

## RESEARCH ARTICLE



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# The impact of service experience on sustainable customer engagement: The mediation of green perceived value and customer satisfaction

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## Abstract

With increasing public environmental awareness, accelerating green transformation has become inevitable for enterprises to achieve long-term development. Sustainable customer engagement (sustainable CE) is a core concept of consumer participation in sustainable consumption. Based on partial least squares-structural equation modeling, this study establishes a prediction model for sustainable CE and explores the impacts of service experience, green perceived value, and customer satisfaction on sustainable customer engagement. This study collected 682 valid data points from customers of green hotels and analyzed the relationships between sustainable CE and its antecedent variables. The results showed that peace of mind and product experience can directly promote sustainable customer engagement. Service experience can enhance sustainable CE through the serial mediation of green perceived value and customer satisfaction. The conclusions enrich the existing knowledge in the field of sustainable consumption and engagement marketing and provide effective suggestions for green hotel managers.

## KEYWORDS

customer satisfaction, green perceived value, service experience, structural equation model, sustainable customer engagement

## 1 | INTRODUCTION

With the emergence and development of the concept of low-carbon environmental protection, social awareness of green environmental protection has gradually strengthened (Shao & Liu, 2022). The trend of green, low-carbon, environmental protection, and sustainable development has not only changed the way of life but also brought about significant changes in consumer behavior and business models. The increasing awareness of environmental protection has made the market more concerned with the sustainability of products and services. Under the public's ardent concerns, reducing the consumption of resources and energy and accelerating green transformation have become inevitable choices for enterprises to achieve long-term development and gain competitive advantage. More emphasis on green is an important consideration for enterprises to create an excellent customer experience.

Tourism plays an important role in economic development and is an important part of tertiary industry. However, its multilink service nodes, large-scale participation groups, and high-frequency consumption make it an important source of resources and emissions (Ma et al., 2021). According to data from the InterContinental Hotels Group PLC, global carbon emissions from the hotel and accommodation industry account for approximately 1% of global carbon emissions, and this figure is still rising. Energy consumption and carbon emissions per unit area of the hotel industry remain high as one of the three pillars of the tourism industry. To comply with the requirements of green carbon reduction, hotels have implemented green transformation and provided green services such as adopting energy-saving facilities, not providing disposable appliances, reducing the number of towel changes, promoting green knowledge, using water-saving equipment, and using new energy, etc. Under this background, the



concept of green hotels came into being (Gao & Mattila, 2014). Green hotels, also known as environment-friendly hotels, are eco-friendly places that adopt sustainable operating concepts to reduce negative impacts on the environment (Tang & Lam, 2017). Specific measures include recycling, reusing energy, reserving resources, improving the utilization of water, transportation, and other resources, purchasing local ecological products, and providing customers with environmentally friendly products and services (Merli et al., 2019). Saving natural resources is a key attribute of green hotels for achieving the important goals of maintaining ecological balance and saving funds (X. Han & Chan, 2013). In this study, a green hotel refers to a hotel that, in the process of planning, construction, and operation, adheres to the concept of saving resources, protecting the environment, safety, and health; takes scientific design, effective management, and technical measures as the means; and takes the maximization of resource efficiency and the minimization of environmental impact as the goals to provide consumers with safe and healthy services.

In addition to the green transformation of hotels, customer engagement (CE) plays an irreplaceable role in sustainable development. CE refers to the interaction between customers and focus objects beyond the transaction relationship and the input of customers' cognition, emotion, and behavior (Hollebeek et al., 2016; Sashi, 2012; van Doorn et al., 2010). From the perspective of service ecosystem, the creation of customer experience requires not only the efforts of product and service providers but also the personal participation of customers in the service context (P. Sharma et al., 2020). Customers work with service providers and other customers to create their own unique experiences in a special service environment (M. Zhang et al., 2017). The interaction and co-creation of CE determine its importance in sustainable consumption. In recent years, scholars have combined CE with sustainable consumption and proposed the concept of sustainable CE. Sustainable CE refers to customers' behavioral manifestations toward a firm that moves beyond transaction, contributing to the sustainability of both environment and online brand communities (Chuah et al., 2020). Its specific manifestations include paying high attention to the resource consumption and environmental impact of products or services, changing the traditional consumption mode, accepting and adopting sustainable consumption, advocating sustainable consumption, willingness to pay higher prices for energy-saving products or services, spreading positive public praise for green products or services, actively responding to the organization of green and sustainable public welfare activities, and participating in green innovation.

Sustainable CE affects the green development of service industry in many ways (Torres-Moraga et al., 2021). Customers' acceptance and adoption behaviors toward sustainable consumption can affect its breadth and depth of sustainable consumption (Choi & Johnson, 2019; W. Jiang et al., 2023). Not all customers are willing to practice sustainable consumption, because it means that customers need to limit their enjoyment needs in some aspects (Mak & Chang, 2019). Consumer preferences for green services can encourage service providers to fully consider the direct and indirect impacts of their practices on consumers' lives and the environment, thus

encouraging them to provide services with higher green content (Leckie et al., 2021). Customers' continuous attention to environmental issues as external supervisors puts pressure on enterprises to implement green behaviors (Cho & Yoo, 2021). By contrast, sustainable CE is a source of green innovation. Customers can coordinate environmental pressures and provide knowledge and resources for green innovation of enterprises (J. Chen & Liu, 2020).

In the field of service ecosystems, studies have been conducted based on the service-dominant logic framework, and more discussion has been conducted on the close relationship between service experience and CE (Teixeira et al., 2012). The service ecosystem view holds that there is a complex and close relationship between service experience and CE. Service experience is an important driving factor in the formation and enhancement of CE (Triantafyllidou & Siomkos, 2018). In addition to directly affecting CE, service experience also affects CE through mediating variables such as customer satisfaction. The CE cycle theory and related research reveal the causal chain of "service experience → perceived value → customer satisfaction → customer engagement" (X. Chen et al., 2020). In the field of sustainable consumption, studies have been conducted on both the supply and demand sides. Demand-side research focuses on the two dimensions of attitude and behavior of sustainable consumption and explores the relationship and gap between subjective intention and the actual behavior of sustainable consumption as well as their driving factors and consequences (Hwang & Yeo, 2022).

By integrating the two research streams of service ecosystems and sustainable consumption, we find that, first, although consumer engagement in sustainable consumption has focused on green development (Leckie et al., 2021), the combination of sustainable consumption and CE has not been deeply explored. Academic research on the theoretical system of sustainable CE is relatively rare and its relationship with key concepts in the service ecosystem remains insufficient. The experience, interaction, and co-creation of CE has not been emphasized in sustainable service ecosystems. Second, the relationship between perceived value, customer satisfaction, and CE in the context of green services needs to be tested further, which is essential for encouraging customers and enterprises to create greater value in sustainable consumption. Therefore, it is necessary to study the relationship between service experiences and sustainable CE in the context of sustainable consumption (Wasaya et al., 2021). The promotion mechanism of the service experience for sustainable CE requires further discussion. Third, the rapid growth of tourism is accompanied by unsustainable consumption behaviors that threaten natural resources and ecosystems, such as pollution, resource depletion, climate change, and global warming (Trang et al., 2019). Consumers also realize that their consumption behavior is directly or indirectly related to current environmental issues, and they are willing to spend more money to support hotels that adopt environmentally friendly practices (H. Han et al., 2019). Therefore, it is important to explore the influencing mechanism of service experience on customers' perceived value, satisfaction, and engagement in the context of green hotels.

Considering the important role of tourism in economic development and the increasing carbon emissions of the global hotel and accommodation industries, this paper takes green hotels as the study investigates the impact mechanism of service experience on sustainable CE and explores the relationship between service experience, green perceived value, customer satisfaction, and sustainable CE. In terms of theoretical contributions, this paper integrates the two research streams of sustainable consumption and CE and discusses the formation mechanism of sustainable customer engagement behavior (SCEB) in the context of sustainable consumption. While enriching the knowledge systems of the two fields, it also provides ideas for research on their intersection of the two fields. In terms of practical contributions, this study uses green hotels as an example to reanalyze the relationship between the four key constructs of service experience, green perceived value, customer satisfaction, and sustainable CE in the context of sustainable consumption, providing insights for hotel operators to understand and manage customers' green engagement behavior and give full play to customers' green value. Simultaneously, by promoting sustainable CE, customers can pay attention to, adopt, and advocate sustainable consumption to guide more people to develop a low-carbon lifestyle, create green value, protect the environment, and benefit society.

## 2 | LITERATURE REVIEW

### 2.1 | Sustainable customer engagement

There is no consensus in academia regarding the definition of CE. Based on the dimensions of CE, the definitions in previous studies can be divided into single and multidimensional definitions, among which the multidimensional definition is dominant. According to this multidimensional definition, CE is the comprehensive performance of a customer's investment in cognition, emotion, and behavior in the interaction process of value co-creation with the focus object (Linda & Chen, 2014), in which cognition and emotion jointly reflect the customer's psychological level. The single-dimensional definition is divided into psychological and behavioral definitions. According to the psychological definition, CE refers to the motivational psychological state related to the focus object and the situation generated in the process of interaction and co-creation of experience with the focus object (Brodie et al., 2011; Hollebeek, 2011), which can be divided into three dimensions: immersion, passion, and activation. The behavioral definition considers CE as the behavioral performance of customers who focus on brands or companies beyond transactions (van Doorn et al., 2010). Specific manifestations are divided into consumption and contributing (Triantafyllidou & Siomkos, 2018).

With societal development, unsustainable consumption patterns have negatively impacted the environment, and sustainable consumption has gradually become the focus of scholars. The main goal of sustainable consumption is to achieve overall harmony by harmonizing consumer needs and environmental protection (Liu et al., 2017), achieving a balance between environmental, social, and economic

objectives and creating benefits for present and future generations (Phipps et al., 2013). Advocating sustainable consumption, driving consumption, and production to form a closed loop will help to form sustainable development and lifestyle and implement the goal of carbon peak and carbon neutrality. CE is an important tool for promoting sustainable consumption behavior such as reuse, reducing resource consumption, and recycling behavior (Gilal et al., 2020). The importance of CE makes it applicable to sustainable consumption. Chuah et al. (2020) integrate the two concepts of sustainable behavior and CE and propose "sustainable customer engagement behavior," including pro-environment (transactional) and pro-community (nontransactional) behaviors. They define SCEB as customers' behavioral manifestations toward a firm that moves beyond transactions, contributing to the sustainability of both the environment and online brand communities. Pilgrimienė et al. (2020) introduce the concept of CE into the context of sustainable consumption, analyze the internal factors (environmental attribute, perceived responsibility, and perceived behavioral efficiency) and external factors (conditions for sustainable consumption, social environment, and promotion of sustainable consumption) of consumers' participation in sustainable consumption, and reveal the important role of CE in sustainable consumption and green purchase intention. Considering that sustainable CE plays an important role in both sustainable consumption and CE, we take it as the core concept of the interaction between customers and service providers under sustainable consumption and define sustainable CE as the behavioral input of customers that goes beyond transaction and contributes to environmental sustainability during the interaction with the focus object. Sustainable CE behavior is an external manifestation of sustainable CE that can create more nontransactional sustainable value for enterprises than the cognitive and emotional dimensions. Therefore, this study focuses on the behavioral dimension of sustainable CE to explore its formation mechanism.

### 2.2 | Service experience

Pine II and Gilmore (1999) put forward the concept of customer experience earlier, defining customer experience as "events that engage individuals in a personal way," and dividing the evolution of enterprise economic value into four stages: the first stage is to provide customers with their own products, the second stage is to produce standardized products for customers, the third stage is to provide services to customers, and the fourth stage is to create an experience for customers. The core value added in the first two stages involves product quality in the process of economic value development, while the latter two stages emphasize providing value to customers through service and experience, or co-creating value with customers. In the current fierce market competition, it is difficult to win more customers and tap into greater value by providing only high-quality products and considerate services. Creating excellent customer experiences has gradually become an important source of core competitiveness for enterprises.

Over the past few decades, the formation of service experiences has shifted from a stimulation-based view to an interaction-based view in the academic field (Lipkin, 2016). The *stimulus–organism–response* (SOR) theory in behavioral psychology is an important theoretical basis for the stimulation-based view (Mehrabian & Russell, 1974). According to the SOR theory, the formation of a service experience is realized through the path of an external stimulus–internal state of organism response. With the advancement of this theory, scholars have put forward another view of the service experience, which is the view based on interaction. The interaction-based view extends the stimulation-based view, arguing that service experience is not only the internal subjective response of customers to service elements but also includes individual participation and social interaction activities (Pareigis et al., 2012). Customers not only act as passive receivers of service experience but also play a greater role in the formation of service experience as creators (Teixeira et al., 2012).

Drawing on the interaction-based perspective, this study defines the service experience as the subjective response and interaction of customers in direct and indirect contact with enterprises in terms of communication, service, and consumption. Klaus and Maklan (2012) developed a Multi-item Assessment Scale of Experience Quality (EXQ), which has been adopted and verified in several empirical studies (Deshwal, 2016; Klaus & Maklan, 2013; Lashkova et al., 2019). This scale classifies service experience into four dimensions: product experience, outcome focus, moments of truth, and peace of mind. Peace of mind (PM) refers to customers' perception and evaluation of emotional benefits, which refer to the sense of ease and reassurance that enterprises or brands bring to customers through professional knowledge and service capabilities. Moments of truth (MT) reflects customer perceptions and evaluations of the performance and flexibility of service restoration at critical moments of the accident. Outcome focus (OF) refers to customers' perceptions and evaluations of the realization of established goals in the experience. Product experience (PE) refers to customer perceptions and evaluations of the freedom and convenience of comparing and selecting products. PE and OF focused more on the functionality of the service experience, whereas MT and PM focused more on the emotions of the service experience.

## 2.3 | Customer satisfaction

Customer satisfaction is a measure of the gap between customer expectations and actual feelings before and after experiencing products or services (Oliver, 1980) and mainly includes emotional and cognitive components (Alnawas & Hemsley-Brown, 2019). Customer satisfaction is an important indicator to measure the success of an enterprise and has a significant impact on customer evaluation, repurchase, and word-of-mouth communication (Islam et al., 2021). As such, it is closely related to service experience, perceived value, and CE (Hapsari et al., 2017). Customer satisfaction not only directly affects CE (Simon & Tossan, 2018) but also mediates the relationship between experience value and CE (Carlson et al., 2019). For the hotel industry, improving customer satisfaction is a key factor in achieving

sustainable development (Cheng et al., 2019). Multidimensional perceived value, namely self-satisfaction, price, quality, transaction, hedonism, esthetics, and prestige, is an important antecedent to improving hotel customer satisfaction (El-Adly, 2019).

## 2.4 | Green perceived value

Zeithaml (1988) proposed the theory of perceived value from the perspective of consumers, and defined it as “consumer's overall assessment of the utility of a product (or service) based on concepts of what is received and what is given.” Most scholars agree that customer perceived value is multidimensional (Suphasomboon & Vassanadumrongdee, 2022) and consists of functional, social, emotional, cognitive, and conditional value (Sheth et al., 1991). Perceived value comes from the experience of products or brands (Teng & Wu, 2019) and is considered an important factor in understanding customers' actual behaviors (Y. Jiang & Hong, 2023). Green perceived value originates from perceived value and emphasizes environment and sustainable development (Aditi et al., 2020). Green perceived value refers to a comprehensive assessment of the green utility of a product (or service) by comparing its perceived benefits and costs from the perspective of sustainable development (Y.-S. Chen & Chang, 2012). Similar to perceived value, green perceived value is a multidimensional concept comprising of emotional, functional, conditional, and social value (Sangroya & Nayak, 2017). Green perceived value is closely related to service experience, customer satisfaction, and CE behavior. Green perceived value can not only directly affect CE behavior, such as advocacy, influencing, and feedback behavior (Leckie et al., 2021; J. Lin et al., 2017), but also indirectly affect customers' repurchasing intention through the mediating effect of customer satisfaction (Luo et al., 2022). In addition, the mediating role of green perceived value in the relationship between green product experience and customer loyalty has also been tested, which encourages customers to continue to pay attention to and purchase corporate products or services (Mahama Braimah et al., 2023).

## 3 | HYPOTHESES AND THEORETICAL MODEL

Some scholars have focused on CE under sustainable consumption and have started to explore the antecedents of sustainable CE. Pilgrimienė et al. (2020) mainly focused on the influence of internal factors of customers and external factors of social environment on CE behavior in the context of sustainable consumption. Chuah et al. (2020) divided SCEB into customer loyalty and citizenship behavior and discussed the influence of CSR brand fit on SCEB. Ullah et al. (2018) emphasized the influence mechanism of customer experience on SCEB in electric vehicle industry. Previous studies have analyzed the internal and external factors of sustainable CE and have considered the important impact of customer experience on sustainable CE. However, there has been insufficient discussion of the causes of sustainable CE in service contexts, and the impact mechanism of service experience on CE has not yet been analyzed. Unlike previous

studies, this study attempts to construct a formation model of sustainable CE in the service context, considering the impact of service experience on sustainable CE in a sustainable consumption context, and incorporating customer satisfaction and green perceived value as mediating variables into the model.

The current research has two main theoretical foundations: the integration theory of customer satisfaction and CE cycle theory, and the SOR model. The former provides a theoretical basis for understanding the relationships between constructs, whereas the latter provides a theoretical framework for constructing the model.

The customer satisfaction theory is important in the field of marketing, and its core viewpoint is that customers' perceived quality or performance is a key antecedent driving their perceived value and satisfaction (Oliver, 1980). Whether customers purchase products or services, they make judgments about the quality of the products and services after using them. With the development of the experience economy, what promotes customer satisfaction is no longer an isolated product or service quality, but comprehensive experience quality. CE cycle theory proposed by Sashi (2012) explains the generation and development of a CE. This theory establishes a CE Cycle Model and holds that the CE is repeated in the following order: connection, interaction, satisfaction, retention, commitment, advocacy, and engagement. X. Chen et al. (2020) further explained the CE Cycle Model of Sashi (2012), and divided the CE development process into four stages: perception, satisfaction, commitment, and engagement. By integrating the two theories, it can be found that the customer satisfaction theory reveals the impact of external stimuli on customer psychology, while the CE cycle theory explores the impact of customer psychological reactions on customer behavioral intentions. The integration of the two can reflect the impact of perceived quality on customer behavior. Specifically, perceived quality affects customer satisfaction and drives engagement behaviors. The current study takes this logical chain as its theoretical foundation and integrates it into the research context, thereby constructing a new theoretical model.

The SOR theoretical model originated in environmental psychology and was proposed by Mehrabian (Mehrabian & Russell, 1974) to explain and predict the effects of different environmental stimuli on people's cognition, emotion, and behavior. Among them, stimulus refers to the external factors that can affect the individual; organism refers to the internal state of the person, including feelings, emotions, and cognitive behavior; and response refers to the behavioral decisions of the organism that combine external stimuli with internal psychological attitudes, including avoidance and approach behaviors (Ettis, 2017; Kwon & Boger, 2021). Based on the SOR theoretical model, this study considers service experience as the stimulus variable, customer satisfaction and green perceived value as the organism variables, and sustainable CE as the response variable, and studies the mechanism of service experience on sustainable CE with customer satisfaction and green perceived value as mediators.

In this study, the dimensions of service experience were considered separately, and a first-order model, rather than a second-order model, was established to explore the differential effects of different dimensions of service experience on green perceived value, customer

satisfaction, and sustainable CE. The theoretical model is illustrated in Figure 1.

### 3.1 | The direct impact of SE on SCE

Experience, interaction, and value co-creation are essential manifestations of CE (Brodie et al., 2011; Kumar et al., 2010; Vivek et al., 2014). Superior SE generates and reinforces CE in both the short and long term. Short-term effect refers to the partial effect of service experience and CE in a single interaction between enterprises and customers (Ahn & Back, 2018). In the short term, if customers have a good experience and develop brand attachment at the beginning of interaction, an emotional engagement will be formed (X. Chen et al., 2019). In the long run, a unified and complete service experience helps customers establish long-term engagement with the brand (Bilgihan et al., 2016). Brands transform core experiences and customer self-perception by strengthening emotional connections (task-based), establishing new connections (experience-based), and promoting the formation of long-term CE (Harmeling et al., 2017). In the context of sustainable consumption, service experience promotes CE in both online and offline industries (Basu et al., 2022). For online services, system design, safety guarantees, and interactive services have a positive impact on CE behavior (Fan et al., 2022). On the other hand, for offline services, product categories, store atmosphere, and interpersonal communication are closely related to CE behaviors (Mohd-Ramly & Omar, 2017). For example, the safety, convenience, economy, and environmental friendliness of electric vehicles can bring excellent experiences to customers, and customers will generate engagement behaviors such as recommendations, feedback, loyalty, and repurchase options (Ullah et al., 2018). Immersed in this green and sustainable atmosphere for a long time, customers will further develop pro-environmental behaviors such as actively participating in environmental protection initiatives, cultivating resource-saving lifestyles, and establishing sustainable development concepts (Kwon & Boger, 2021), all of which are forms of SCEBs. Based on the above discussion, we infer that an excellent service experience can promote sustainable CE. Therefore, we propose the following hypotheses:

**Hypothesis 1.** SE has a significant positive impact on SCE in sustainable consumption.

PM emphasizes customers' emotional value. Customers who gain emotional value will have a higher intention to participate (Pierce et al., 2003). When a product or service meets customers' psychological needs, it provides emotional benefits and promotes CE (Franzak et al., 2014). Based on these results, we assume that emotional value promotes customer engagement in sustainable consumption and propose hypothesis H1a:

**Hypothesis 1a.** PM has a significant positive impact on SCE in sustainable consumption.

## Service experience

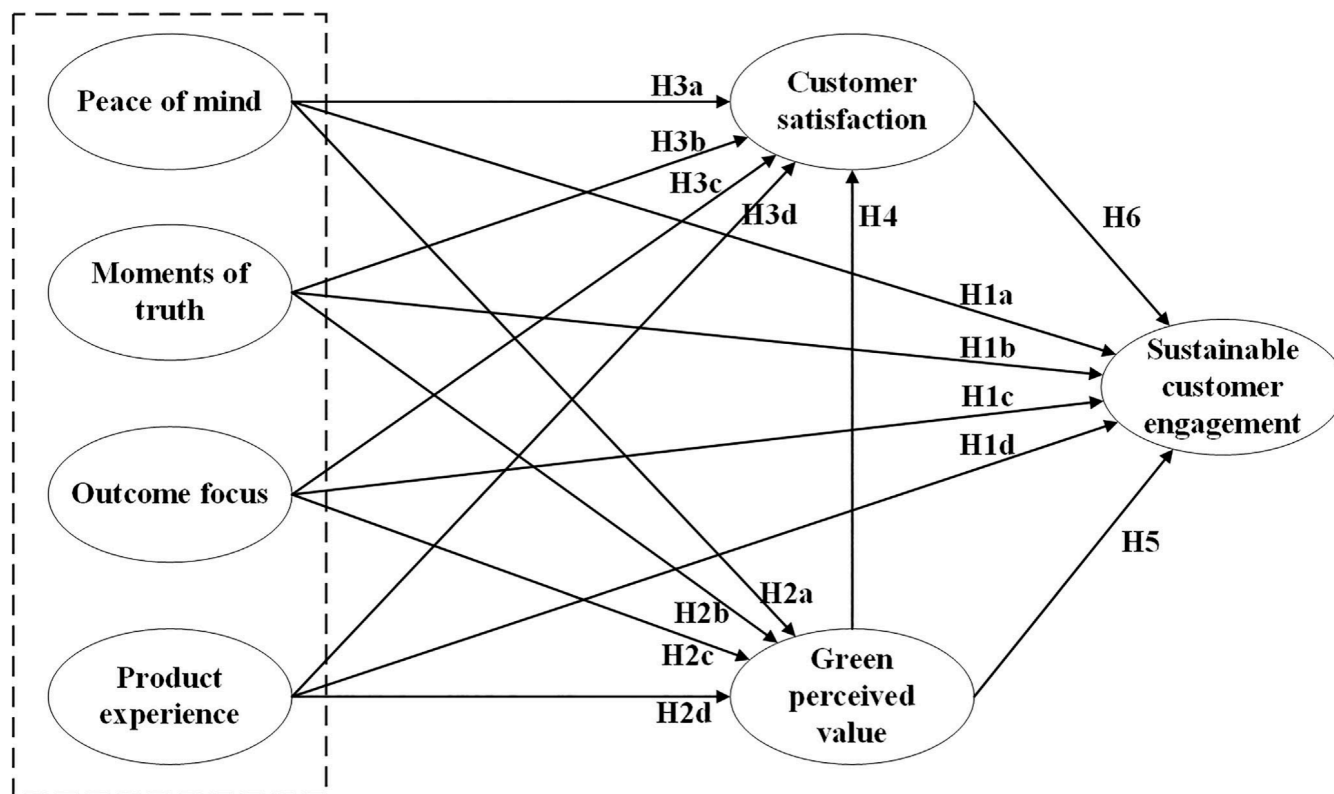


FIGURE 1 Theoretical model.

MT is a key stage in achieving an unexpected experience and inducing CE behaviors, such as re-purchasing and recommendations (Homburg et al., 2015). The characteristics of services make service accidents inevitable. The method of carrying out service remediation at critical moments is crucial for changing customers' negative emotions and re-establishing a good relationship (Fang et al., 2012) and can increase the likelihood of customers participating in interactions. Therefore, we propose **H1b** for sustainable consumption.

**Hypothesis 1b.** MT has a significant positive impact on SCE in sustainable consumption.

OF conveys goal-oriented customer behavior that reduces customers' desire to find new service providers (Benhamza Nsairi, 2012). In other words, it involves reducing transaction costs for customers (Raina et al., 2019). The reduction in transaction costs will increase customers' repurchase intentions, encourage customers to choose the same service provider, and promote CE (Che et al., 2015). Based on these results, we propose hypothesis **H1c** for sustainable consumption.

**Hypothesis 1c.** OF has a significant positive impact on SCE in sustainable consumption.

In this study, PE refers to the convenience and freedom perceived by customers when comparing and selecting products/services. Adequate choices and convenient comparison methods can promote positive customer behavior. Convenient comparison methods can make customers more willing to grasp product and service information and deepen their interaction (J. Z. Zhang et al., 2022). The freely selectable service options can enable customers to balance their hedonic and environmentally friendly tendencies, leading to greener consumption (Mathmann et al., 2017). Based on these results, we propose hypothesis **H1d** for sustainable consumption.

**Hypothesis 1d.** PE has a significant positive impact on SCE in sustainable consumption.

### 3.2 | SE → GPV and CS → SCE path

Tabaku and Kruja (2019) found that “service experience-perceived value-satisfaction” is a three-factor model for predicting customer behavior; that is, service experience is not sufficient to directly predict customer behavior, and only when it is transformed into perceived value or satisfaction can it drive customer behavior intention. In the context of sustainable consumption, research has tested the positive impact of green product experience on the perceived value of green

products (Mahama Braimah et al., 2023), because green product experience can enable customers to focus on green products and form a dependency on green products (Ahmad & Zhang, 2020) and emotional well-being (Syarifuddin & Alamsyah, 2017). Specifically, in the green hotel industry, the hotel service experience primarily includes atmosphere, design, interaction, and social factors, which have a positive impact on customers' green perceived value (T. Y. Chang & Lin, 2022). This is a healthier and more pleasant experience that non-green hotels cannot provide (Millar & Baloglu, 2011). In addition, Abdou et al. (2022) found that the environmental protection behavior of enterprises has a significant positive impact on the green perceived value of consumers, such as improving the utilization rate of energy and water resources and adopting recycling policies. Based on this discussion, we infer that a good service experience contributes to the formation of customers' GPVs. Therefore, we propose the following hypotheses:

**Hypothesis 2.** SE has a significant positive impact on GPV in sustainable consumption.

Kato (2021) found that emotional benefits have a greater influence on customers' purchase intentions than functional benefits. In other words, customers attach importance to the pleasure and happiness obtained in the interaction with products or services, which further influences value perception and evaluation of products or services (Kusmarini et al., 2020). Based on these results, we propose hypothesis H2a for sustainable consumption.

**Hypothesis 2a.** PM has a significant positive impact on GPV in sustainable consumption.

The attribution, stability, and controllability of services at critical moments are important for customer perception value (Grenler & Gwinner, 2000). When an accident occurs, the speed, initiative, and effectiveness of the service provider will also directly affect customer trust and value perception (Barari et al., 2020). Therefore, we propose hypothesis H2b regarding sustainable consumption.

**Hypothesis 2b.** MT has a significant positive impact on GPV in sustainable consumption.

OF refers to customer perceptions and evaluations of a product or service to achieve a set goal. Service providers can create a better experience for customers (Demangeot & Broderick, 2006). In the hotel service industry, the degree to which customers achieve their goals positively affects their perceived value (Saut & Bie, 2022). Based on these results, we propose hypothesis H2c for sustainable consumption.

**Hypothesis 2c.** OF has a significant positive impact on GPV in sustainable consumption.

PE can enhance customers' perceived value as an important dimension of service experience (Woodruff, 1997). When service providers present customers with the convenience of comparing products or sufficient product options, customer-perceived costs, such as time or knowledge costs, are reduced (C. Y. Wang & Wu, 2012). In other words, PE can enhance customer perceived value. Based on these results, we propose hypothesis H2d for sustainable consumption.

**Hypothesis 2d.** PE has a significant positive impact on GPV in sustainable consumption.

The traditional CS focuses on the post-consumption evaluation stage. According to expectation inconsistency theory, the difference between customers' expectation before consumption and the perceived quality after consumption directly determines the level of CS. With the deepening of research, the role of SE in promoting CS has been widely recognized (Brakus et al., 2009; Chahal & Dutta, 2015). CS is the comprehensive result of emotional and psychological accumulation after a customer's perception experience (Y. H. Lin, 2015; Meyer, 2007; White & Yu, 2005). In the context of sustainable consumption, green product quality and green corporate image are important factors that affect customer satisfaction (N. J. Chang & Fong, 2010), this conclusion has also been tested in the green hotel industry. When customers recognize the services of green and non-green hotels, they are more satisfied with green hotels (Gao & Mattila, 2014). Green hotels conform to the social concerns of sustainable development and provide additional pleasant experiences to customers (Heung & Gu, 2012). Previous studies have found that the factors affecting customer satisfaction include green perceived quality, green expectations, and green perceived value by building an eco-hotel customer satisfaction index model (Shih, 2018). Specifically, green hotels can provide better water quality, recycling of towels and linens, and provide customers with a good service experience, which significantly affects customer satisfaction (Yu et al., 2017). Based on this discussion, we infer that an excellent service experience can improve customer satisfaction. Therefore, we propose the following hypotheses:

**Hypothesis 3.** SE has a significant positive impact on CS in sustainable consumption.

Customers can improve their emotional benefits and achieve customer satisfaction based on their perceived experiences of service providers (Krishna & Deshwal, 2016). PM can maintain long-term friendly relationships between customers and service providers by increasing customer trust and customer satisfaction (Sinčić Čorić & Jelić, 2015). Based on these results, we propose hypothesis H3a in sustainable consumption:

**Hypothesis 3a.** PM has a significant positive impact on CS in sustainable consumption.

MT is an important indicator to evaluate customer experience (Jüttner et al., 2013), involving cognitive, behavioral, emotional, and social aspects (Lemon & Verhoef, 2016). MT of customer experience is crucial to improve customer satisfaction (Raina et al., 2019). Therefore, we propose hypothesis H3b in sustainable consumption:

**Hypothesis 3b.** MT has a significant positive impact on CS in sustainable consumption.

Williams et al. (2020) found that companies such as Amazon, Uber, and Netflix provide customers with user-friendly and smooth purchasing experiences, thereby making them more clear about what they want and easier to obtain. The key to the success of these strategies lies in improving customer satisfaction by focusing on customer needs and expectations (Demangeot & Broderick, 2006). Achieving customer goals is a prerequisite for customers to achieve satisfaction. Based on these results, we propose hypothesis H3c for sustainable consumption.

**Hypothesis 3c.** OF has a significant positive impact on CS in sustainable consumption.

With the prosperity of businesses, customer needs and expectations are becoming increasingly complex. Customers hope to have ample options when choosing goods and services. Service providers provide customers with sufficient choices to cover their diverse preferences and satisfy them through their experience (Ahani et al., 2019). Based on these results, we propose hypothesis H3d for sustainable consumption.

**Hypothesis 3d.** PE has a significant positive impact on CS in sustainable consumption.

In the general service context, there is a direct positive correlation between perceived value and customer satisfaction (Cronin et al., 2000; Keh & Sun, 2008). In the context of sustainable consumption, when environmental and sustainable development expectations and green needs are met, customers perceive green value, thereby generating a sense of satisfaction (Y.-S. Chen, 2010; Ullah et al., 2021). Compared to perceived value, green perceived value has a more significant impact on customer satisfaction (Y.-S. Chen, 2013). The functional, social, conditional, and emotional values of green perceived value significantly affect the satisfaction with and purchase intention of green energy (Jabeen et al., 2021; Sangroya & Nayak, 2017). Based on the above discussion, we infer that green perceived value is closely related to customer satisfaction. Therefore, we propose the following hypotheses:

**Hypothesis 4.** GPV has a significant positive impact on CS in sustainable consumption.

SCEB is specifically manifested as paying close attention to resource consumption and the environmental impact of products or services, changing traditional consumption patterns, accepting and adopting sustainable consumption, advocating sustainable consumption, willingness

to pay higher prices for energy-saving products or services, spreading a positive reputation for green products or services, actively responding to the organization of green and sustainable public welfare activities, and participating in green innovation. Previous studies have shown that customers' perceived value affects a series of subsequent behaviors such as customer cognition, choice, purchase, and satisfaction (V. M. Sharma & Klein, 2020). In the context of sustainable consumption, when customers perceive green value, they exhibit more CE behaviors toward green brands (Ullah et al., 2021). Specifically, they are willing to pay additional fees for green products (de Medeiros et al., 2016), help enterprises improve their products or services (Roy et al., 2018), actively provide feedback to enterprises (J. Lin et al., 2017), recommend and purchasing behaviors (Roman-Augusto et al., 2022), encourage customers to spread positive word of mouth (Y.-S. Chen, 2013), and participate in green initiative advocacy behaviors (Koller et al., 2011). Based on the above discussion, we infer that green perceived value can promote sustainable CE. Therefore, we propose the following hypothesis:

**Hypothesis 5.** GPV has a significant positive impact on SCE in sustainable consumption.

Many studies have discussed and tested the positive impact of CS on CE (Hapsari et al., 2017; Pansari & Kumar, 2017; Youssef et al., 2018). A high long-term degree of satisfaction will make customers pay more attention to the focus object (Petzer & Van Tonder, 2019), actively participate in brand interaction, and achieve CE (X. Chen et al., 2020; Sashi, 2012). Green fields also support the relationship between customer satisfaction and sustainable CE. Previous studies have proven that customer satisfaction can enhance customers' willingness to buy green products (Luo et al., 2022), such as green detergent brands (Papista et al., 2018) and hybrid vehicles (Hur et al., 2013). From the perspective of enterprises, the implementation of WOS (White Ocean Strategy, a corporate strategy that creates competitive advantage by focusing on environmental concerns) can improve customers' green value, emotional value, and customer satisfaction, and further influence CE behavior (Hartini et al., 2022). From an individual's perspective, the higher the satisfaction with green behavior (such as waste sorting), the more time and energy they are willing to invest, which is one of the manifestations of sustainable CE behavior (Q. L. Wang et al., 2020). Based on the above discussion, we infer that customer satisfaction is closely related to sustainable CE. Therefore, we propose the following hypothesis:

**Hypothesis 6.** CS has a significant positive impact on SCE in sustainable consumption.

## 4 | METHODS

### 4.1 | Measures and data collection

The scales of this survey were determined based on existing literature and expert interviews. We propose a preliminary survey scale based

on the existing literature. The EXQ scale developed by Klaus and Maklan (2013), which includes 19 items and has been empirically tested in several contexts, was used to measure service experience. A 4-item scale proposed by Riva et al. (2022) and S. Y. Chen and Lu (2016) was used to measure GPV, and a 3-item scale developed by Edward et al. (2010) was used to measure CS. Sustainable CE was measured using the scale proposed by So et al. (2014). These scales from the literature were adapted to the research and Chinese contexts. Subsequently, we organized four academic tourism experts, hoteliers of green hotels, and two customers to review the scale's content validity. Additionally, professional translators translated the questionnaire into Chinese. Simultaneously, another professional translator translated the Chinese questionnaire back into English to ensure that there were no semantic differences between the two English questionnaires.

The questionnaire comprised of three parts. We provided a clear explanation of green hotels at the beginning of the questionnaire to ensure that they were familiar with the concept of green hotels. The respondents were then asked to recall their most impressive experiences in green hotels. Next, the respondents were asked questions about SE, CS, GPV, and SCE in relation to their experiences in the hotel. The questions were answered on a 7-point Likert scale. The final part of the questionnaire consisted of questions about the respondents' age, gender, hotel brand level, purpose, and frequency of stay in green hotels.

To ensure the reliability and validity of the scale, we conducted a pretest survey with 79 respondents prior to the main survey. Most respondents were college students from Shandong Province. Table A1 in Appendix presents the adjusted scale.

The target respondents of the main survey were customers who had stayed at green hotels in China. Green hotels have developed rapidly in China in recent years. According to the "2022 Overview of the Social Responsibility of China's Hotel Industry" released by CHINA HOSPITALITY ASSOCIATION, China has established around 1500 green hotels, with individual hotels accounting for 72% and international brand hotels accounting for 19%. Because the population is unknown, non-probability convenience sampling is adopted in the cross-sectional survey of this study (Dandis et al., 2022). The questionnaires were distributed and collected using a professional online questionnaire platform (<https://www.wjx.cn/>). To ensure the representativeness of the sample, questionnaires were distributed through social media and randomly pushed by the platform. We screened the respondents using the question, "Have you ever stayed in a green hotel?" A total of 741 questionnaires were received, and 59 invalid questionnaires were eliminated according to the following rules: questionnaires with a response time of less than 60 seconds and questionnaires with the same options for all questions. Finally, 682 retained questionnaires were used for data analysis. The demographic information of the respondents is presented in Table 1.

Common method bias can affect the accuracy of the analytical results. To check for common method bias, two methods were used in this study: first, "Frequency of staying" was set as a marker variable according to Chin et al. (2013), and it was found that there was no significant change in  $R^2$  values with or without this marker variable in the model. Second, according to Lindell and Whitney (2001), the correlation between

**TABLE 1** Sample statistics.

| Measure              | Items                      | Percentage |
|----------------------|----------------------------|------------|
| Gender               | Male                       | 54.9       |
|                      | Female                     | 45.1       |
| Age                  | <18                        | 0.9        |
|                      | 18–25                      | 34.1       |
|                      | 26–30                      | 34.3       |
|                      | 31–40                      | 17.6       |
|                      | 41–50                      | 8.2        |
|                      | 51–60                      | 4.9        |
| Education            | High school                | 11.9       |
|                      | College or university      | 41.8       |
|                      | Graduate school            | 46.3       |
| Hotel brand level    | Premium brand              | 34.8       |
|                      | Medium brand               | 57.0       |
|                      | Low brand                  | 8.2        |
| Purpose              | For travel                 | 75.6       |
|                      | For business               | 11.6       |
|                      | Other                      | 12.8       |
| Frequency of staying | Less than 2 times per year | 38.3       |
|                      | 3–5 times per year         | 53.7       |
|                      | 6 or more times per year   | 8.0        |

the marker variable and the other constructs was not significant, with correlation coefficients of less than 0.1. Therefore, the common method bias did not affect the results of the data analysis in this study.

## 4.2 | Data analysis procedure

Owing to the complexity and exploratory nature of the theoretical model, this study used partial least square structural equation modeling (PLS-SEM) instead of covariance base structural equation modeling (CB-SEM) for model analysis (Ringle et al., 2012), using Smart PLS 3.3.2 software to analyze the data. There are two reasons for this. First, the model developed in this study includes seven structural variables, and PLS-SEM can handle complex structural equation models composed of multiple constructs for better data analysis. Second, this study develops a new path by adding GPV as a mediating variable based on existing theories, and PLS-SEM is more suitable than CB-SEM for theoretical exploration and extension to predict the relationship between constructs.

## 5 | RESULTS

### 5.1 | Analysis of the measurement model

In this study, the measurement model was analyzed using the PLS algorithm of the Smart PLS software. The computational settings were as follows: the weighting scheme was path, the maximum

**TABLE 2** Reliability and convergent validity.

| Constructs | Cr. Alpha | C.R.  | AVE   |
|------------|-----------|-------|-------|
| PM         | 0.936     | 0.950 | 0.758 |
| MT         | 0.949     | 0.961 | 0.831 |
| OF         | 0.905     | 0.933 | 0.778 |
| PE         | 0.882     | 0.919 | 0.739 |
| CS         | 0.951     | 0.968 | 0.911 |
| GPV        | 0.915     | 0.940 | 0.796 |
| SCE        | 0.924     | 0.946 | 0.814 |

Abbreviations: AVE, average variance extracted; Cr. Alpha, Cronbach's alpha; CR, composite reliability; CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

number of iterations was 5000, and the ending criterion ( $10^{-x}$ ) was seven. Evaluation of the measurement model included reliability, convergent validity, and discriminant validity. As shown in Table 2, the Cronbach's  $\alpha$  coefficients of the latent variables ranged from 0.882 to 0.951, all of which exceeded 0.7. The composite reliability ranged from 0.919 to 0.968, all of which exceed 0.7. Therefore, the data indicated that the measurement model is sufficiently reliable.

The convergent validity of the measurement model was evaluated with reference to the AVE values and factor loadings. As shown in Table 2, the AVEs of all the latent variables ranged from 0.739 to 0.911, which exceeded 0.5 (Fornell & Larcker, 1981). In addition, the factor loadings of the question items exceeded 0.717, indicating strong convergent validity (Carmines & Zeller, 1979). Table 3 presents the factor loadings of the revised scale.

**TABLE 3** Reliability and convergent validity.

|       | PM           | MT           | OF           | PE           | GPV          | CS           | SCE          |
|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| PM1   | <b>0.836</b> | 0.763        | 0.656        | 0.677        | 0.722        | 0.797        | 0.676        |
| PM2   | <b>0.898</b> | 0.751        | 0.674        | 0.663        | 0.693        | 0.773        | 0.636        |
| PM3   | <b>0.878</b> | 0.731        | 0.657        | 0.660        | 0.669        | 0.712        | 0.634        |
| PM4   | <b>0.888</b> | 0.762        | 0.760        | 0.620        | 0.714        | 0.754        | 0.691        |
| PM5   | <b>0.903</b> | 0.741        | 0.738        | 0.639        | 0.690        | 0.732        | 0.664        |
| PM6   | <b>0.820</b> | 0.736        | 0.606        | 0.630        | 0.602        | 0.645        | 0.596        |
| MT1   | 0.763        | <b>0.896</b> | 0.639        | 0.726        | 0.729        | 0.747        | 0.734        |
| MT2   | 0.798        | <b>0.903</b> | 0.639        | 0.710        | 0.762        | 0.734        | 0.755        |
| MT3   | 0.777        | <b>0.907</b> | 0.697        | 0.691        | 0.713        | 0.792        | 0.679        |
| MT4   | 0.788        | <b>0.927</b> | 0.640        | 0.750        | 0.741        | 0.769        | 0.745        |
| MT5   | 0.787        | <b>0.925</b> | 0.669        | 0.739        | 0.742        | 0.790        | 0.730        |
| OF1   | 0.716        | 0.664        | <b>0.901</b> | 0.538        | 0.658        | 0.733        | 0.616        |
| OF2   | 0.690        | 0.590        | <b>0.861</b> | 0.604        | 0.577        | 0.678        | 0.529        |
| OF3   | 0.705        | 0.655        | <b>0.912</b> | 0.582        | 0.673        | 0.696        | 0.632        |
| OF4   | 0.657        | 0.632        | <b>0.854</b> | 0.623        | 0.616        | 0.624        | 0.644        |
| PE1   | 0.655        | 0.691        | 0.609        | <b>0.864</b> | 0.631        | 0.720        | 0.612        |
| PE2   | 0.515        | 0.587        | 0.433        | <b>0.794</b> | 0.528        | 0.548        | 0.619        |
| PE3   | 0.719        | 0.732        | 0.633        | <b>0.896</b> | 0.692        | 0.730        | 0.677        |
| PE4   | 0.651        | 0.707        | 0.581        | <b>0.881</b> | 0.652        | 0.679        | 0.698        |
| GPV 1 | 0.681        | 0.710        | 0.612        | 0.630        | <b>0.897</b> | 0.725        | 0.753        |
| GPV 2 | 0.736        | 0.750        | 0.687        | 0.670        | <b>0.896</b> | 0.775        | 0.734        |
| GPV 3 | 0.661        | 0.703        | 0.592        | 0.654        | <b>0.895</b> | 0.728        | 0.807        |
| GPV4  | 0.724        | 0.723        | 0.665        | 0.659        | <b>0.882</b> | 0.790        | 0.703        |
| CS1   | 0.818        | 0.798        | 0.738        | 0.767        | 0.810        | <b>0.951</b> | 0.800        |
| CS2   | 0.811        | 0.808        | 0.750        | 0.732        | 0.808        | <b>0.956</b> | 0.796        |
| CS3   | 0.798        | 0.802        | 0.732        | 0.746        | 0.803        | <b>0.955</b> | 0.798        |
| SCE1  | 0.666        | 0.719        | 0.600        | 0.690        | 0.763        | 0.745        | <b>0.929</b> |
| SCE2  | 0.768        | 0.781        | 0.737        | 0.721        | 0.807        | 0.874        | <b>0.908</b> |
| SCE3  | 0.705        | 0.744        | 0.641        | 0.680        | 0.772        | 0.759        | <b>0.922</b> |
| SCE4  | 0.532        | 0.625        | 0.465        | 0.638        | 0.675        | 0.611        | <b>0.848</b> |

Abbreviations: CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

The discriminant validity of the measurement model was assessed using cross-factor loadings and the Fornell–Larcker criterion (Fornell & Larcker, 1981). As shown in Table 3, the factor loadings (bold values in Table 3) of each construct were greater than the cross loadings (other values in the corresponding columns and rows in Table 3). As shown in Table 4, according to the Fornell–Larcker criterion, the square roots of the AVEs of the constructs (bold values in Table 4) were all greater than the correlation coefficients with the other variables below (other values in the corresponding columns in Table 4). Therefore, the discriminant validity of the measurement model used in this study was acceptable.

## 5.2 | Analysis of the structural model

### 5.2.1 | Path coefficient analysis

The path coefficient analysis was performed using the bootstrapping algorithm of Smart PLS. As shown in Table 5, PM and OF have no significant positive effect on SCE (the reason we choose to reject H1a is

because the value of  $\beta$  is negative, contrary to the positive effect assumed previously, and the absolute value of  $\beta$  is less than 0.1), while MT and PE have positive effects on SCE. The four dimensions of service experience have significant positive effects on CS and GPV. Among them, MT has the largest effect on GPV ( $\beta = 0.382$ ,  $p < 0.000$ ), and PM has the largest effect on CS ( $\beta = 0.235$ ,  $p < 0.000$ ). GPV had a significant positive effect on CS. GPV had a significant positive effect on SCE. Last, CS had a significant positive effect on SCE. The results of the test model are shown in Figure 2.

### 5.2.2 | Mediating effect test

Since the total effect of PM on SCE is not significant ( $\beta = 0.067$ ,  $p = 0.204$ ), the indirect effect of PM on SCE will not be discussed. The results of the mediating effect test were obtained using the bootstrapping algorithm of Smart PLS, as shown in Table 6.

As there was no significant direct effect OF on SCE, GPV and CS completely mediated the effect of OF on SCE. GPV and CS partially

**TABLE 4** Discriminant validity by Fornell–Larcker criterion.

|     | PM           | MT           | OF           | PE           | GPV          | CS           | SCE          |
|-----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| PM  | <b>0.871</b> |              |              |              |              |              |              |
| MT  | 0.859        | <b>0.912</b> |              |              |              |              |              |
| OF  | 0.785        | 0.721        | <b>0.882</b> |              |              |              |              |
| PE  | 0.745        | 0.794        | 0.663        | <b>0.860</b> |              |              |              |
| GPV | 0.785        | 0.809        | 0.717        | 0.732        | <b>0.892</b> |              |              |
| CS  | 0.848        | 0.841        | 0.775        | 0.784        | 0.846        | <b>0.954</b> |              |
| SCE | 0.748        | 0.799        | 0.686        | 0.758        | 0.840        | 0.836        | <b>0.902</b> |

Abbreviations: CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

**TABLE 5** Path coefficient analysis results.

| Hypothesis |                       | $\beta$ values | T statistics | p Values | Decision    |
|------------|-----------------------|----------------|--------------|----------|-------------|
| H1a        | PM $\rightarrow$ SCE  | −0.099         | 2.120        | 0.034    | Unsupported |
| H1b        | MT $\rightarrow$ SCE  | 0.173          | 3.424        | 0.001    | Supported   |
| H1c        | OF $\rightarrow$ SCE  | 0.017          | 0.571        | 0.568    | Unsupported |
| H1d        | PE $\rightarrow$ SCE  | 0.158          | 4.658        | 0.000    | Supported   |
| H2a        | PM $\rightarrow$ GPV  | 0.191          | 4.423        | 0.000    | Supported   |
| H2b        | MT $\rightarrow$ GPV  | 0.382          | 10.203       | 0.000    | Supported   |
| H2c        | OF $\rightarrow$ GPV  | 0.181          | 4.603        | 0.000    | Supported   |
| H2d        | PE $\rightarrow$ GPV  | 0.167          | 4.602        | 0.000    | Supported   |
| H3a        | PM $\rightarrow$ CS   | 0.235          | 4.941        | 0.000    | Supported   |
| H3b        | MT $\rightarrow$ CS   | 0.147          | 3.512        | 0.000    | Supported   |
| H3c        | OF $\rightarrow$ CS   | 0.152          | 4.444        | 0.000    | Supported   |
| H3d        | PE $\rightarrow$ CS   | 0.159          | 5.018        | 0.000    | Supported   |
| H4         | GPV $\rightarrow$ CS  | 0.317          | 8.589        | 0.000    | Supported   |
| H5         | GPV $\rightarrow$ SCE | 0.389          | 6.310        | 0.000    | Supported   |
| H6         | CS $\rightarrow$ SCE  | 0.308          | 5.502        | 0.000    | Supported   |

Abbreviations: CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

## Service experience

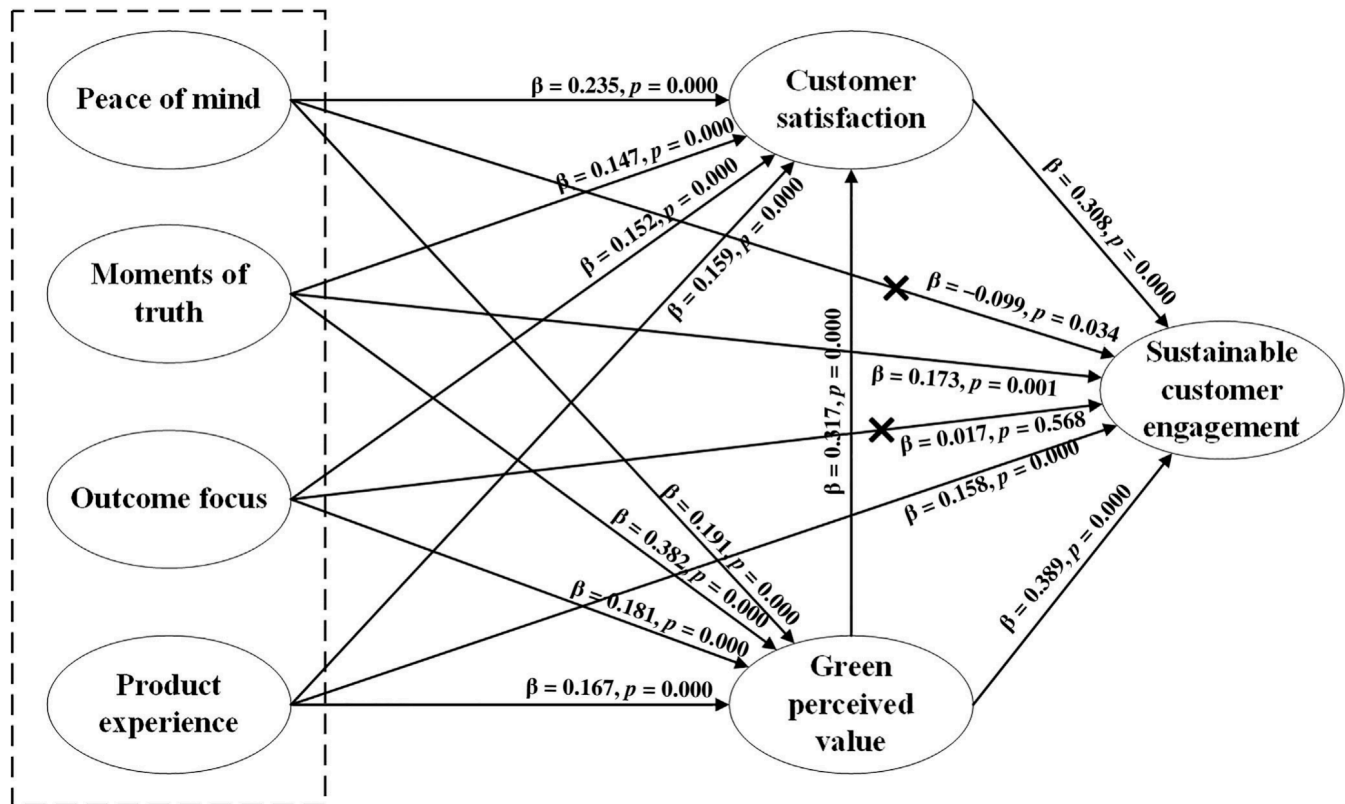


FIGURE 2 Tested model.

mediated the effects of MT and PE on NCE. This study compared the magnitudes of the mediating effects of the variables in a multiple mediation model. CS and GPV mediate the effects of the three dimensions of service experience (MT, OF, and PE) on SCE. In particular, GPV plays greater mediating roles in these three sets of relationships (MT  $\rightarrow$  SCE, OF  $\rightarrow$  SCE, and PE  $\rightarrow$  SCE) compared to CS. Moreover, SE (MT, OF, and PE)  $\rightarrow$  GPV  $\rightarrow$  CS  $\rightarrow$  SCE is significant, indicating that GPV and CS play the serial mediating roles between SE and SCE.

## 5.2.3 | Model fit

In this study, insignificant paths were removed based on the results of the path coefficient analysis, and the model was revised and recalculated. The results of the model fitness indices are listed in Table 7. The  $R^2$  values of GPV, CS, and SCE were 0.709, 0.832, and 0.776, respectively, which are all greater than 0.67, indicating that the independent variables have strong explanatory power. The  $f^2$  values for GPV on the CS and SCE were 0.173 and 0.165, respectively, indicating that GPV had a moderate influence on the CS and SCE (Chin, 1998). The other independent variables had a weak influence on the dependent variables (Chin, 1998).  $Q^2$  was calculated using the bindfolding algorithm of Smart PLS. As the table shows, the  $Q^2$  values

are all greater than zero, indicating that the model has predictive relevance (Geisser, 1975). The goodness of fit (GOF) value of the modified model was 0.780, which exceeded the critical value of 0.36, indicating good model fitness (Wetzels et al., 2009). The results show that the SRMR of the modified model is 0.051, which is less than 0.08, indicating a good fitness (Hu & Bentler, 1998). Therefore, the data indicated a good fit for the model in this study.

## 6 | DISCUSSION

These increasingly prominent environmental issues have made sustainable consumption an inevitable choice for the society. The popularization of sustainable consumption requires joint efforts on the supply side and on the demand side (Sivapalan et al., 2021). Sustainable CE is the interaction between customers and enterprises or other customers in a sustainable consumption context that can create significant sustainable value. This study links service experience in service ecosystems with CE in a sustainable consumption context and examines the direct impact of different dimensions of service experience on sustainable CE, as well as the mediating effect of green perceived value and customer satisfaction. Next, we discuss the results of the main model, implications, limitations, and directions for future research.

**TABLE 6** Results of the intermediary effect test.

|                     | $\beta$ values | T statistics | p Values |
|---------------------|----------------|--------------|----------|
| PM → GPV → CS       | 0.060          | 3.685        | 0.000    |
| MT → GPV → CS       | 0.121          | 7.004        | 0.000    |
| OF → GPV → CS       | 0.057          | 3.793        | 0.000    |
| PE → GPV → CS       | 0.053          | 3.992        | 0.000    |
| PM → GPV → SCE      | 0.074          | 3.358        | 0.001    |
| MT → GPV → SCE      | 0.149          | 5.869        | 0.000    |
| OF → GPV → SCE      | 0.070          | 3.425        | 0.001    |
| PE → GPV → SCE      | 0.065          | 3.320        | 0.001    |
| PM → CS → SCE       | 0.072          | 3.477        | 0.001    |
| MT → CS → SCE       | 0.045          | 3.055        | 0.002    |
| OF → CS → SCE       | 0.047          | 3.573        | 0.000    |
| PE → CS → SCE       | 0.049          | 3.605        | 0.000    |
| GPV → CS → SCE      | 0.098          | 4.524        | 0.000    |
| PM → GPV → CS → SCE | 0.019          | 3.001        | 0.003    |
| MT → GPV → CS → SCE | 0.037          | 4.149        | 0.000    |
| OF → GPV → CS → SCE | 0.018          | 3.053        | 0.002    |
| PE → GPV → CS → SCE | 0.016          | 3.437        | 0.000    |

Abbreviations: CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

## 6.1 | Discussion of model results

### 6.1.1 | Path analysis

The sustainable CE model established links between the four dimensions of service experience and sustainable CE. The test results of H1a–H1d indicate that it cannot be assumed, in general, that the service experience in the context of sustainable consumption can definitely generate and promote sustainable CE. In other words, the direct effect of service experience on sustainable CE is partially validated. Previous studies verified the direct impact of service experience on CE. Basu et al. (2022) validated that both online and offline dimensions of service quality positively promote customer green citizenship behaviors. Ullah et al. (2018) and Fan et al. (2022) believe that all dimensions of service-experience quality enhance CE. The results of the different effects of the different dimensions of service experience in this study differ from those of Ullah et al. (2018), Fan et al. (2022), and Basu et al. (2022). In this study, moments of truth and product experience have positive effects on sustainable CE, consistent with Santini et al. (2020) and Jin et al. (2020), whereas peace of mind and outcome focus have no positive effects.

In terms of the test results of H2a–H2d, H3a–H3d, the four dimensions of service experience have significant positive effects on green perceived value and customer satisfaction, which is in line with the findings of many previous studies in the context of green hotel (Yu et al., 2017), tourism (Wu et al., 2018), retailing (Mainardes et al., 2019), and eco-smart hotels (Shih, 2018). The results for H4 indicate that green perceived value has a significant positive impact

on customer satisfaction, which is consistent with previous relevant studies by Ullah et al. (2021) and Jabeen et al. (2021). This shows that customer-perceived value remains an important driving factor for promoting customer satisfaction in the context of green services. Moreover, H5 is supported by the data. Green perceived value has a significant positive impact on sustainable CE, further validating and enriching the views of Roman-Augusto et al. (2022), Roy et al. (2018), and V. M. Sharma and Klein (2020). In addition, the results for H6 indicate that customer satisfaction can promote sustainable CE, which is consistent with many previous researches (Papista et al., 2018; Petzer & Van Tonder, 2019; Q. L. Wang et al., 2020).

### 6.1.2 | Mediating effect of GPV and CS

According to the results of the mediation test, green perceived value and customer satisfaction mediate the connection between service experience and sustainable CE separately. This result is in line with the research findings of Carlson et al. (2019), Ananda et al. (2022), and Mahama Braimah et al. (2023). Unlike previous studies, this study also verifies the existence of the chain mediating path of “service experience → green perceived value → customer satisfaction → sustainable customer engagement.” In addition to independent customer satisfaction and independent green perceived value, service experience also affects sustainable CE by successively influencing green perceived value and customer satisfaction.

## 6.2 | Implication

This paper can make several contributions to the existing researches.

### 6.2.1 | Theoretical implications

This study has important theoretical implications for research on CE and sustainable consumption in the context of service ecosystems. The main theoretical contribution of this study is to construct and validate a formation model of sustainable CE that is different from the existing researches (Chuah et al., 2020; Pilgrimienè et al., 2020; Ullah et al., 2021) based on sustainable consumption scenarios. First, it links the service experience of service ecosystems with sustainable CE of CE theory and explores the direct impact of service experience on sustainable CE. The study found that in contrast to other scenarios (Basu et al., 2022; Fan et al., 2022; Ullah et al., 2018), the impacts of different dimensions of service experience on sustainable CE are heterogeneous in sustainable service scenarios. Second, this study validates and expands the mediating role of green perceived value and customer satisfaction. This study verified that green perceived value and customer satisfaction separately mediate the impact of service experience on sustainable CE in green hotels (Ananda et al., 2022; Carlson et al., 2019; Mahama Braimah et al., 2023). Finally, this study expanded the mediating role of green perceived value and customer

TABLE 7 Model fits.

|     | $R^2$ | $Q^2$ | $f^2$ |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|
|     |       |       | PM    | MT    | OF    | PE    | GPV   |
| GPV | 0.709 | 0.561 | 0.026 | 0.105 | 0.042 | 0.034 |       |
| CS  | 0.832 | 0.753 | 0.065 | 0.024 | 0.050 | 0.051 | 0.173 |
| SCE | 0.776 | 0.624 |       | 0.017 |       | 0.035 | 0.165 |
|     |       |       |       |       |       |       | 0.070 |

Abbreviations: CS, customer satisfaction; GPV, green perceived value; MT, moment of truth; OF, outcome focus; PE, product experience; PM, peace of mind; SCE, sustainable customer engagement.

satisfaction and found that service experience can enhance green perceived value, thereby promoting customer satisfaction and ultimately affecting sustainable CE. These findings have enriched the theoretical system of CE in the context of sustainable consumption in the service ecosystem and have established a theoretical framework and empirical conclusions for scholars to further carry out research on sustainable CE.

### 6.2.2 | Practical implications

This study has practical implications for green hotel managers. Sustainable CE is important for green hotels to achieve sustainable development. The research results show that an important means of improving customer participation is to make customers perceive a higher level of green service value in the context of green hotels. Customer satisfaction remains an important driving factor of sustainable consumer engagement. The root cause of both is that green hotels should create excellent green service experiences for customers. Second, green hotels should selectively distract attention from other unrelated aspects and focus on creating core green service experiences (especially emotional experiences), improving customers' green perceived value and customer satisfaction, promoting sustainable CE, paying attention to, adopting, and advocating sustainable consumption, participating in sustainable consumption innovation, and jointly creating green value. Finally, for both developed and developing countries, establishing green hotels can guide more people to develop low-carbon lifestyles, adopt low-carbon behaviors, enhance overall environmental awareness, and reduce carbon emissions, thus achieving the goals of protecting the environment and benefiting society.

### 6.3 | Limitations

First, considering the severe situation of energy conservation and emission reduction faced by Chinese hotels, this study considered Chinese hotel customers as the object of investigation. Future research should consider regional differences in sustainable consumption and investigate hotel consumers in different countries. Second, this study builds a prediction model of sustainable CE based on the SOR theory, without considering the influence of individual cultural characteristics. Future research could analyze the strengthening or

weakening effects of cultural awareness on the relationships between research models.

## 7 | CONCLUSIONS

First, not all dimensions of the service experience directly affect sustainable customer engagement. Moments of truth and product experience positively affect sustainable CE, whereas peace of mind and outcome focus have no positive effects. This indicates that the drivers of sustainable and traditional customer engagements are inconsistent. Although service experience is an important construct in the service ecosystem that promotes positive psychology and behavior among customers, the heterogeneity of its internal structure (i.e., the different effects of different service-experience characteristics) cannot be ignored in the context of sustainable consumption. The findings show that if green hotels can fully give customers the right and convenience of choosing services freely and can make flexible and effective remedies in case of service accidents, customers will be more willing to accept sustainable consumption and participate deeply in it and create sustainable value with the hotel.

Second, the service experience directly promotes perceived green value and customer satisfaction. Peace of mind had the greatest effect on customer satisfaction, and moments of truth had the greatest effect on perceived green value. This reveals that the emotional dimensions of the service experience are more important than the functional dimensions in the context of green hotel services, which can enhance customer green perceived value and promote customer satisfaction. In addition, the positive effects of green perceived value and customer satisfaction on sustainable customer engagement remain significant in the context of sustainable consumption.

Third, customer satisfaction and green perceived value mediate the effects of moments of truth, outcome focus, and product experience on sustainable customer engagement. In addition to acting as separate mediators, green perceived value and customer satisfaction mediate the relationship between service experience and sustainable customer engagement through a serial path. In other words, service experience can enhance sustainable customer engagement through the serial mediation of green perceived value and customer satisfaction. For customers who practice sustainable consumption, high-quality green services provided by green hotels directly affect their perception and evaluation of green value, thus improving customer

satisfaction and ultimately promoting sustainable participation behavior intention.

The conclusions enrich the existing knowledge in the field of sustainable consumption and engagement marketing and provide effective suggestions for green hotel managers. Green hotels should not distract attention from other unrelated aspects but should focus on creating core green service experiences, improving customers' green perceived value and customer satisfaction, effectively promoting sustainable customer engagement, and creating more green value together.

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## APPENDIX

**TABLE A1** The measurement items.

|                                         |                                                                                                           |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Peace of mind (service experience)      |                                                                                                           |
| PM1                                     | I am confident in X hotel's expertise                                                                     |
| PM2                                     | The whole process with X hotel is easy                                                                    |
| PM3                                     | X hotel will look after me for a long time                                                                |
| PM4                                     | I stay with X because of my past dealings with X hotel                                                    |
| PM5                                     | I have dealt with X hotel before so getting what I needed was really easy                                 |
| PM6                                     | X hotel gives independent advice                                                                          |
| Moments of truth (service experience)   |                                                                                                           |
| MT1                                     | X hotel is flexible in dealing with me and looked out for my needs                                        |
| MT2                                     | X hotel keeps me up to date                                                                               |
| MT3                                     | X hotel is a safe and reputable company/brand                                                             |
| MT4                                     | The people in X hotel have good people skills                                                             |
| MT5                                     | X hotel deal(t) with me correctly when things go (went) wrong                                             |
| Outcome focus (service experience)      |                                                                                                           |
| OF1                                     | Staying with X hotel makes the process much easier                                                        |
| OF2                                     | X hotel gives me what I need swiftly                                                                      |
| OF3                                     | I prefer X hotel over an alternative provider                                                             |
| OF4                                     | The people in X hotel can relate to my situation                                                          |
| Product experience (service experience) |                                                                                                           |
| PE1                                     | I need to choose between different options in X hotel                                                     |
| PE2                                     | I need to receive offers from more than just X hotel                                                      |
| PE3                                     | I need to compare different options from X hotel                                                          |
| PE4                                     | I have one designated contact at X hotel                                                                  |
| Green perceived value                   |                                                                                                           |
| GPV1                                    | I think that X hotel's environmental functions have great value for me                                    |
| GPV2                                    | I think that X hotel's environmental performance meets my expectations                                    |
| GPV3                                    | I think that I choose X hotel because it is more environmentally friendly than other types of hotels      |
| GPV4                                    | I think that I choose X hotel because it is environmentally friendly                                      |
| Customer satisfaction                   |                                                                                                           |
| CS1                                     | The product/service given by X hotel is satisfactory                                                      |
| CS2                                     | I feel good about my decision to choose X hotel                                                           |
| CS3                                     | Overall I am happy with X hotel                                                                           |
| Sustainable customer engagement         |                                                                                                           |
| SCE1                                    | I spend a lot of time looking for information about X hotel                                               |
| SCE2                                    | I try to switch off the electrical appliances right after using them to reduce electricity consumption    |
| SCE3                                    | I'm used to sorting garbage and reusing as many things as possible                                        |
| SCE4                                    | I am willing to share relevant information about X hotel with others and recommend them to choose X hotel |