap between EK and the act of purchasing sustainable products, suggesting that knowledge alone is not sufficient to guarantee behavioral change. When EK fails to consistently trigger GPI, expensive and massive environmental education efforts may struggle to achieve the intended goal of fostering sustainable consumption. Consequently, this slows the transition to a green economy and complicates the achievement of the Sustainable Development Goals (SDGs), specifically in sectors solely dependent on consumer behavior, such as tourism. Tourists who do not translate EK into responsible purchasing decisions may continue to impose a negative ecological impact, threatening the environmental and social sustainability of the visited destinations.

This study is highly relevant and important because it attempts to fill a significant literature gap by empirically testing the relationship between EK and GPI through a more complex and detailed mediation pathway. Considering the inconsistency of previous results, the hypothesis is that the connection between EK and GPI is most possibly not direct, but rather mediated by other factors. Pro-environmental Behavior (PEB) and Environmental Concern (EC) were proposed as crucial mediators in the relationship. PEB reflects an individual active engagement in concrete actions that support sustainability, such as reducing the use of single-use plastics, conserving energy, or participating in conservation programs (Deltomme et al., 2023). Meanwhile, EC reflects emotional sensitivity to environmental issues and a sense of moral responsibility to protect nature (Hamzah & Tanwir, 2021). The complex interactions between these variables are expected to influence each other sequentially. EK triggers broader PEB, which will then increase EC and ultimately strengthen the intention to purchase green products. By identifying and testing these mediating pathways, this study will make a significant theoretical contribution to enrich the understanding of the psychological mechanisms underlying green consumer behavior, helping to bridge the often-found "knowledge-action gap".

The Theory of Planned Behavior (TPB) proposed by Ajzen (1991) is a powerful framework because it emphasizes that behavioral intention is the most direct predictor of behavior. This intention is shaped by three main components, including attitude toward behavior, subjective norm, and perceived behavioral control. Within this premise, TPB provides a solid theoretical foundation for integrating EK as an antecedent and exploring how EK may not directly influence GPI, but rather interacts through more complex mediators such as PEB and EC, potentially associated with TPB components. The hypotheses regarding

the mediating role of PEB and EC in enhancing GPI were shaped by the TPB premises. The first premise is that human actions are largely deliberate and reasoned choices. Meanwhile, the second premise is that intention is a direct predictor of behavior, systematically shaped by attitude, subjective norm, and perceived behavioral control.

The specific targets of this study are domestic and international tourists visiting Bali who show PEB. The group represents an important segment that directly interacts with the Bali environment and contributes to consumption trends in the destination. By focusing on tourists who already have pro-environmental tendencies, this study can delve deeper into the factors that drive the intention to purchase green products, while also providing insights into how the intention can be strengthened in a broader tourist segment.

While prior studies have examined the relationship between Environmental Knowledge (EK) and Green Purchase Intention (GPI), the direct influence of EK on GPI remains inconsistent. Moreover, the mechanisms through which EK may impact GPI—particularly the mediating roles of Pro-environmental Behavior (PEB) and Environmental Concern (EC)—are not fully understood, especially in unique socio-cultural tourism contexts such as Bali. Therefore, this study seeks to answer the following research questions: (1) How do EK, PEB, and EC influence GPI among tourists visiting Bali? (2) Does PEB mediate the relationship between EK and GPI? Addressing these questions will provide deeper insights into the determinants of sustainable consumption intentions in tourism.

Based on the discussion above, this study aims to empirically test the relationship between EK, PEB, EC, and GPI among tourists in Bali. The main focus is to revalidate the results of Simanjuntak et al. (2023) regarding the insignificant influence of EK on GPI, while also exploring the mediating role of PEB and EC in the relationship. Specifically, this study focuses on several efforts: (1) to examine the influence of EK on PEB among tourists in Bali, (2) to analyze the mediating effect of PEB on the relationship between EK and GPI, (3) to assess the influence of EC on GPI, as well as the role in strengthening PEB among tourists.

The selection of Bali, Indonesia, as the location is highly strategic and provides unique added value. Bali is not only a domestic province in Indonesia, but a globally recognized international tourist destination, attracting millions from various parts of the world each year (Bali Province Statistics Agency, 2024). The status as a global tourism icon makes Bali an ideal "living laboratory" for examining tourist behavior in a sustainability context. The tourism sector is a key pillar of Bali's local economy, providing livelihoods for a large portion of its population. Therefore, understanding tourist consumption behavior is crucial to ensuring the island's long-term sustainability. Bali also faces significant environmental challenges due to the rapid tourism growth, including critical waste management issues, reaching 3198.50 tons per day (SIPSN, 2024), water pollution, and pressure on natural ecosystems. In addition, strong Balinese cultural and social values, such as the Tri Hita Karana philosophy (harmony between humans, nature, and God), presumably influence how tourists interact with the local environment and consumption choices.

2. Literature Review

2.1. Theoretical Framework: Integrating TPB Core Constructs with EK, EC, and PEB

The theoretical framework underpinning this study is grounded in Ajzen's (1991) Theory of Planned Behavior (TPB), which posits that attitudes, subjective norms, and perceived behavioral control shape behavioral intentions. This study extends the TPB by integrating Environmental Knowledge (EK), Environmental Concern (EC), and Pro-Environmental Behavior (PEB) to more comprehensively explain tourists' Green Purchase Intention (GPI) in Bali (Simanjuntak et al., 2023; Ajzen, 1991). Environmental Knowledge is viewed as a cognitive foundation, providing individuals with critical information about environmental issues, thus fostering responsible behavior and influencing PEB (Pardeshi et al., 2024; Raza

et al., 2024; Suhaeni et al., 2024). Environmental Concern contributes affective and moral dimensions, motivating individuals by strengthening emotional engagement and moral commitment, which have a direct and strong influence on GPI (Parker et al., 2022; Gomes & Lopes, 2023).

PEB functions as a key mediator translating knowledge and concern into tangible actions, enhancing green purchasing intentions by bridging the 'knowledge-action gap' (Capiene et al., 2022; Ogiemwonyi et al., 2023; Ribeiro et al., 2023). This mediating role confirms that cognitive understanding alone is insufficient without active pro-environmental participation (Simanjuntak et al., 2023). Furthermore, although subjective norms and other potential mediators such as social norms, environmental identity, and cultural values were omitted, their importance in shaping sustainable behavior is acknowledged, especially in Bali's unique socio-cultural context (Cooray et al., 2024). The study's cross-sectional design limits insight into temporal changes in tourist behavior, indicating the need for longitudinal research to capture evolving environmental attitudes and behaviors influenced by travel experiences and media campaigns (Cui et al., 2024). Overall, this integrated framework enriches TPB by emphasizing the substantial mediating role of PEB and the strong direct effect of EC, thereby offering practical insights for tourism managers and policymakers aiming to promote green products and sustainable consumption in ecologically sensitive destinations (Ajzen, 1991; Aman et al., 2021; Deltomme et al., 2023).

2.2. PEB from the Perspective of the TPB

Pro-environmental behavior (PEB) among tourists is defined as conscious actions intended to minimize negative impacts on the natural environment or to generate positive environmental benefits (Al Husban, 2025; Lisboa et al., 2024). In the context of tourism destinations such as Bali, PEB includes a wide spectrum of environmentally responsible behaviors. Examples extend beyond the frequently cited activities of recycling paper, plastic, and metal, or reducing the use of single-use plastics by employing personal reusable shopping bags (Težak Damijanić et al., 2023). Additional behaviors comprise conserving water and electricity during accommodation stays, selecting eco-friendly modes of transportation, reducing food waste, prioritizing locally sourced and sustainable products, and actively participating in community-based ecotourism programs that support environmental preservation and indigenous livelihoods (Deltomme et al., 2023; Aman et al., 2021).

While Bali's cultural values, such as the Tri Hita Karana philosophy, which promotes spiritual and environmental harmony, play a notable role in shaping both the local community's and visitors' environmental attitudes, it is important to contextualize these within the tourists' diverse cultural and national backgrounds. Tourists bring with them environmental knowledge, concerns, and behaviors shaped by their own societal norms, environmental policies, and educational experiences prior to their visit (W. H. Lee & Moscardo, 2005; Nguyen-Viet et al., 2024). These pre-existing attitudes interact dynamically with Balinese cultural values during their stay, influencing the extent and form of their pro-environmental actions. Understanding the multicultural origins of tourists' environmental behavior is crucial for tourism stakeholders aiming to promote sustainable consumption. Recognizing that tourists' green purchase intentions (GPI) reflect both internalized global environmental awareness and the immediate local ecological context can assist in designing more effective interventions (Simanjuntak et al., 2023; Aman et al., 2021). For instance, informational campaigns combined with opportunities for direct pro-environmental participation can reinforce these attitudes by translating environmental knowledge into practical, sustainable behaviors (Ogiemwonyi et al., 2023; Ribeiro et al., 2023).

The Theory of Planned Behavior (TPB) framework (Ajzen, 1991) continues to provide a robust foundation for examining the motivations behind PEB. Attitudes toward environ-

mental behavior, subjective norms, and perceived behavioral control mediate the intention to engage in sustainable consumption practices. However, the influence of diverse cultural identities necessitates the inclusion of social norms and environmental identity variables in expanding TPB models, which would capture the multifaceted nature of tourists' ecological self-images and social pressures (Cooray et al., 2024). Consequently, tourism management programs in Bali and similar destinations should tailor strategies that acknowledge and integrate tourists' varied cultural backgrounds while fostering engagement with local environmental values. This approach promises to bridge the gap between awareness and action, encouraging a wider adoption of green products and sustainable practices within ecologically sensitive tourism contexts (Aman et al., 2021; Deltomme et al., 2023).

2.3. EK as a Driver of PEB

The study of EK has received significant attention in the literature on environmental psychology and consumer behavior, particularly in the context of sustainability. EK is generally understood as the accumulated information an individual possesses regarding environmental issues, impacts, as well as possible solutions (Pardeshi et al., 2024; Raza et al., 2024; Suhaeni et al., 2024) It comprises a range of cognitive activities including (1) the collection of information about global and local environmental issues (e.g., the impact of tourism on Bali ecosystem, the plastic waste crisis), (2) the dissemination of this understanding within personal awareness and close social circles, and (3) the ability to respond to the information by developing a deeper understanding of the implications on environment. EK is a strategic input for individuals in encouraging more responsible behavior.

As previously discussed, EK is a potential driver of PEB. Individuals with strong EK tend to engage in actions that support environmental sustainability (Cui et al., 2024; Liang et al., 2024). However, it is crucial to understand how EK effectively triggers and enhances specific types of PEB, specifically among tourists. EK reinforces the importance of environmentally friendly actions, fostering responsible consumption through PEB, defined as the ability to consciously and actively perform actions that reduce negative environmental impacts or provide positive benefits (Cooray et al., 2024; Yaqub et al., 2023). These actions are supported by a deep understanding of environmental values embedded in behavior.

EK plays a crucial role in shaping tourist behavior; for example, domestic and international tourists conversant with the importance of water conservation tend to conserve water at the hotel. Similarly, awareness of the plastic waste problem in Bali can trigger a strong intention to use personal shopping bags and reduce the use of single-use plastics. Moreover, EK is an individual capacity to understand environmental impacts and internalize the knowledge into a drive to take concrete, environmentally friendly actions (Težak Damijanić et al., 2023; Tosun et al., 2023). Based on this discussion, the following hypothesis was proposed:

H1. *EK has a positive influence on PEB.*

2.4. PEB and EC and GPI

The benefits derived from engaging in Pro-Environmental Behavior (PEB) are crucial factors in determining an individual's Environmental Concern (EC). Pro-environmental actions undertaken with a high level of commitment, which are a consequence of context-specific individual capacities, for example, visits to tourist destinations, can result in a deeper EC compared to those with lower PEB (Tosun et al., 2023). PEB, grounded in personal awareness and values, as well as supported by concrete actions including waste reduction or resource conservation, will result in stronger levels of EC (Singh & Khanwani, 2023). Increased EC is achieved through PEB grounded in awareness. PEB can be defined as individual creativity in developing ideas, learning processes, and finding

solutions to environmental problems in the face of alternative options, ultimately providing superior value for oneself and the environment, based on the benefits of diversifying pro-environmental actions (Linder et al., 2021; Markle, 2019; Rivera-Torres, 2018). Individuals who actively engage in pro-environmental actions tend to be more efficient and effective in contributing to a better environment, which in turn deepens their emotional connection to environmental issues (Anderson & Krettenauer, 2021; Ren et al., 2022).

PEB carried out with specific attributes, such as consistency of action (e.g., tourists always bring shopping bags in Bali), tangible impacts on environmental health (e.g., clean water from not littering), or preserving natural beauty as a result of pro-environmental actions, can be a driving force for increasing EC within individuals. Exploiting the potential of PEB in terms of positive attributes embedded in individual actions is key to increasing EC (Grilli & Curtis, 2021). High levels of PEB have a significant impact on increasing EC due to their ability to cause deeper awareness and emotional engagement with environmental issues (Fritz et al., 2023; Rampedi & Ifegbesan, 2022). The literature suggests that PEB is a prerequisite for increasing EC in terms of internalizing environmental values or appealing to positive feelings embedded in individual actions (Li et al., 2023; Zeng et al., 2023). When engagement in PEB is shaped by specific attributes that potentially resonate with environmental values, and the benefits are emphasized, then it is rational to propose the following hypothesis:

H2. *Pro-Environmental Behavior (PEB) has a positive influence on Environmental Concern (EC).*

Pro-environmental Behavior (PEB) constitutes a critical mechanism through which environmental knowledge (EK) is translated into concrete sustainable consumer choices, thereby fostering Green Purchase Intention (GPI). Prior research indicates that tourists' direct engagement in environmental actions—such as conserving water or minimizing waste during travel—facilitates the internalization of sustainability values, which subsequently strengthens their intention to purchase environmentally friendly products (Ogiemwonyi et al., 2023; Ribeiro et al., 2023; da Silva et al., 2023). This process effectively bridges the gap between cognitive awareness and affective commitment, aligning with the Theory of Planned Behavior that posits behavior as an essential antecedent in shaping intentions (Ajzen, 1991). Empirical evidence further demonstrates that proactive environmental behaviors not only deepen tourists' emotional connection to ecological issues but also enhance their moral motivation, resulting in increased GPI (Sánchez-Feijoo & Bonisoli, 2022; Mabaire et al., 2021). Therefore, we hypothesize:

H3. *Pro-environmental behavior (PEB) positively and significantly influences Green Purchase Intention (GPI).*

2.5. EC and GPI

Tourists are constantly in search of options that add value to their experiences and consumption. A strong sense of Environmental Concern (EC) within an individual is a crucial factor that drives purchasing decisions toward sustainable practices. This strong EC reflects a deep personal commitment to environmental issues, which directly influences attitudes toward purchasing green products within the TPB framework (Ajzen, 1991; Kamalanon et al., 2022). The higher a tourist's EC, the more positive their attitude toward purchasing green products, which in turn fosters a stronger intention.

A deep EC shows the development of an individual's awareness and commitment to addressing environmental issues. This provides a clear indication that Green Purchase Intention (GPI) is based on responsible values and is consistent with environmental interests (Alam et al., 2023; Balaskas et al., 2023; Tran et al., 2022), in the context of general consumer

behavior. A strong level of EC can also be influenced by subjective norms (perceived social pressure to act green) and perceived behavioral control (belief in the ability to purchase green products) in the TPB framework.

EC aims to enhance behavioral commitment, significantly contributing to the formation of responsible purchasing intentions. Tourists with deep EC understand environmental needs and use this understanding as a basis for forming GPI (Aman et al., 2021; Lemmen et al., 2023), in the context of customer insight. The relevance between environmental understanding and personal values is crucial for realizing effective GPI (Caniëls et al., 2021; Unal et al., 2017; Walton & Jones, 2022).

GPI is a measure of the extent to which an individual commits to sustainable consumption. Measuring GPI is important because different levels of awareness and personal values influence individual perspectives. GPI can be reflected in the probability of purchasing environmentally friendly products, the willingness to select these products despite challenges, for example, price, and the contribution to positive changes in consumption trends (Wijekoon & Sabri, 2021).

Several previous studies confirmed that EC has a significant positive impact on GPI and PEB (Kamalanon et al., 2022; Parker et al., 2022). Based on this discussion, the following hypothesis is proposed:

H4. *EC has a positive influence on GPI.*

2.6. PEB as a Driver of EC and Its Mediating Role on GPI

Active engagement in Pro-environmental Behavior (PEB) plays a vital role in strengthening an individual's Environmental Concern (EC). Examples of such behaviors by tourists in Bali include recycling waste, conserving energy at accommodations, and using personal shopping bags, all of which reflect a higher level of EC (Aman et al., 2021; Greene et al., 2024). According to the Theory of Planned Behavior (Ajzen, 1991), PEB is influenced by individuals' attitudes, subjective norms, and perceived behavioral control, which collectively contribute to enhancing EC. Tourists who consistently participate in PEB tend to develop deeper emotional connections to environmental issues (Whitburn et al., 2020). This increase in environmental concern stems from direct experiences and responsible actions that improve their awareness and perception of environmental challenges (Soga & Gaston, 2023).

Considering the inconsistent findings regarding the direct effect of Environmental Knowledge (EK) on Green Purchase Intention (GPI), this study posits that PEB serves as a critical mediator. In this framework, PEB mediates the relationship between EK and GPI. This approach is grounded in the understanding that EK, as the cognitive process of acquiring and disseminating environmental information at the individual level, acts as an initial stimulus that manifests through concrete behaviors (PEB) before influencing specific purchase intentions (C. C. Chen et al., 2018; Simanjuntak et al., 2023). When tourists apply their knowledge through pro-environmental actions—such as conserving water or minimizing waste while visiting Bali—they are more likely to internalize sustainability values and subsequently develop stronger green purchase intentions (Aman et al., 2021). This process illustrates how environmental knowledge and awareness (EK) are transformed into pro-environmental behaviors, which in turn reinforce sustainable consumption intentions. Therefore, the following hypothesis is proposed:

H5. *Pro-environmental behavior (PEB) mediates the influence of environmental knowledge (EK) on green purchase intention (GPI).*

3. Methods

3.1. Study Area

The study was conducted in Bali, Indonesia, a world-renowned sustainable tourism destination known for its rich cultural heritage and natural beauty. Bali's distinctive ecological and socio-cultural characteristics make it an ideal setting for investigating tourists' green purchase intentions and pro-environmental behaviors. The island's commitment to ecotourism and environmental preservation offers an appropriate backdrop for understanding how environmental knowledge and concern influence tourist consumer behavior. The map in Figure 1 below shows the geographical location of Bali and its main tourist areas relevant to our study, including popular destinations such as Kuta, Tanah Lot Temple, Ubud, and Lovina Beach.
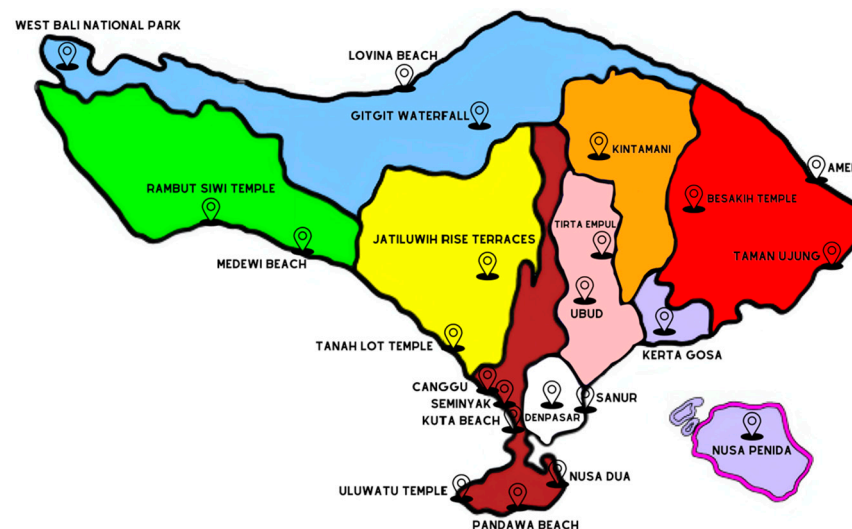
Figure 1. Map of Bali highlighting key tourist destinations.

3.2. Research Instrument Design

The research instrument consisted of a structured questionnaire developed to measure key constructs: Environmental Knowledge (EK), Environmental Concern (EC), Pro-environmental Behavior (PEB), and Green Purchase Intention (GPI). The questionnaire items were adapted from validated scales and prior empirical studies within the environmental and consumer behavior literature to ensure theoretical alignment and measurement validity (e.g., Simanjuntak et al., 2023; Deltomme et al., 2023; Hamzah & Tanwir, 2021). In this research, a 5-point Likert scale was employed for all questionnaire items. Respondents were asked to indicate their level of agreement or frequency of behavior on a scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. This scale selection was motivated by multiple considerations. Firstly, the 5-point Likert scale provides sufficient gradation to effectively capture variations in respondent attitudes and behaviors without overwhelming them with excessive response options, which could compromise response quality. Secondly, the EK, EC, PEB, and GPI constructs were adapted from existing validated instruments that similarly used 5-point Likert-type scales. Maintaining this scale format ensures comparability and consistency with prior research findings. Thirdly, the 5-point scale supports the application of parametric and non-parametric statistical techniques, including factor analysis and structural equation modeling, facilitating robust psychometric validation and hypothesis testing. Lastly, this scale optimally balances respondent ability to differentiate degrees of agreement or frequency while minimizing confusion or fatigue, which is particularly important given the mixed-mode (online and offline) survey administration.

The instrument utilized constructs that have been validated in previous studies, highlighting the cognitive, affective, and behavioral dimensions of environmental sustainability (Deltomme et al., 2023; Hamzah & Tanwir, 2021; Simanjuntak et al., 2023; Težak Damijanić et al., 2023). EK items assessed respondents' awareness of issues such as global warming, climate change, recycling, eco-label interpretation, and the benefits of green products, consistent with the approach of Simanjuntak et al. (2023). Pro-environmental behavior was measured through indicators related to actual environmentally friendly actions (e.g., recycling, water and energy conservation), following best practices noted in Deltomme et al. (2023) and Težak Damijanić et al. (2023). Environmental concern measured affective and attitudinal responses toward environmental issues, reflecting the theoretical framework of Ajzen's Theory of Planned Behavior (Ajzen, 1991) and the operationalizations used by Hamzah and Tanwir (2021). In addition, Green Purchase Intention captured respondents' cognitive readiness and willingness to purchase green products, adapted from studies such as Simanjuntak et al. (2023).

3.3. Data Collection and Samples

This study used purposive sampling, targeting tourists visiting Bali who are aged 17 years and above, as individuals of this age are considered capable of making informed opinions and decisions. An online survey was conducted from February 2024 to March 2024 to examine the Green Purchase Intention (GPI) of these tourists. The survey was distributed through both offline and online media using a structured questionnaire. A total of 350 questionnaires were circulated offline and online via platforms such as Instagram, Facebook, TikTok, and WhatsApp groups. Ultimately, 300 valid questionnaires were collected and utilized for analysis. Offline survey processes, the researchers collaborated with tour guides and travel agents who directly interact with tourists on the ground. This collaboration was supervised by a research team present in the field to ensure that data collection was carried out according to respondent criteria and to maintain data validity.

To ensure that actual tourists completed the questionnaires, we collaborated with local tour guides. A member of our research team was always present at key tourist locations to oversee and assist with the distribution and collection of the questionnaires in person. This allowed us to confirm that tourists completed the questionnaires independently. Consequently, the number of foreign tourists completing the surveys onsite was relatively limited due to their short visit duration. In contrast, domestic tourists were more willing to fill out the questionnaires during their rest breaks after lunch. For online questionnaire distribution, we received assistance from tour guides who shared the survey link within WhatsApp groups of the tours they accompanied. This approach helped ensure that the questionnaires were completed by tourists who were genuinely part of those tour groups and present at the tourist sites, thereby validating the authenticity of the data collected. Incomplete questionnaires or those that did not meet the criteria (e.g., non-tourists) were excluded from the analysis, resulting in 300 valid questionnaires used in the study.

3.4. Profiles of Respondents

The distribution of respondents showed diverse demographic characteristics, with the majority being female (62.3%) and male (37.7%). Based on age range, most respondents were in the 19 to 25 year group (42.0%), followed by the 26 to 30 year group (32.0%), 31 to 35 year group (16.0%), 35 to 40 year group (8.3%), and above 40 years (1.7%). Regarding education level, 48.0% of respondents had a diploma/bachelor's degree, 33.0% had a postgraduate degree, 17.3% had a high school education, and 1.7% had a doctorate. In total, 197 respondents (65.67%) were domestic tourists, while 103 respondents (34.33%) were

foreign tourists. Complete demographic characteristics of the respondents are shown in Table 1 in the results section.

Table 1. Profiles of respondents.

Profiles	Frequency	Percentage (%)
Gender		
Male	113	37.7
Female	187	62.3
Age		
19–25 years old	126	42.0
26–30 years old	96	32.0
31–35 years old	48	16.0
35–40 years old	25	8.3
Above 40 years old	5	1.7
Education		
High School	52	17.3
Degree/Diploma	144	48.0
Postgraduate	99	33.0
Phd/Doctor	5	1.7
Occupation		
Student	106	35.3
Privat Employee	77	25.7
Government Employee	46	15.3
Self Employee	71	23.7
Income (Rupiahs)		
Below IDR 5 million	109	36.3
IDR 5 Million–10 million	81	27.0
IDR 11 million–15 million	55	18.3
IDR 16 Million–20 million	23	7.7
Above IDR 20 million	32	10.7
Domestic Tourist	197	65.67
Foreigner Tourist	103	34.33

4. Data Analysis

4.1. Evaluation of Measurement Model

The measurement model was evaluated to ensure internal consistency, convergent validity, and discriminant validity of the latent constructs. The reliability of the dataset was tested using Cronbach's Alpha and composite reliability (CR). All constructs showed Cronbach's Alpha values > 0.700 (the highest EK was 0.928), showing high reliability. The CR (rho_c) values for all four constructs also exceeded 0.89 (the highest EK was 0.941), confirming excellent CR as well as the stability and consistency of the model measurements. Convergent validity was tested using CR, standardized factor loading, and Average Variance Extracted (AVE). All indicators had loading values > 0.70. The AVE values for all constructs exceeded 0.50 (Hair et al., 2019; Khadka et al., 2022), with EC reaching 0.778. This implies that each construct can explain more than 78% of the variance of the indicators, suggesting strong convergent validity. Moreover, no indicators were eliminated, confirming the reliability and suitability of the measurement model for structural analysis. Excellent discriminant validity was also shown by the Heterotrait-Monotrait Ratio (HTMT). All HTMT values were below the threshold of 0.90 (Henseler et al., 2015), confirming adequate conceptual differentiation between constructs. The highest HTMT value in Table 2. was between EC and GPI (0.561), while the lowest was between EC and EK (0.261).

Based on the proven strong validity and reliability, the measurement model, as summarized in Table 3, is suitable for use in further structural analysis.

Table 2. HTMT Criteria for Discriminat Validity.

	EC	EK	GPI	PEB
EC				
EK	0.261			
GPI	0.561	0.406		
PEB	0.443	0.530	0.439	

This study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) because of its robustness in handling complex models with relatively small to moderate sample sizes, its non-parametric nature allowing for non-normal data distributions, and its focus on prediction and theory development. Moreover, a reflective measurement model was adopted, wherein observed indicators are considered manifestations of latent constructs, as supported by strong factor loadings, reliability, and convergent validity measures (Hair et al., 2019; Henseler et al., 2015).

Convergent validity was evident from the AVE values exceeding the threshold of 0.50 for all constructs. Based on the results, EK has an AVE of 0.669, PEB of 0.721, EC of 0.778, and GPI of 0.747. This shows that the instrument constructs can adequately explain the indicator variance. Internal reliability was measured using Cronbach's Alpha and CR, all of which met the criteria with values above 0.70. EK had the highest reliability with a Cronbach's Alpha of 0.928 and a CR of 0.931 (Table 4). Multicollinearity was examined by calculating the Variance Inflation Factor (VIF) for all variables. The VIF values ranged from 1.692 to 3.456, all substantially below the commonly accepted threshold of 5.0, indicating the absence of multicollinearity concerns within the dataset.

The skewness and kurtosis statistics for all observed variables provide insight into the distributional properties of the data, supporting the appropriateness of the analysis method used.

All variables (EK, PEB, EC, and GPI) have very small skewness values (between -0.056 and 0.079) and are within the range of -1 to $+1$, so they can be categorized as close to a symmetric distribution. For kurtosis values, all are negative (between -0.940 and -1.132), indicating a slightly platykurtic distribution (flatter than a normal distribution). However, all kurtosis values are still within the general tolerance limit, which is ±2 (or even ±7 according to more lenient criteria, Hair et al., 2019).

Table 3. Measurement Model Evaluation: Reliability, Convergent Validity, and Multicollinearity.

Construct	Indicator Code	Variable Indicator	Outer Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)	Multicollinearity Statistics (VIF)
				0.928	0.941	0.669	
	EK1	Understand the effects of global warming	0.740				1.856
	EK2	Understand green products	0.768				1.952
Environmental	EK3	Understand how the climate is changing	0.849				2.723
Knowledge (EK), adapted	EK4	Understand the term "greenhouse gas"	0.715				1.692
from Simanjuntak et al.	EK5	Understand recycling	0.825				2.481
(2023)	EK6	Understand how to select products that can cut down on waste	0.871				3.272
	EK7	Understanding environmental product packaging symbols	0.877				3.456
	EK8	Understand that environmentally friendly products are safer than conventional ones	0.879				3.447
				0.872	0.912	0.721	
Pro-environmental	PEB1	Metal, plastic, and paper that have been recycled	0.867				2.218
Behavior (PEB), adapted	PEB2	Saved energy or water in my house	0.820				2.005
from Deltomme et al.	PEB3	Reduction of waste amount	0.850				2.082
(2023), Težak Damijanić et al. (2023)	PEB4	Using your own shopping bag can help you use fewer plastic bags	0.859				2.187
				0.905	0.933	0.778	
Environmental Concern	EC1	Environment is something that worries me	0.857				2.392
(EC), adapted from	EC2	My health is impacted by the state of the environment	0.900				3.024
Hamzah and Tanwir	EC3	I am prepared to give up something in order to save the environment	0.867				2.368
(2021)	EC4	I believe that people have an obligation to preserve the environment	0.904				3.081
				0.887	0.922	0.747	
Green Purchase Intention	GPI1	Think about purchasing environmentally friendly products	0.885				2.683
(GPI), adapted from	GPI2	Think about moving from conventional to environmentally friendly items	0.823				1.912
Simanjuntak et al. (2023)	GPI3	Prepare to consume green products	0.884				2.695
	GPI4	Will continue to purchase even green things	0.864				2.372

Table 4. Skewness and Kurtosis Value.

	Descriptive Statistics					Skewness		Kurtosis	
	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Statistic	Std. Error	Statistic	Std. Error
EK	300	8.00	80.00	44.0000	18.77699	0.079	0.141	−0.940	0.281
PEB	300	4.00	40.00	22.0000	9.77882	−0.012	0.141	−1.070	0.281
EC	300	4.00	40.00	22.0000	10.15103	−0.056	0.141	−1.132	0.281
GPI	300	4.00	40.00	22.0000	9.94466	−0.019	0.141	−1.021	0.281
Valid N (listwise)	300								

4.2. Measurement of the Structural Model

The measurement model was evaluated by testing the internal consistency and convergent validity of each latent construct using Cronbach's Alpha, CR, and AVE. The results, as presented in Table 3, show that all constructs meet high reliability criteria. The Cronbach Alpha value for each construct is above the threshold of 0.70, with EK indicating the highest reliability (α = 0.928), which shows excellent internal stability. The CR value also shows instrument reliability with a value above 0.90 for all constructs, exceeding the minimum threshold of 0.70 as suggested by Hair et al. (2019). This implies that all indicators consistently reflect the constructs being measured. Meanwhile, the AVE of all constructs also exceeds the minimum value of 0.50, suggesting adequate convergent validity. EC had the highest AVE (0.778), showing that the indicators in the construct explained more than 50% of the variance. These results confirm that the measurement model used has met the psychometric requirements for further structural analysis.

The model, as shown in Figure 2, showed excellent quality, as evidenced by all outer loading values of each indicator (EK, PEB, EC, and GPI) being far above the standard of 0.7, showing that the instrument used is valid and reliable. Based on the path analysis, EK has a positive and strong effect on PEB with a path coefficient of 0.481, which explains 22% (R^2 = 0.229) of the variance. PEB also has a significant positive impact on EC with a coefficient of 0.400 and explains 15.7% (R^2 = 0.157) of the variance. GPI was influenced by both mediators, with EC having a more dominant effect, as evidenced by a coefficient of 0.404. In contrast, the influence of PEB was smaller with a coefficient of 0.123. This model explains 32.3% (R^2 = 0.323) of the variance in GPI, implying that EC is a stronger driver than mere behavior in shaping consumer purchase intention towards green products.
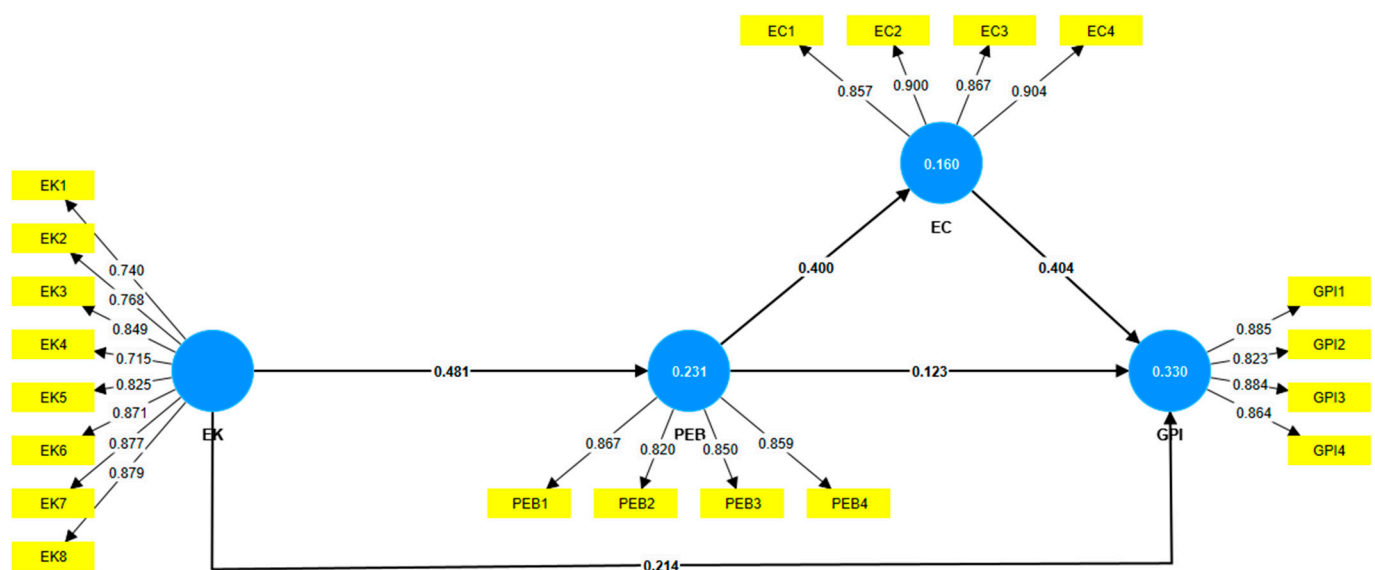
Figure 2. SEM Analysis.

Structural path analysis was conducted to test the strength and significance of the relationships between variables in the conceptual model. Based on the results presented in Table 5, all causal paths showed significant *p*-values (<0.05) with t-statistics far exceeding the minimum threshold of 1.96, indicating strong empirical support for all hypotheses. EK had a positive effect on PEB (β = 0.481; t = 11.506), showing that the higher an individual's understanding of environmental issues, the greater the tendency to engage in pro-environmental actions. A similar previous study also emphasized the role of cognition in shaping behavior. Furthermore, PEB contributed positively to EC (β = 0.400; t = 8.426) and GPI (β = 0.123; t = 2.050). This suggests that concrete actions taken by tourists in the context of sustainability have a dual effect, namely, deepening emotional attachment to environmental issues and fostering more responsible consumption decisions. EC also significantly influenced GPI (β = 0.404; t = 8.412), confirming that moral affection and environmental awareness are strong predictors of GPI. The result reinforces one of the main assumptions of the TPB (Ajzen, 1991) that an individual's internal attitudes and values are the primary determinants of intention. Furthermore, the mediation effect analysis showed that the indirect relationship from EK to GPI through PEB and EC, respectively, was also significant (β = 0.078; t = 5.143). This shows that the formation of purchase intention requires not only knowledge, but also active participation and emotional concern. The single mediation paths from EK to GPI through PEB (β = 0.059; t = 2.027) and from PEB to GPI through EC (β = 0.162; t = 5.937) were also significant, showing that the mediators play a crucial role in bridging the gap between cognition and sustainable consumption intention. These results help explain what is often referred to as the "knowledge-action gap" in green behavior literature.

Table 5. Path Coefficients and Hypothesis Testing Result.

Path Relationship	Coefficient (β)	t-Statistic	*p*-Value	Hypothesis Support
EK → PEB	0.481	11.506	0.000	Supported
PEB → EC	0.400	8.426	0.000	Supported
PEB → GPI	0.123	2.050	0.041	Supported
EC → GPI	0.404	8.412	0.000	Supported
EK → PEB → GPI (Indirect)	0.059	2.027	0.044	Supported
EK → GPI	0.214	4.504	0.000	Supported

To measure the model's predictive power, the coefficient of determination (R^2) and predictive relevance (Q^2) values were analyzed. The results in Table 6 show that the GPI construct has an R^2 of 0.323, showing approximately 32.3% of the GPI variability can be explained by the independent variables in the model, namely PEB and EC. Although considered moderate, this value is still within the acceptable range for social studies (Ozili, 2023). The PEB and EC constructs have R^2s of 0.229 and 0.157, respectively, showing that both have sufficient explanatory power for the constructs. More importantly, the Q^2 value for all three constructs is 0.561, well above the 0.35 threshold, showing high predictive relevance (Hair et al., 2019). This implies that the model is not only statistically suitable but also has strong predictive capabilities for real-world behavior, particularly in the context of tourist behavior in sustainable destinations such as Bali.

Table 6. Coefficient of Determination (R^2) and Predictive Relevance (Q^2) of Constructs.

Construct	R^2 (Adjusted)	Q^2
Green Purchase Intention (GPI)	0.323	0.561
Pro-environmental Behavior (PEB)	0.229	0.561
Environmental Concern (EC)	0.157	0.561

4.3. Mediation Effect

The mediation effect testing using the PLS-SEM approach and bootstrapping technique showed that all mediation paths analyzed were statistically significant. The first path, namely EK → PEB → GPI, shows an indirect effect coefficient of β = 0.059 with a t value of 2.027 and $p < 0.05$. To strengthen the interpretation of the mediation strength, The Variance Accounted For (VAF) value of 21.6% for the mediation path EK → PEB → GPI indicates partial mediation, as the direct effect of EK on GPI remains significant as shown in Table 5. Therefore, PEB acts as a partial mediator in the relationship between EK and GPI. This result confirms that PEB plays a key role as the main mediator in the psychological structure of EK and EC towards GPI. In this context, real behavior is not only the result of cognitive processes, but also a reinforcement of affective and moral commitments, which then foster the formation of sustainable consumption intentions.

5. Discussion and Conclusions

This study validates the essential role of EK as an essential catalyst that incites PEB and EC, which in turn influence GPI among tourists (Hamzah & Tanwir, 2021; Yaqub et al., 2023). The results demonstrate that PEB serves as a crucial mediator linking EK and EC to the intention to purchase green products (Hong et al., 2024). This corroborates the premise in the Theory of Planned Behavior (TPB) that intention is influenced not only by cognitive and affective elements but also by established behavioral patterns (Ajzen, 1991). Tangible environmental actions undertaken by visitors enhance their emotional engagement with environmental issues and strengthen their commitment to sustainable consumption, thereby helping to bridge the 'knowledge-action gap' in sustainable consumer behavior (Capiene et al., 2022).

EC emerges as a crucial predictor of green purchasing intention, highlighting the major influence of moral emotion and personal understanding in driving pro-environmental consumption choices (Parker et al., 2022). This research addresses green purchase intentions, particularly in socially unique environments like Bali (Khan et al., 2021). Consequently, broadening the conceptual model to incorporate these variables may yield a more thorough comprehension of the factors influencing green buying intention.

This study builds a conceptual model to answer the question of EK, which has the potential to significantly increase GPI by leveraging the role of PEB. Acceptance of the proposed hypothesis has several valuable insights for managing EK to enhance GPI.

First, PEB acts as a key mediator between EK and EC, which in turn influences GPI. This shows that knowledge should be translated into concrete pro-environmental actions capable of deepening emotional attachment and moral commitment to environmental issues. Therefore, encouraging tangible, sustainable behavior among tourists is crucial to increasing EC and strengthening GPI (Ajzen, 1991; Gomes & Lopes, 2023; S. Lee et al., 2019).

Second, EC has a stronger direct influence on GPI compared to PEB, confirming the importance of affective and moral engagement as drivers of GPI. This implies that campaigns and interventions need to focus not only on raising awareness but also on building deep-seated environmental values and concerns to motivate responsible purchasing decisions (Ahn et al., 2020; L. Chen et al., 2022). The results indicating that Environmental Concern (EC) has a more substantial direct influence on Green Purchase Intention (GPI) than Pro-Environmental Behavior (PEB) offer meaningful insights into the psychological mechanisms driving sustainable consumption. Although PEB entails concrete environmental actions, it appears that the affective and moral engagement embodied in EC serves as a more powerful direct motivator of green purchasing decisions. This pattern is consistent with the Theory of Planned Behavior (Ajzen, 1991), which suggests that intention is primar-

ily shaped by attitudes encompassing both emotional and normative aspects, rather than solely by prior behaviors.

Engaging in PEB can foster and deepen EC by providing direct experiences that reinforce environmental values and moral commitment (Singh & Khanwani, 2023; Tosun et al., 2023). This experiential learning mechanism explains hypothesis H2 (PEB → EC) and positions PEB as an antecedent that indirectly influences GPI through its effect on EC. In this regard, PEB strengthens environmental concern, which in turn functions as a proximal predictor of intention, representing a sequential cognitive-affective-behavioral pathway (Capiene et al., 2022; Ribeiro et al., 2023).

Thus, while PEB is critical in promoting environmental awareness and engagement, it is the emotional attachment and moral responsibility captured by EC that more directly motivate consumers to intend to purchase green products. This understanding highlights the importance of designing interventions that not only encourage pro-environmental actions but also cultivate affective and moral concern for the environment to enhance GPI. By fostering EC alongside PEB, such strategies can more effectively bridge the knowledge-action gap and promote lasting, sustainable consumer behavior.

Third, although this study successfully integrated PEB as a mediating variable, limitations occurred due to the failure to include other potential mediator variables such as social norms, environmental identity, or local cultural values. These factors contribute to tourist GPI through social pressure or strengthening ecological self-images. Therefore, future studies are expected to expand this conceptual model (Cooray et al., 2024). Fourth, the cross-sectional nature of the data limited understanding of the temporal dynamics of tourist behavior and intentions. Given that environmental behavior can develop over time due to exposure to environmental issues, travel experiences, or media campaigns, longitudinal studies should capture these changes and identify long-term determinants of sustainable consumption behavior (Cui et al., 2024).

In general, this study makes both theoretical and practical contributions by expanding the TPB framework through the inclusion of PEB as a significant mediator. Concrete environmental action serves as a crucial link between cognitive knowledge and affective concern in shaping sustainable consumption intention. For tourism managers and policymakers, program design that fosters active pro-environmental participation can effectively bridge the gap between knowledge and intention, thereby encouraging wider adoption of green products in ecologically stressed destinations such as Bali (Ajzen, 1991; Aman et al., 2021; Deltomme et al., 2023).

Managerial Implications

The results emphasize the importance of collaboration between local governments, tourism industry players, and academics in building a sustainable tourism ecosystem. Effective environmental education needs to be developed by providing easily accessible information and campaigns that emphasize local cultural values to increase tourist awareness and concern for environmental issues. Local community participation in the design and management of ecotourism programs is also crucial to ensure social relevance and long-term sustainability, allowing tourists to have authentic and environmentally responsible experiences.

Tourism businesses need to provide facilities and products that support environmentally friendly behavior, including ecotourism accommodations and green-certified local products, as well as develop reward systems that foster more sustainable consumption behavior. Integration between MSMEs, tourism associations, and digital platforms should also be strengthened to promote a broader green lifestyle and tourist engagement. This integrated and multidimensional approach will not only make tourist destinations more

economically competitive but also contribute significantly to environmental preservation and the social well-being of the surrounding community.

6. Limitations and Recommendations for Future Studies

Future studies should expand the model by including additional mediating or moderating variables such as social norms, environmental identity, and local cultural values, as these factors influence GPI alongside EK and EC. This study employed a cross-sectional survey design, which limits the ability to infer causal relationships or observe changes in tourist pro-environmental behavior and green purchase intention over time. To better understand how these behaviors evolve, longitudinal studies are recommended to capture temporal dynamics and the impact of travel experiences or environmental campaigns. Furthermore, the questionnaire did not differentiate between tourist origin, specifically between foreign and domestic tourists. Differences in cultural backgrounds, environmental awareness, and motivations between these groups may significantly influence environmental knowledge, concern, and behavior. Without this segmentation, the generalizability of the findings across diverse tourist populations in Bali is constrained. Future research should incorporate comparative analyses between foreign and domestic tourists to identify unique drivers and barriers influencing their sustainable consumption intentions.

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Abbreviations

The following abbreviations are used in this manuscript:

EK	Environmental Knowledge
PEB	Pro-environmental Behavior
EC	Environmental Concern
GPI	Green Purchase Intention

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