



# Fostering eco-conscious tourists: How sustainable marketing drives green consumption behaviors

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## ABSTRACT

This study aims to examine the impact of sustainable marketing on the sustainable consumption behavior of tourists in the Chinese hospitality industry, data science and machine learning techniques to analyze behavioral patterns. Green intrinsic motivation as the mediator and environmental knowledge as the moderator. In line with the 412 valid responses collected using the SMART-PLS analysis, the paper affirms that sustainable marketing significantly affects both green intrinsic motivation and sustainable consumption behavior. Moreover, green intrinsic motivation was found to partially mediate the sustainable marketing and consumption behavior whereas environmental knowledge was found to enhance the mediating role as a moderator. These results stress the necessity for the application of sustainable measures and educational programs in the hospitality industry that can contribute to the formation of appropriate environmental perceptions of tourists. It was found that by increasing tourists' intrinsic motivation and their understanding of the environment, hospitality organizations can positively influence the continuum of sustainable consumption. It is recommended that policymakers and industry stakeholders actively participate in such endeavors, including the promotion of incentives for sustainable business and awareness-raising campaigns.

## 1. Introduction

Climate change is one of the contemporary multifaceted global challenges of the century that affect the environment, economies, and societies (Guan et al., 2023; Jiang et al., 2025). Climate data demonstrate that storms and floods are intensifying, sea levels are gradually increasing; and species are being lost, which is why it is imperative to act collectively (Yuxiang et al., 2024). Climate change is one topic that does not have an easy solution; it is a war that can only be won through cooperation among governments, organizations, and individuals (Ahmad, Samad, & Mahmood, 2024). In this regard, and the tourism and hospitality industry assumes a critical role because of its tremendous environmental impact (Baloch et al., 2023).

Due to its excessive resource consumption and substantial ecological effects, the tourism and hospitality industry exercises key responsibilities towards global environmental sustainability. The tourism sector generates 8 % of global greenhouse gas (GHG) emissions (Miralles

et al., 2023), and accommodation services produce over 20 % of the sector's overall carbon footprint (Gössling & Lund-Durlacher, 2021). The environment suffers due to hotels' excessive power utilization, water usage patterns, discarded food, and extensive plastic use. The total CO<sub>2</sub> emissions from hotels stem mostly from their electrical needs, which heat, cool, and light their operations (Laura, 2024). Research shows that hotel guests typically create waste ranging from 1 to 2 kg each night, which ends up in landfills and creates pollution (Business Waste, 2024). The hospitality industry consumes significant amounts of water throughout areas facing existing water supply concerns just as it generates waste and carbon emissions. According to an estimate, the daily average water usage per hotel room ranges from 100 to 400 gal of water daily per occupied room when accounting for guestroom needs food preparation and beverage production and pool and laundry maintenance (Davodi, 2024). The large amount of water consumption in tourist hotspots creates overwhelming strain on area water supplies thereby increasing environmental stress. Hotels along with restaurants generate

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79 million tons of annual food waste, equivalent to 17 % of total food service within the hospitality sector (Ally et al., 2024). Food waste creates methane emissions from landfills while working against sustainability goals for responsible consumption.

Environmental concerns about the hospitality industry demand immediate adoption of sustainable practices within its management framework (Ahmad, Ahmad, Lewandowska, & Han, 2024; Xu et al., 2022). Through sustainable marketing initiatives, we can expect transformative changes in consumer behavior since education about environmentally friendly practices can be combined with incentives for responsible consumption choices. The hospitality sector's vast environmental impact makes sustainable marketing an essential field of focus that will help drive environmental conservation initiatives forward. Sustainable marketing, defined as the action of informing individuals and consumers about environmentally friendly products or services (Dangelico & Vocalelli, 2017), is very useful in nurturing the culture of environmental conservation among the people. Along with the improvement of the environmental image of hospitality organizations, it is possible to contribute to the development of sustainable tourism consumption if the organizations manage to convey the environmental effects of their products. This is especially so bearing in mind that the tourists of the current modern world are beginning to realize the impact of the activities they undertake on the environment and are willing to pay for products and services from firms who are environmentally sensitive (Šagovnović & Stamenković, 2023). Hence, it becomes crucial to investigate how sustainable marketing impacts the behavior of tourists in order to develop proper tactics that would contribute to improving stewardship of the hospitality industry (Ahmad, Samad, & Mahmood, 2024). This paper seeks to establish the role of sustainable marketing strategy in influencing sustainable consumption behavior through green intrinsic motivation while being moderated by environmental knowledge.

In the recent past. More specifically in the current decade, the sustainability concept has been realized in the tourism and hospitality industry (Ahmad, Ahmad, & Siddique, 2024). This sector takes one of the leading places and is one of the most dynamically growing sectors in the world economy and significantly affects the increase in the economies of countries (Ahmad, Ahmad, & Siddique, 2023). However, it also entails a high degree of environmental threats like energy intensity, waste generation, and carbon footprint. Hence, the concept of sustainable marketing emerges as a major concern for hospitality organizations that want to reduce the negative impacts on the environment and respond to the customers' increased demand for the green products and services. By embracing and encouraging sustainability, hospitality organizations can positively influence consumer behavior towards sustainable consumption.

Sustainable marketing practices and tourist behavior is connected in many ways and can be affected by different factors. Green intrinsic motivation is one of them, and this is the motivation that stems from the individual's self-interest and values in acting in a pro-environmental way (Lin, 2022). Sustainable marketing stimuli are more likely to be accepted by tourists with high green intrinsic motivation because of their environmental concerns. Environmental knowledge is another potential antecedent to support sustainable marketing communication since it can provide suitable information for tourists. This research, therefore, seeks to contribute to the ongoing discussion on responsible production and consumption by exploring the part played by green intrinsic motivation and environmental knowledge within the realm of sustainable marketing and sustainable consumption behavior of the tourists within the Chinese hospitality industry. Specifically, the study is concerned with understanding such dynamics and aims to contribute knowledge to hospitality organizations that will help the world and avert climate change.

In the present work, green intrinsic motivation is included as the mediator, and environmental knowledge is the moderator in sustainable marketing and consumption. Green intrinsic motivation is relevant as it

illustrates the tourists' self-interest in environmental conservation, which, despite being argued, could be an efficient tool for attaining the sustainable consumption goal (Line et al., 2018). Thus, when the tourists are intrinsically motivated, they can display an environmental attitude that they hold such as choosing environmentally friendly accommodation and participating in conservation process. Knowing how sustainable marketing practices can enhance this intrinsic motivation is the first step in developing future marketing strategies that will appeal to tourists with environmental concerns. Green intrinsic motivation is also moderated by environmental knowledge, which plays an important role in enhancing the impacts of green intrinsic motivation. If tourists are aware of the environmental factors and benefits of implementing sustainable practices, they are capable of achieving sustainable practices. Such information enables tourists to exercise the self-motivation that comes with the tourists' nature and engage in activities that are friendly to the environment. Hence, this research establishes the relationships between sustainable marketing practices and sustainable consumption behavior and examines how green intrinsic motivation and knowledge mediate and moderate this relationship.

The Chinese hospitality industry can be a perfect context for this research, given that the hospitality industry in China is growing fast and the emphasis on sustainability is gradually being extended (Sun & Nasrullah, 2024). Since China is a country with considerable awareness of environmental issues and a significant commitment to sustainable development, the views of Chinese tourists towards sustainable marketing practices are particularly informative. With this background, this study seeks to advance knowledge on sustainable consumption behaviors in the Chinese context as a contribution to the literature on the tourism and hospitality industry and offer practical implications for organizations interested in improving their sustainable consumption efforts and minimizing the negative impact on the environment.

This research fills several gaps that are evident in the current literature. To begin with, although the concept of sustainable marketing and its effects on consumers' buying decisions have been explored in prior research, there is a dearth of research that looks at the effects of sustainable marketing in the context of the tourism and hospitality industry, especially in China. This research addresses this gap by offering context-specific information on how sustainable marketing affects tourist behavior in one of China's most dynamic hospitality markets. Secondly, the study incorporates the mediating effect of green intrinsic motivation, which has not been investigated adequately in the sustainable marketing literature. Thus, by focusing on internal drivers of change, this research better comprehends the psychological factors behind sustainable consumption. Thirdly, the study looks at the moderating effects of environmental knowledge; this is in a bid to address the debate on the potential of information and knowledge in improving the implementation of sustainable marketing strategies. Hence, the present focus on motivation and knowledge offers a better theoretical foundation to enhance understanding and change sustainable behavior. Through doing so, the study contributes to the theoretical framework of sustainable marketing and consumer behavior and provides tangible recommendations for the hospitality businesses to enhance the sustainability of the tourism sector.

## 2. Hypotheses development

The link between sustainable marketing and sustainable consumption behavior has received increased attention in the recent literature (Haider et al., 2022; Li et al., 2024). Eco-marketing or green marketing strategies positively affect customers buying behavior and decisions (Sheth & Parvatiyar, 2021). Today's tourists are more conscious about the environment and are likely to support environmentally conscious businesses (Park et al., 2022). Eco-friendly marketing communication positively impacts tourists' sustainable behavioral intentions, including green hotel selection (Chung, 2020). Based on this positive relationship, it can be inferred that the company's sustainable marketing strategies

help hospitality businesses capture environmentally responsible tourists and promote sustainable behaviors that align with environmental objectives.

We base our study on the value-belief-norm (VBN) theory, which has a relatively newer application in environmental psychology and sustainable behavior (Sharma & Gupta, 2020). According to the VBN theory, values determine beliefs in developing personal norms for environmental behaviors (Stern, 2000). To this end, sustainable marketing can change the tourists' attitude and perception towards the environment, enhancing the personal norms towards sustainable consumption. In the Chinese hospitality industry's context, this theory makes it easier to decipher how the marketing process affects the values and beliefs of tourists and enables them to make sustainable consumption decisions. Prior research has shown that VBN theory is useful in anticipating individuals' green behaviors (Denley et al., 2020).

**H1.** Sustainable marketing practices positively influence tourist sustainable consumption behavior.

Sustainable marketing practices contribute to individuals' sustainable consumption behavior as well as have a vital impact on the intrinsic motivation of individuals (Dodds et al., 2022). Indeed, sustainable marketing practices tap into the inherent values and thus create a more profound behavioral commitment to sustainable action (Carvache-Franco et al., 2022). Riva et al. (2022) argued that if companies embrace sustainable marketing strategies, there is a likelihood that customers' self-generated motivation will improve and they will adopt sustainable practices. In the same vein, Chung (2020) established that sustainability marketing strategies result in enhanced consumer involvement in green activities due to the compatibility of the communicated marketing messages with consumers' environmental concerns.

This is backed up by VBN theory, as when the tourists feel that the hospitality organization's marketing activities align with their environmental beliefs, their self-generated sustainable consumption intention improves. This intrinsic motivation is important as it results in sustainable and consistent environmentally friendly behaviors as opposed to extrinsic motivation. Prior research in environmental settings has shown that marketing appeals, when congruent with consumers' environmental attitudes, would best predict sustainable behavior.

**H2.** Sustainable marketing practices positively influence tourists' green intrinsic motivation.

Green intrinsic motivation is an important factor in defining customers' sustainable consumption (van Dam & van Trijp, 2016). Intrinsic motivation, a type of motivation that originates from the person's personality and thus entails performing the tasks being valued due to the person's appreciation of their worth, helps shape consumption behavior in a positive manner (Li & Wen, 2019). High green intrinsic motivation of tourists is closely associated with the sustainable consumption behaviors that include selection of green hotels, reduction of waste and support of conservation measures (Seeler et al., 2021). Psychological motivation is more effective and long-lasting for maintaining sustainable behaviors as the activities are performed per the individual's moral standards.

In the context of VBN theory, if tourists' values and beliefs about the environment are positive, they will likely consider it sacrificial to protect the environment and take actions towards sustainability (Park et al., 2022). These personal norms have been established as significant determinants of many different environmental behaviors, including recycling, energy saving, and environmentally sound travel (Whitley et al., 2018). For example, Landon et al. (2018) noted that customers with high intrinsic motivation tended to engage in sustainable consumption behaviors due to internal motivation rather than external motivations. This perspective highlights the need to integrate sustainable marketing activities with tourists' environmental attitudes to enhance self-internalization and encourage sustainable marketing consumption.

**H3.** Tourists' green intrinsic motivation positively influences their sustainable consumption behavior.

Green intrinsic motivation is pivotal in understanding the effects of sustainable marketing activities on the sustainable consumption behavior of tourists (Mehmood & Khan, 2023). Sustainable marketing practices aim to persuade consumers to purchase environmentally friendly products and services and may directly influence the consumer's behavior by appealing to their ethical sense (Baktash & Talib, 2019). However, the success of these marketing practices is contingent upon the extent to which they elicit green intrinsic motivation among tourists. Green intrinsic motivation is one's self-endorsement to perform green behavior due to personal reasons based on perceived values and beliefs on sustainability (Groening et al., 2018). When tourists are intrinsically motivated, they are more likely to respond to the messages contained in sustainable marketing and act sustainably.

According to the VBN theory, sustainable marketing practices change tourists' environmental values and beliefs, creating a personal responsibility for sustainable practices. This context, therefore, underlines the need to ensure that the sustainable marketing implemented is in line with the tourists' environmental attitude to ensure that the motivation to adjust the consumption pattern is internal. Theoretical and empirical evidence suggests that intrinsic motivation plays the role of a buffer that explains the connection between external sources (green marketing initiatives in the current case) and behaviors (sustainable consumption behavior, in this study) (Gilal et al., 2020). For instance, Zhang et al. (2021) established that inner motivation works as a mediator for sustainable individual behavior, confirming the significance of internal motivation in accomplishing sustainable results. This suggests that when tourists believe that the marketing communication of a hospitality organization aligns with their environmental values, their self-generated motivational need for sustainable consumption will be boosted, resulting in longer and more consistent sustainability-related behaviors compared to extrinsic motivation.

**H4.** Tourists' green intrinsic motivation mediates the relationship between sustainable marketing practices and tourists' sustainable consumption behavior.

Sustainable marketing practices indirectly impactsustainable consumption behavior through green intrinsic motivation, where environmental knowledge moderates this relationship. Environment knowledge is defined as for the environment and how willing an individual is to support conservation (Dabiezies & Taks, 2021). The improvement of sustainable marketing communication is further enhanced by the fact that tourist has a high level of awareness of environmental issues, and thus can embrace sustainable initiatives. Environmental knowledge and green intrinsic motivation are the two factors that predict the level of consumption in sustainable practices. Sustainable marketing can efficiently convey the tourists who possess high environmental consciousness because they are in a position to interpret the messages of sustainable marketing and also are able to understand the impact of their consumption on the environment (Jaiswal et al., 2022). This recognition not only increases the motivation of individuals to engage in sustainable behaviors, but also changes this motivation into effective sustainable consumption practices. Research by Simanjuntak et al. (2023) supports the notion that knowledgeable consumers are more responsive to sustainable marketing and more likely to engage in eco-friendly behaviors. Furthermore, from the standpoint of VBN theory, when tourists receive relevant information about environmental problems, they feel more motivated inside to preserve the environment and then exhibit more positive pro-environmental behaviors.

**H5.** Environmental knowledge moderates the relationship between sustainable marketing practices and tourists' sustainable consumption behavior via green intrinsic motivation.

Table 1 summarizes key studies on sustainable marketing,

**Table 1**

Summary of key studies on sustainable marketing, motivation, and consumption behavior.

Study	Key focus	Methodology	Key findings	Identified research gap	Contribution of this study
Haider et al. (2022)	Influence of sustainable marketing on consumer behavior	Survey-based, cross-sectional	Sustainable marketing positively affects consumers' pro-environmental purchasing decisions	Limited focus on tourism and hospitality industry	Expands analysis to the hospitality sector, focusing on tourists' sustainable consumption behavior
Chung (2020)	Impact of green hotel marketing on consumer attitudes	Experimental design	Eco-friendly marketing messages improve tourists' willingness to stay in green hotels	Lacks a theoretical model explaining why marketing influences behavior	Integrates Value-Belief-Norm (VBN) theory to explain psychological mechanisms behind sustainable marketing's impact on behavior
Dodds et al. (2022)	Role of intrinsic motivation in sustainability practices	Survey-based, multi-industry	Intrinsic motivation leads to stronger and more lasting pro-environmental behaviors	No mediation analysis linking marketing to motivation and behavior	Identifies green intrinsic motivation as a mediator between sustainable marketing and consumption behavior
Jaiswal et al. (2022)	Effect of environmental knowledge on sustainable consumption	Survey-based, general consumers	Environmental knowledge strengthens the relationship between environmental concern and action	No moderation analysis in hospitality or tourism	Demonstrates that environmental knowledge moderates the relationship between motivation and sustainable behavior
Simanjuntak et al. (2023)	Tourists' knowledge and sustainability choices	Cross-sectional survey	Knowledgeable tourists engage more in eco-friendly behaviors	Does not consider the role of marketing stimuli	Shows how sustainable marketing enhances tourists' motivation and knowledge, leading to sustainable consumption
van Dam and van Trijp (2016)	Psychological factors influencing sustainable consumption	Meta-analysis	Motivation is crucial for sustained pro-environmental actions	Lacks empirical validation in the hospitality sector	Strengthens the empirical basis for motivation as a key factor in hospitality-based sustainable consumption
Sheth and Parvatiyar (2021)	Sustainable marketing and consumer decision-making	Literature review	Green marketing influences consumer preferences but is not always translated into action	Does not explore underlying psychological mechanisms	Establishes the link between marketing, motivation, and sustainable actions through VBN theory
Landon et al. (2018)	Application of Value-Belief-Norm theory in tourism behavior	Survey-based, tourist sample	Tourists' values and beliefs shape their pro-environmental behaviors	Does not examine the role of marketing as an external stimulus	Uses VBN theory to demonstrate how sustainable marketing can activate tourists' personal norms for responsible tourism
Gilal et al. (2020)	Role of intrinsic motivation in green consumer behavior	Experimental design	Self-determined motivation is a strong predictor of pro-environmental behavior	No moderation analysis with environmental knowledge	Shows that environmental knowledge strengthens intrinsic motivation, leading to stronger sustainability actions
Baktash and Talib (2019)	Green marketing strategies and consumer loyalty	Structural Equation Modeling (SEM)	Green branding and marketing increase consumer retention	Does not examine sustainable consumption beyond brand loyalty	Extends findings to actual behavioral change rather than just brand perception
Zhang et al. (2021)	Customer motivation in sustainability initiatives	Multi-level study	Motivated customers engage in sustainable behaviors voluntarily	Lacks the moderating effect of knowledge	Demonstrates that sustainability education amplifies motivation-driven behaviors
This study	Sustainable marketing, motivation, and knowledge in hospitality	Empirical survey, SmartPLS analysis	Sustainable marketing affects tourists' sustainable consumption via motivation, with environmental knowledge strengthening this relationship	Limited studies integrating all three constructs (marketing, motivation, and knowledge) within a theoretical model	Provides a comprehensive model based on VBN theory, demonstrating how marketing triggers psychological processes leading to sustainable consumption

motivation, and consumption behavior, and Fig. 1 includes our conceptual model.

### 3. Methodology

#### 3.1. Participants, procedure, research location and justification

The study was conducted in three major tourist cities in China: Hangzhou, Chengdu, and Xi'an. The researchers selected locations demonstrating various forms of tourist behavior and diverse sustainability approaches in hospitality operations. As a tourist destination, Hangzhou welcomes visitors with its environmental conservation programs alongside its preserved cultural heritage, offering experiences of nature exploration and historical exploration. Chengdu's reputation for urban sustainability initiatives and wildlife conservation work, especially its panda conservation project, allows researchers to study sustainable tourism participants. Tourists from education and leisure backgrounds visit China's heritage destination, Xi'an, because it represents a unique opportunity to study sustainability awareness at historical sites. The choice of these three cities serves to generate findings that demonstrate tourism motivations and behavioral interactions with sustainable hospitality across various forms of tourism. The research team selected hospitality organizations for study based on their active

promotion of sustainable practices to improve the study's overall relevance. The research examined organizations through their environmental certification programs and sustainability documentation and engagement in eco-friendly programs. The research design grounds its findings in genuine hospitality settings where sustainable practices actively gain promotion throughout the industry sector.

A total of 700 self-administered paper-based questionnaires were administered with the view of having a large sample size because survey research generally records low response rates (Ahmad, Samad, & Han, 2024; Fu et al., 2023). The questionnaires were administered on the spot, targeting tourists within the hospitality organizations at the reception, lobby, or at the time of registration/check out.

A total of 443 questionnaires were filled and completed, out of which 412 questionnaires were considered usable, excluding the incomplete ones. This allowed for a response rate of about 58 %. The criteria for selecting the research participants were the participants' age over 18 and their stay at the hospitality organizations of the sample for at least one night. The respondents were recruited based on a non-probability sampling method, and they represented different ages, genders, educational levels, and nationality. This diversity would have enabled the results of the study to be generalized to other parts of the tourist population.



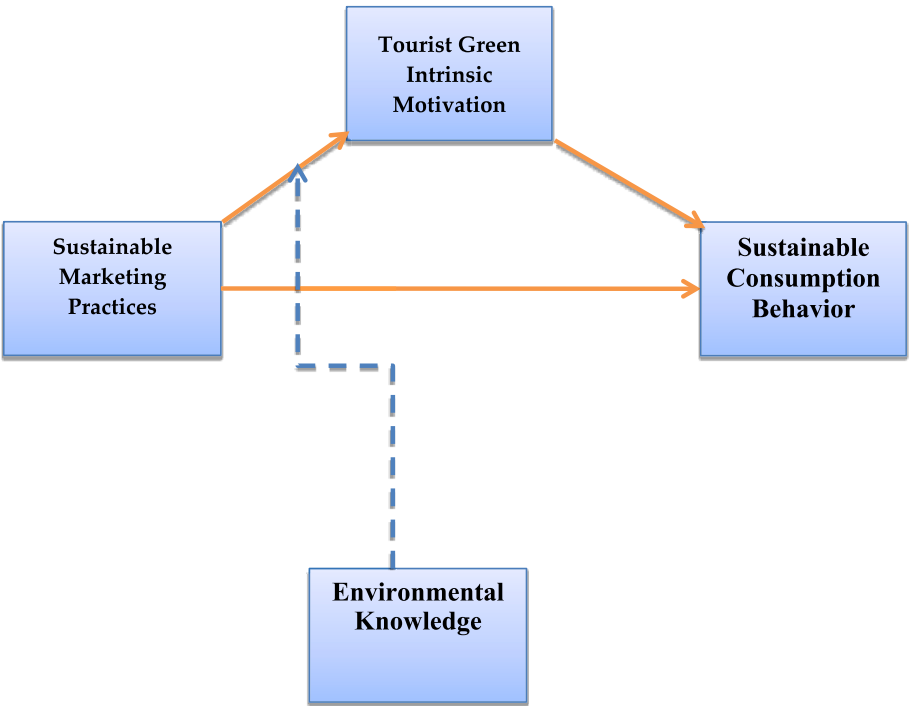


Fig. 1. The hypothesized research model.

3.2. Survey method and rationale

A self-administered survey was selected as the primary data collection method due to its effectiveness in collecting direct, unbiased responses from tourists in real time. This method allows participants to reflect on their experiences and perceptions without external influence, reducing interviewer bias. Additionally, self-administered surveys are widely used in consumer behavior research as they provide greater anonymity, which can lead to more honest and accurate responses, particularly when exploring attitudes and motivations related to sustainability. Given the transient nature of tourists, paper-based surveys were distributed at hotel receptions, lobbies, and checkout counters, allowing participants to complete them at their convenience. To enhance response rates, hospitality staff, who were trained in ethical research procedures, encouraged participation while maintaining a neutral stance to avoid influencing responses (Liu et al., 2024; Wang et al., 2024).

3.3. Steps to minimize response bias

Implementation steps were put in place to minimize response bias while improving data reliability. The respondents received guarantees about both anonymity and confidentiality as researchers made it clear responses would only be used for scientific research. There was no collection of personal information because it aimed to boost participant honesty. Surveys were distributed at various times throughout the day and week to collect diverse data from a wide array of tourist populations and activities. The study maintained a representative sample through equal representation of domestic tourists and international travelers alongside business visitors and leisure vacationers who came from multiple educational backgrounds and different age groups. The survey designers randomized the question order in essential sections to eliminate response impacts from question sequence effects (Ahmad, Han, & Kim, 2024). Thirty respondents participated in a pre-testing stage to enhance questionnaire clarity and comprehension before distributing the main research survey (Liu et al., 2023). Prior to data collection, the pre-testing phase enabled researchers to refine the questionnaire by

validating the understanding and appropriateness of each item for study goals (Table 2).

Data collection took place over a three-month period from June to August 2023. We used a structured questionnaire designed to measure the key variables of interest: sustainable marketing practices, green intrinsic motivation, sustainable consumption behavior, and environmental knowledge. The questionnaire was developed based on validated scales from previous research, ensuring its reliability and validity. The questionnaire included sections on demographic information, perceptions of the hospitality organization’s sustainable marketing practices, intrinsic motivation towards green behaviors, environmental knowledge, and sustainable consumption behaviors during their stay. To minimize response bias, we assured participants of the anonymity and confidentiality of their responses.

Major ethical guidelines for conducting research with human participants were strictly followed. Participants were informed about the

Table 2  
Study demographic.

Demographic profile	Frequency	Percentage (%)
Gender		
Male	220	53.4 %
Female	192	46.6 %
Age		
18–25	103	25.0 %
26–35	145	35.2 %
36–45	91	22.1 %
46–55	54	13.1 %
56 and above	19	4.6 %
Education		
High school or below	78	18.9 %
Bachelor’s degree	204	49.5 %
Master’s degree or higher	130	31.6 %
Type of tourist		
Local	230	55.8 %
International	182	44.2 %
Purpose of visit		
Leisure	305	74.0 %
Business	67	16.3 %
Other	40	9.7 %

purpose of the study, their rights as participants, and the voluntary nature of their participation (Ahmad, Samad, & Han, 2023; Zhou et al., 2023). Informed consent was obtained from all participants before they completed the questionnaire. Participants were assured that their responses would remain confidential and that the data would be used solely for academic research purposes.

### 3.4. Reliability and validity of the survey instrument

The study utilized previously published scales, using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Sustainable marketing practices were measured using a 12-item scale with four dimensions from Jung et al. (2020): economic (3 items, e.g., “This hospitality organization improves the economic power of the traditional market with various activities”), social (3 items, e.g., “This hospitality organization supports activities for the community”), environmental (3 items, e.g., “This hospitality organization uses environmentally friendly materials to deliver its product/services”), and cultural (3 items, e.g., “This hospitality organization respects various races”). Sustainable consumption behavior, was assessed using a 24-item scale from Quoquab et al. (2019). This includes three dimensions: quality of life (11 items, e.g., “I always try hard to reduce misuse of goods and services”), care for environmental well-being (7 items, e.g., “I switch off lights and fans when I am not in the room”), and care for future generations (6 items, e.g., “I often think about future generation’s quality of life”). Environmental knowledge was measured through 4-item based on Mohd Suki and Mohd Suki (2015), e.g., “Compared to an average person, I am familiar with hospitality organizations’ environmental policies.” Green intrinsic motivation was measured with a 5-item borrowed from Ali et al. (2020), e.g., “I feel excited when I stay at environmentally friendly hospitality organizations.”

The questionnaire was reviewed by two independent experts in sustainable tourism research to confirm its relevance and appropriateness (Ahmad, Ullah, et al., 2023). For construct validity, a confirmatory factor analysis (CFA) was conducted, demonstrating strong factor loadings ( $>0.70$ ) for all constructs, confirming the adequacy of the measurement model. Composite reliability values exceeded 0.70, indicating strong internal consistency (Chen et al., 2022; Han et al., 2022) and average variance extracted values were above 0.50, confirming convergent validity (Ahmad et al., 2022; Peng et al., 2022). Discriminant validity was ensured by verifying that the square roots of average variance extracted values were greater than inter-construct correlations (Fu et al., 2022). For full transparency and replicability, the complete questionnaire is provided in Appendix 1.

## 4. Results

We used SMART-PLS for data analysis to assess the measurement model. During the analysis, a few items were deleted due to weak factor loadings. The results of the Confirmatory Factor Analysis (CFA) are summarized in Table 3 below. Each construct demonstrated strong factor loadings ( $>0.70$ ), indicating good convergent validity. Fig. 2 represents our measurement model.

Table 4 below presents the composite reliability (CR), average variance extracted (AVE), correlations, square root of the AVEs (diagonal values), and R-squared values. The CR values for all constructs exceed the recommended threshold of 0.70, indicating strong internal consistency. The AVE values are all above 0.50, confirming good convergent validity (Ahmad et al., 2021; Gupta et al., 2021). The square roots of the AVEs are greater than the inter-construct correlations, supporting discriminant validity. The R-squared value for TGIM is 0.54, indicating that 54 % of the variance in tourists’ green intrinsic motivation is explained by sustainable marketing practices, demonstrating a substantial effect.

We conducted a comprehensive assessment of reliability and validity for our measurement model which followed structural equation

**Table 3**  
CFA results.

Constructs	Items	Factor loadings
Care for Future Generations (CFG)	CFG1	0.915
	CFG3	0.820
	CFG4	0.944
	CFG5	0.932
	CFG6	0.930
	CFG7	0.910
Environmental Knowledge (EKW)	EKW1	0.910
	EKW2	0.944
	EKW3	0.943
	EKW4	0.862
Environmental Well-being (ENW)	ENW1	0.931
	ENW2	0.947
	ENW3	0.935
	ENW5	0.933
	ENW6	0.939
	ENW7	0.939
Quality of Life (QOL)	QOL1	0.910
	QOL11	0.804
	QOL3	0.749
	QOL4	0.768
	QOL6	0.905
	QOL7	0.915
	QOL8	0.890
	QOL9	0.855
	QOL10	0.855
Sustainable Marketing Practices - Cultural (SMP-CI)	SMP-CI1	0.931
	SMP-CI2	0.800
	SMP-CI3	0.919
Sustainable Marketing Practices - Economic (SMP-Ec)	SMP-Ec1	0.950
	SMP-Ec2	0.974
	SMP-Ec3	0.961
	SMP-Ec4	0.961
Sustainable Marketing Practices - Environmental (SMP-En)	SMP-En1	0.967
	SMP-En2	0.978
	SMP-En3	0.960
	SMP-En4	0.960
Sustainable Marketing Practices - Social (SMP-Sc)	SMP-Sc1	0.965
	SMP-Sc2	0.970
	SMP-Sc3	0.970
Tourist Green Intrinsic Motivation (TGIM)	TGIM1	0.867
	TGIM2	0.857
	TGIM3	0.665
	TGIM4	0.694
	TGIM5	0.567

modeling (SEM) literature guidelines. All constructs achieved composite reliability (CR) scores above 0.70, demonstrating robust internal consistency (Hair et al., 2019). We conducted supplementary tests on the constructs because several CR values exceeded 0.95 to verify construct distinctiveness and avoid redundancy. All constructs displayed average variance extracted (AVE) values above 0.50 (Fornell & Larcker, 1981) thus proving the indicators sufficiently explain their construct variances. Discriminant validity assessment included both the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio (Henseler et al., 2015). The study results demonstrated empirical uniqueness between each construct which resolved possible concerns about conceptual overlap. Our confirmatory factor analysis (CFA) established that each factor loading exceeded 0.70, indicating strong item contributions to their respective construct (Hair Jr et al., 2017). The variance inflation factor (VIF) values across all models demonstrated no significant multicollinearity issues because they stayed below 5 (Diamantopoulos & Siguaw, 2006). The high CR values in our research stem from the strong construct consistency of established theoretical constructs rather than redundant items.

We acknowledge that high CR values could potentially create doubts about redundant exploration during research. Our research uses established measurement scales from sustainable marketing and consumer behavior literature, which require high levels of internal consistency

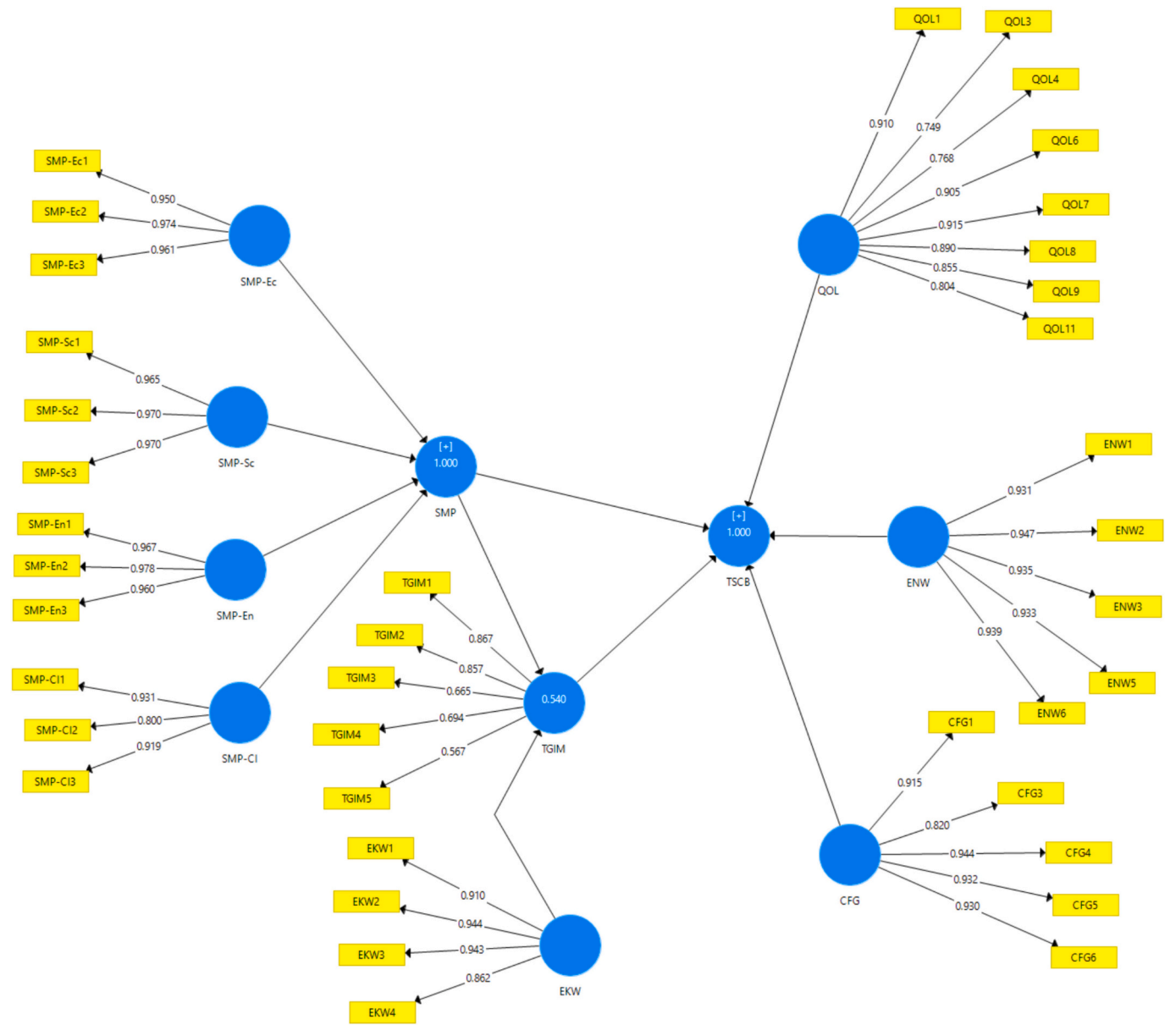


Fig. 2. The measurement model of the current research.

Table 4  
Correlations, validity and reliability.

Constructs	CR	AVE	CFG	EKW	ENW	QOL	SMP	SMP-CI	SMP-Ec	SMP-En	SMP-Sc	TGIM	TSCB	R-squared
CFG	0.960	0.827	0.909											
EKW	0.954	0.838	0.177	0.915										
ENW	0.973	0.878	0.344	0.358	0.937									
QOL	0.955	0.726	0.326	0.344	0.580	0.852								
SMP	0.933	0.539	0.770	0.356	0.589	0.638	0.734							
SMP-CI	0.916	0.784	0.389	0.401	0.577	0.691	0.818	0.886						
SMP-Ec	0.974	0.925	0.493	0.141	0.315	0.318	0.759	0.351	0.962					
SMP-En	0.978	0.938	0.333	0.336	0.493	0.570	0.794	0.474	0.313	0.968				
SMP-Sc	0.978	0.937	0.492	0.186	0.290	0.346	0.737	0.347	0.557	0.260	0.968			
TGIM	0.854	0.546	0.323	0.465	0.605	0.611	0.697	0.488	0.305	0.582	0.296	0.739		
TSCB	0.947	0.503	0.594	0.388	0.524	0.492	0.588	0.411	0.559	0.387	0.555	0.419	0.709	
TGIM														0.54
TSCB														

according to Nunnally and Bernstein (1994) and (Bagozzi & Yi, 1988). The constructs green intrinsic motivation and environmental knowledge maintain robust internal consistency because they demonstrate stable

conceptual frameworks when applied in attitudinal research (Podsakoff et al., 2003). Our results received additional verification through a sensitivity test that analyzed how removing individual items from

constructs affected CR scores. The results demonstrated that CR values stayed within acceptable parameters, which confirmed that redundancy did not affect internal consistency scores. Our additional assessments demonstrate both theoretical and empirical separation of constructs as well as confirm that elevated reliability scores do not undermine construct validity. Based on these multiple reliability and validity checks, we conclude that our measurement model is both statistically sound and theoretically robust. Our results align with best practices in SEM research and ensure that the constructs in this study accurately capture the intended latent variables without redundancy. These methodological refinements strengthen the validity of our findings and reinforce the theoretical contributions of this study.

The results of the hypothesis testing, including the path coefficients (beta), standard deviations (Sd), t-statistics, p-values, and confidence intervals (2.50 % and 97.50 %), are summarized in Table 5 below. The path coefficient from sustainable marketing practices (SMP) to tourists' green intrinsic motivation (TGIM) (H2) is 0.604, with a t-statistic of 8.754 and a p-value of 0.000. This indicates a strong and significant positive relationship. Thus, H2 is accepted. The direct effect of sustainable marketing practices (SMP) on tourists' sustainable consumption behavior (TSCB) (H1) has a path coefficient of 0.331, a t-statistic of 7.881, and a p-value of 0.000, confirming a significant positive relationship. Therefore, H1 is accepted.

The relationship between tourists' green intrinsic motivation (TGIM) and their sustainable consumption behavior (TSCB) is also significant, as supported in H3, with a path coefficient of 0.228, t-statistic equal to 6.162, and a p-value is <0.05, thus accepting H3. The mediating effect of TGIM on SMP and TSCB (H4) is found to be significant, with path coefficient of 0.138,  $t = 4.313$ , and a p-value of <0.05. This supports H4 in this study. The results support the hypothesis that environmental knowledge (EKW) has a moderating effect on the relationship between TGIM and TSCB (H5) with a path coefficient of 0.078, a t-statistic value of 3.391, and a p-value of 0.000 which indicate that the results are statistically significant. Fig. 3 presents the full structural model of our study.

## 5. Discussion

This research validates how sustainable marketing practices generate a substantial positive effect on tourists' sustainable consumption practices based on previous studies demonstrating that sustainability-driven marketing strategies determine consumer choices. Numerous hospitality studies demonstrate that businesses that present their sustainable approaches effectively including waste reduction and carbon footprint reduction alongside eco-friendly accommodation choices will generate higher engagement in pro-environmental behavior from tourists (Haider et al., 2022). Our findings support this assumption by showing that sustainable marketing practices improve visitor understanding of environmental problems and motivate them to consider sustainability aspects during travel planning. The research conducted by Chung (2020) demonstrated that hotels with straightforward sustainable policy communication achieved greater participation from guests in their energy conservation programs and recycling activities. Through our study we demonstrate that sustainable marketing effectively influences hospitality customers' consumption behavior by fostering environmental responsibility inside the industry. Our research establishes that green

intrinsic motivation functions as a mediating mechanism which explains the connection between sustainable marketing initiatives and tourist sustainable consumption actions. People who demonstrate natural environmental conservation motivation tend to perform eco-friendly behaviors during their everyday routines, according to Dodds et al. (2022). Travelers who dedicate themselves passionately to sustainability practices choose sustainable business operations through behaviors that embrace eco-friendly hotel certifications, decrease water consumption, and get involved with environmental protection work. Tourists who show genuine interest in environmental sustainability demonstrate increased reception to promotional messages that appeal to their core values, according to Lin (2022). Our research strengthens this understanding through evidence that shows sustainable marketing initiatives that trigger intrinsic motivation produce enduring changes in consumption habits instead of short-lived behavioral changes.

Environmental knowledge intensifies the connection between green intrinsic motivation and sustainable consumption behavior. Previous research has demonstrated that environmental knowledge functions as a key element in converting environmental attitudes into meaningful actions. The study by Jaiswal et al. (2022) showed that ecologically conscious individuals adopted sustainable travel practices more frequently than others because they comprehended the effects of their purchase decisions. Our findings show that guests who possess superior environmental awareness adopt behaviors that match their intrinsic incentives better. Educational interventions, together with awareness campaigns running specifically within hospitality operations need to communicate sustainability messages effectively to tourists. The research conducted by Simanjuntak et al. (2023) shows that sustainability-oriented tourism programs, including eco-tours and informational materials and digital campaigns, lead to greater environmental knowledge among tourists and promote genuine behavioral changes. Hospitality establishments should establish sustainability training programs to obtain maximum results from their environmental marketing strategies, according to our research findings.

These results confirm the VBN theory because personal values alongside beliefs determine how individuals act towards environmental protection. Green intrinsic motivation serves as a key mediator between sustainable marketing and sustainable consumption behavior through norm activation because people who identify environmental issues as personally relevant tend to choose behaviors that match their core values. Environmental knowledge acts as a moderating factor, which shows that knowledgeable individuals possess superior abilities to transform their intrinsic motivation into actual behavioral changes. These findings add to the sustainable tourism body of knowledge by proving that sustainable marketing methods alone cannot achieve sufficient behavioral change, so personal environmental commitment and knowledge growth both play essential roles. The integration of prior research insights with the VBN framework generates meaningful implications that benefit the hospitality industry. Researchers should investigate how marketing approaches together with visitor composition and cultural patterns, influence behavior adoption to develop enhanced knowledge of sustainability-focused consumer choices.

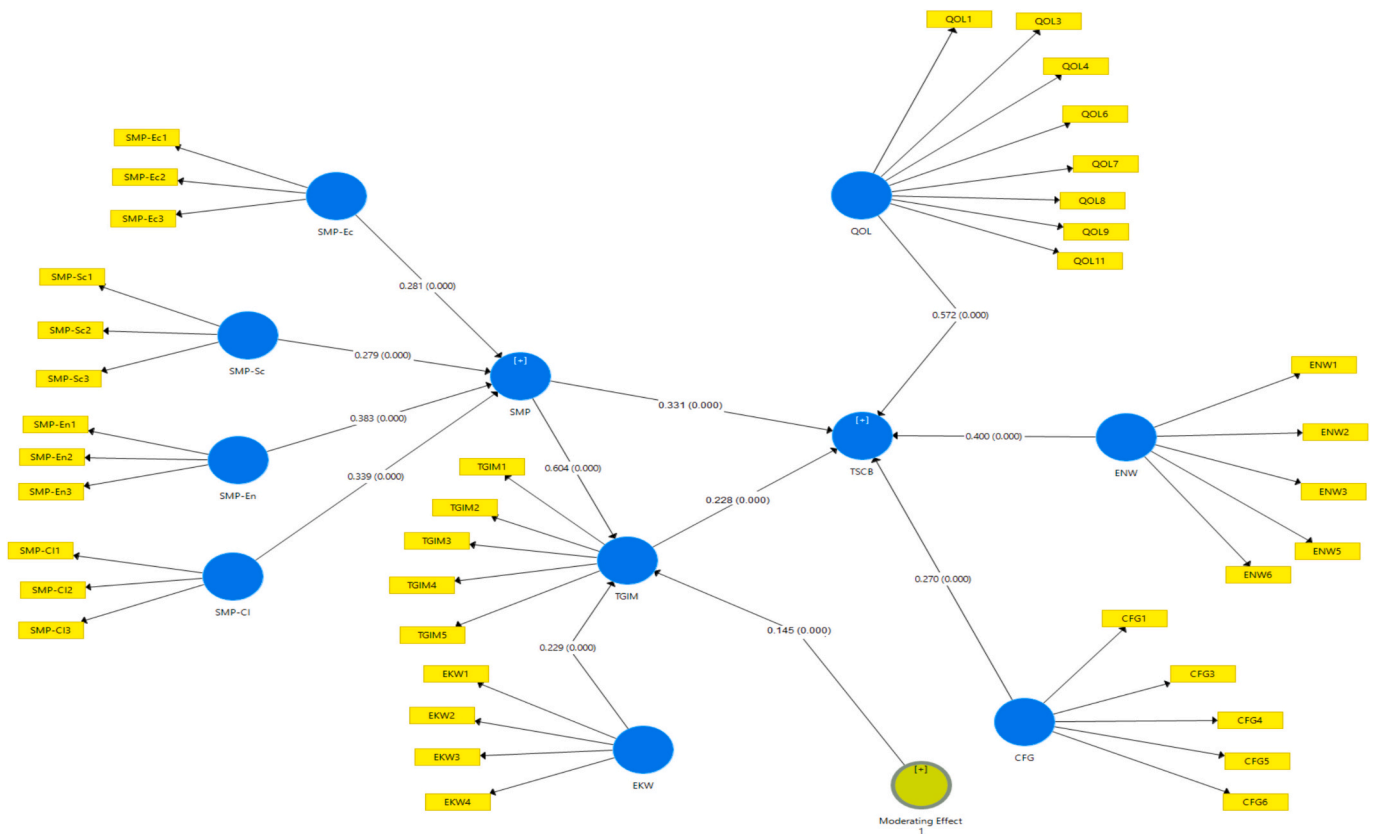
### 5.1. Theoretical implications

Theoretically, this research offers several advancements by

**Table 5**  
Path analysis.

Path	Beta	Sd	t-Statistics	p-Value	2.50 %	97.50 %	Hypothesis
SMP → TGIM (H2)	0.604	0.069	8.754	0.000	0.531	0.674	Accepted
SMP → TSCB (H1)	0.331	0.042	7.881	0.000	0.289	0.343	Accepted
TGIM → TSCB (H3)	0.228	0.037	6.162	0.000	0.198	0.250	Accepted
Moderating effect 1 → TGIM → TSCB (H5)	0.078	0.023	3.391	0.000	0.047	0.088	Accepted
SMP → TGIM → TSCB (H4)	0.138	0.032	4.313	0.000	0.111	0.149	Accepted





Furthermore, this research is useful for expanding the knowledge base on environmental knowledge by demonstrating how it can moderate the relationship between sustainable marketing and sustainable consumer behavior mediated by green intrinsic motivation. Past studies have confirmed that environmental knowledge is essential in fostering people's capability to make appropriate decisions (Jaiswal et al., 2022). This extends prior work by demonstrating that environmental knowledge not only amplifies the effect of green intrinsic motivation on behavior but also increases the indirect effect of intrinsic motivation on the association between sustainable marketing practices and sustainable consumption behavior. This duality of environmental awareness emphasizes the necessity of educational interventions in addition to

Furthermore, our study also fills some voids that are apparent from the related literature. Although earlier literature has proposed different models that attempted to determine the effects of sustainable marketing on consumer behavior, little effort has been made to analyze these relationships within the Chinese hospitality industry. In this respect, the present research contributes to the existing literature by considering this context and shedding light on how sustainable marketing can be successfully practiced and perceived by tourists in China, a market that has been continuously expanding and paying more attention to sustainability issues. Moreover, extending the analysis by incorporating green intrinsic motivation and environmental knowledge into the framework contributes to the development of a more comprehensive theoretical model in which sustainable marketing impacts behavior and thus can be beneficial for further empirical research.

The research findings contain vibrant knowledge that benefits the hospitality sector by strengthening sustainable marketing approaches to drive environmentally responsible tourism. Hotels at every scale can create functional action plans that merge sustainability initiatives with marketing approaches to cultivate enduring guest participation in environment-friendly hotel operations. Accomplishing sustainable marketing objectives starts with providing open and understandable information about sustainability programs. Large hotels utilize multimedia content through videos, virtual tours, and interactive web pages to showcase their environmental commitment, but smaller hotels achieve similar objectives by creating personalized interactions, printed sustainability commitments, and visible signs displaying ecological initiatives like towel and linen conservation programs. Clear sustainability

messages delivered in ways that all guests can understand help guests understand environmental issues better, which leads to more pro-environmental action.

Every hospitality organization should strive to obtain green certifications such as LEED, Green Key, and EarthCheck because these certifications build trust in their sustainability activities. International certifications work best for large hotel chains that incorporate them within their branding and marketing strategies, but smaller properties succeed by earning regional sustainability certifications that are recognized by eco-sensitive guests. Guests feel assured about booking a hotel when they see environmental certification logos presented on platforms and websites as well as promotional materials because these logos demonstrate recognized environmental standards. Guests can be motivated to participate in sustaining initiatives through incentive-based programs that hotels establish. The reward programs of large hotels include perks like discounts, loyalty points, and free amenities for guests who decline daily cleaning services and have reusable water bottles. Meanwhile, smaller hotels offer local complimentary products or donate money to environmental programs on behalf of environmentally friendly guests. Rewards and incentives have been proven to improve guest participation in sustainability programs, leading to lasting behavioral modifications.

The commitment of hotel staff requires proper training to allow them to effectively spread and perform sustainability practices. Training programs at large hotels must include comprehensive instruction for energy conservation alongside waste reduction methods and guest participation in sustainability initiatives. For smaller hotels, an impactful approach to training staff through informal methods works to ensure that personnel understand and adopt green initiatives. Staff-initiated sustainability programs, including eco-tour guidance and community maintenance efforts, help both reinforce hotel environmental dedication and engage guests in conservation efforts. Hotels achieve maximum impact in their sustainability marketing by utilizing digital platforms together with social media channels. The sustainability education of guests through interactive apps can be handled by big hotels, yet smaller hotels can showcase their eco-friendly programs through social media storytelling. Guest testimonials combined with behind-the-scenes sustainability videos and video demonstrations of green practices create appealing content that makes sustainable tourism more attractive. The hotel builds its sustainability commitment by asking customers to post their hotel encounters on social networks.

Sustainable partnerships between hotels and local businesses that choose sustainability as their core priority are essential to this strategy. Large hospitality facilities should unite with sustainable suppliers, organic farmers, and renewable power providers to achieve a completely sustainable supply system, while small hotels should team up with neighborhood artisans, organic growers, and eco-friendly transportation providers to add sustainability to visitor experiences. Hotel marketing campaigns that promote their partnerships can appeal to environmentally conscious travelers while stimulating their reputation as sustainability leaders in the hospitality industry. A hotel can accomplish significant improvements in its sustainability profile by implementing sustainable waste management approaches together with energy efficiency measures throughout its daily operations. Large hotels utilize advanced technology systems, solar power generation, and water recycling technologies to reduce their environmental impact, but smaller hotels benefit from select affordable solutions, including LED lights and motion sensors coupled with food waste composting. The presentation of sustainability initiatives via digital channels and guest interaction platforms enhances both the awareness and the visibility of hotel sustainability missions. Sustainable marketing strategies adopted by hotels, regardless of size, help achieve better sustainability results while prompting environmentally friendly tourist behaviors and lasting conservation projects. These operational recommendations offer businesses step-by-step guidance to embed sustainability practices into hotel operations and marketing approaches, which fulfills consumer

sustainability requirements and satisfies broader sustainable development targets.

### 5.3. Limitations and future research directions

This study has a few limitations that provide avenues for future research. First, the sample was limited to tourists in the Korean hospitality industry, which may not generalize to other regions or sectors. Future studies should include diverse geographical locations and industries to enhance generalizability. Second, this study relied on self-reported data, which may be subject to social desirability bias. Future research could incorporate longitudinal designs and objective measures to validate findings. Lastly, while this study focused on the moderating role of environmental knowledge and the mediating role of green intrinsic motivation, future research could explore additional moderators and mediators, such as cultural differences and technological advancements, to provide a more comprehensive understanding of sustainable consumption behaviors.

## 6. Conclusion

In light of this, this study emphasizes the importance of sustainable marketing in promoting sustainable consumption habits among tourists in the Chinese hospitality industry. Our findings indicate that sustainable marketing increases tourists' green intrinsic motivation, leading to more sustainable consumption. Furthermore, knowledge about the environment enhances the link between intrinsic motivation and sustainable behavior. In this study, sustainable marketing is considered to be vital in changing the value systems of tourists and their behaviors. Through proper communication on their sustainability policies, the hospitality organizations are able to market the spots to tourists that adhere to sustainability practices. This direct relationship demonstrates how marketing activities can directly enhance the cause of sustainability. The significance of green intrinsic motivation is due to the intermediary position that should encourage internal motivations among tourists. This can be done by providing environmental facilities and programs that are of concern to the tourists regarding the environment. This approach is beneficial to environmental objectives and also improves guests' satisfaction and their repeat patronage.

The moderating impact of environmental knowledge supports the necessity of education drives. Thus, by making tourists aware of environmental problems, organizations enable the guests to make the correct choice, enhancing the motivation/behavior connection. This study provides practical implications for future research and sustainability initiatives. Thus, using sustainable marketing, motivating employees through intrinsic motivation, and raising awareness on environmental issues among hospitality organizations can promote important behavioral changes that lead to environmental sustainability and improved competitiveness and reputation. The study's findings also provide insights to policymakers and other players in the industry. Industry cooperation can be achieved through approaches like offering bonuses for sustainable practices and awareness creation.

Filling the research gaps in the existing literature, this research contributes to understanding sustainable marketing in the context of China's hospitality industry. Both intrinsic motivation and environmental knowledge are conducive to the enhancement of sustainable behaviors, providing a theoretical framework. Hence, this research contributes to the theoretical framework of sustainable consumer behavior while providing managerial implications for the hospitality industry. Thus, it is possible to state that the effective implementation of the enumerated strategies can contribute to the increase in organizational sustainability, the enhancement of the brand image, the attraction of faithful customers, and the attainment of long-term goals. Such findings stress the significance of sustainability as the company's strategic management priority and the constant enhancement of sustainability activities.

CRediT authorship contribution statement

**ShiYong Zheng:** Writing – original draft, Formal analysis, Data curation, Conceptualization. **JiaNing Han:** Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Franco Gandolfi:** Writing – original draft, Validation, Methodology. **Fahad Alturise:** Writing – review & editing, Methodology, Formal analysis, Data curation. **Salem Alkhalaf:** Writing – review & editing, Resources, Funding acquisition.

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Ethics statement

This study was conducted in accordance with ethical research guidelines and approved by the Ethical Review Committee of Guilin University of Electronic Technology (Reference No.: GUET-2024/ETH-008).

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Declaration of competing interest

The authors declare no conflict of interest.

Appendix 1. The survey items

Construct name (source)	Sub-dimension	Items
Sustainable Marketing Practices (Adapted from Jung et al., 2020)	Economic (3 items)	"This hospitality organization makes efforts for efficient management." "This hospitality organization puts significant effort into technological innovation." "This hospitality organization improves the economic power of the traditional market with various activities."
	Social (3 items)	"This hospitality organization supports activities for the community." "This hospitality organization returns some of its profits to society." "This hospitality organization donates a portion of its profits to social causes."
	Environmental (3 items)	"This hospitality organization uses environmentally friendly materials in its operations." "This hospitality organization considers environmental impact throughout the design process." "This hospitality organization prevents environmental pollution during the production and distribution process."
	Cultural (3 items)	"This hospitality organization respects various races and cultural backgrounds." "This hospitality organization recognizes and values international multiculturalism." "This hospitality organization promotes collaboration between global and local cultures."
Sustainable Consumption Behavior (Adapted from Quoquab et al., 2019)	Quality of Life (11 items)	"I always try hard to reduce misuse of goods and services (e.g., I switch off lights and fans when I am not in the room)." "I recycle daily newspapers (e.g., use as a pet's litter box, etc.)." "I avoid being extravagant in my purchases." "I avoid overuse/consumption of goods and services (e.g., take print only when needed)." "I reuse paper to write on the other side." "While dining in a restaurant, I order only the amount of food that I can eat to avoid wasting food." "I choose to buy products with biodegradable containers or packaging." "I don't like to waste food or beverages." "I recycle my old stuff in every possible way (e.g., distribute old clothes among needy people)." "I reuse shopping bags every time I go shopping." "I plan carefully before I purchase a product or service."
	Care for Environmental Well-Being (7 items)	"I do care for the natural environment."  "I use eco-friendly products and services." "I purchase and use products that are environmentally friendly." "I often pay extra money to purchase environmentally friendly products (e.g., organic food)." "I am concerned about the shortage of natural resources." "I prefer to use paper bags since they are biodegradable." "I love our planet."
	Care for the Future Generation (6 items)	"I always remember that my excess consumption can create a hindrance for the future generation to meet their basic needs." "I try to control my desire for excessive purchases for the sake of the future generation." "I am concerned about the future generation." "I try to minimize excess consumption for the sake of preserving environmental resources for the future generation." "I care for the need fulfillment of the next generation." "I often think about the future generation's quality of life."
	Environmental Knowledge (Adapted from Mohd Suki & Mohd Suki, 2015)	"Compared to an average person, I am familiar with hospitality organizations' environmental policies." "I understand how the use of non-energy-efficient appliances in hospitality organizations contributes to climate change." "I know how hospitality organizations can select products that help reduce electricity consumption."

(continued on next page)

(continued)

Construct name (source)	Sub-dimension	Items
Green Intrinsic Motivation (Adapted from Ali et al., 2020)		"I am familiar with energy-saving labels, phrases, and symbols used in hospitality organizations." "I enjoy accepting new green initiatives and sustainable practices in hospitality organizations." "I enjoy solving environmental problems through green measures in hospitality organizations." "I enjoy searching for eco-friendly hospitality services and accommodations that are completely new." "I enjoy giving feedback to improve existing green practices in hospitality organizations." "I feel excited when I stay at environmentally friendly hospitality organizations."

Data availability

Data will be made available on request.

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