Green Restaurant Practices and Customer Loyalty:
The Role of Ecological Image

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Abstract

Environmental issues have become increasingly important to restaurants. Thus, this study explores the relationship among green practices, green consumerism, perceived value, ecological image and customer loyalty towards green restaurants. The analysis of data from 358 restaurant customers through structural equation modelling revealed a robust link among green practices, green consumerism, and green perceived value. Green consumerism and green perceived value predict customer loyalty towards green restaurants. Specifically, green perceived value has a stronger influence than green consumerism. Moreover, this study identifies green consumerism and green perceived value as mediators between green practices and customer loyalty with green consumerism showing the strongest effect. Additionally, ecological image perception influences the relationship between green perceived value and customer loyalty. The findings highlight the importance of establishing comprehensive green policies and effectively conveying their benefits to consumers. Hence, this study provides insights for restaurant managers and marketers who are seeking to promote green practices and foster customer loyalty in an environmentally conscious industry. Moreover, it offers practical recommendations for increasing sustainability in gastronomic tourism through a collaborative multistakeholder approach, thus enhancing our understanding of green practices in the restaurant industry.

Keywords

Introduction

Tourism has emerged as an important economic driver that has boosted worldwide growth and job creation. The last seven decades have seen an incredible boom in global travel with the number of travelers increasing more than fiftyfold. However, this expansion is not without consequences. Tourism, particularly in municipalities, has become a major source of trash, thus resulting in increasing environmental and socioeconomic issues (Obersteiner et al., 2021). The industry's rapid growth has sparked questions about its environmental impact and long-term economic viability.

Sustainable tourism requires competent environmental management. Kibtiah and Assgaf (2024) described sustainable tourism as activities that attempt to reduce tourism's environmental footprint while also encouraging natural resource protection and preservation. As key components of the tourism industry, restaurants have been identified as important contributors to environmental impacts through their operations (Jang, 2016). This situation has raised worries among consumers and regulators about the hospitality industry's environmental imprint.

In response, the restaurant sector has acknowledged the critical need to implement green practices and marketing techniques. These programs not only address environmental concerns but also improve financial performance and contribute to local communities' economic and environmental sustainability (Bux et al., 2022). With the rising environmental consciousness worldwide, restaurants are tailoring their offerings to meet changing customer expectations by emphasizing sustainability as a key component of their operations.

The convergence of agriculture, agro-industry, and tourism, notably in Apulia, Italy, emphasizes the significance of managing food waste. The hospitality sector generates approximately 22% of municipal solid waste in Apulia with food waste accounting for the majority. The hospitality industry is one of the most resource-intensive sectors, which relies on high-energy activities, including heating, cooling, cooking and washing (Bux et al., 2022). Addressing these difficulties is crucial to enhancing the sector's sustainability.

The implementation of green practices in restaurants faces several challenges. Consumer preferences and perceptions of these practices vary and can conflict. Becker-Olsen et al. (2006) noted that 'consumers will [not] blindly accept these initiatives as sincere actions and thus may or may not reward the firm'. Consumers often question restaurants' green quality, environmental values and ecofriendly features because of inconsistent practices across establishments (Namkung & Jang, 2017). This skepticism creates a significant barrier for restaurants implementing sustainable practices.

Green restaurants, which engage in environment-friendly practices, such as energy and water conservation, waste reduction and the use of local/organic ingredients, have emerged as a viable solution for reducing the industry's environmental impact (Han et al., 2020). The success of green restaurants depends on consumer acceptance and support. Understanding consumer attitudes and behavioral intentions towards green restaurants is essential for these establishments' long-term viability (Riva et al., 2022).

Ecological image is the perception of a brand or organization as being ecologically responsible (Khairy et al., 2023). This representation has a significant impact on consumer attitudes and actions especially in the context of green restaurants. A strong ecological image can provide a competitive advantage (Zameer et al., 2020). Furthermore, Mahasuweerachai and Suttikun (2022) discovered that an ecological image moderates the association between green behavior and customer loyalty. When customers believe that a restaurant's green initiatives are genuine and congruent with its entire image, they are likely to create positive behavioral intentions, such as loyalty and willingness to pay a premium (Han et al., 2020). When a contradiction is perceived between a restaurant's declared ecological principles and its actual practices, consumer distrust can occur, thus reducing the positive impacts of green initiatives (Becker-Olsen et al., 2006).

Despite the rising amount of research on green practices and consumer behavior in restaurants, few studies have investigated the function of ecological image in regulating customer loyalty and perceived value, particularly in the context of Southeast Asian tourism destinations. While green measures are acknowledged to be significant, the role of a strong ecological image in promoting these practices and resolving consumer concerns has received little attention, especially in Thailand's restaurant sector. This study fills these gaps by examining how ecological image influences the relationship among green practices, perceived value, and customer loyalty in restaurants located in Thai tourist destinations. By focusing on Thailand's unique tourism and hospitality landscape, this research provides insights for restaurant managers in tourist-dependent economies who are looking to boost customer loyalty through successful environmental measures while contributing to the limited literature on green restaurant practices in developing Asian markets.

Literature Review

Green Practices

Green practices refer to actions and strategies for reducing negative environmental impacts while promoting resource conservation and ecological balance (Jang et al., 2017). In the restaurant industry, green practices cover a wide range of activities, including energy conservation, waste reduction, renewable resource utilization, recycling, and ethical sourcing (Guo et al., 2020). Green practices also encompass supply chain management, personnel training, material consumption and overall management methods (Chou et al., 2012; McBride et al., 2019).

Bux et al. (2022) emphasized the transition to sustainable food systems by integrating the 'food cluster', 'water cluster', 'consumer cluster', 'corporate cluster' and 'energy cluster'. This approach highlights that food, water and energy are the most heavily influenced natural resources in tourism, thereby necessitating active monitoring and collaboration between users and managers. Given that environmental concerns and consumer preferences shift, the use of green restaurant tactics has grown significantly. These techniques include energy and water saving, waste management, responsible sourcing, and the usage of environmentally friendly products (Kwok et al., 2016).

Energy-saving solutions, such as installing efficient appliances and smart systems, not only minimize environmental impact but also save operational expenses (Chou et al., 2012). Although water conservation methods reduce consumption significantly, proper waste management improves environmental performance and strengthens a restaurant's ecological reputation (Martinez-Martinez et al., 2019). Sustainable food sources enhance food quality, thus resulting in increased customer satisfaction and pleasure (Poulston & Yiu, 2011). Furthermore, using environmentally friendly products improves customer perception (Namkung & Jang, 2013), while active staff participation in green projects improves organizational performance and customer satisfaction (Kim et al., 2017). These methods underline the relevance of sustainability in achieving environmental and corporate goals.

The relationship among green practices, restaurant operations, and consumer perception is complex and significant. Studies in Spain and Taiwan have demonstrated that implementing green practices can enhance operational performance, competitiveness and overall business outcomes (Chiu & Hsieh, 2016; Perramon et al., 2014). For instance, reducing food waste in food service operations can minimize environmental impact while maintaining customer satisfaction, thereby creating mutual benefits (Kallbekken & Sælen, 2013).

Green practices can have a substantial impact on customer perception and brand equity, enhance green brand image, and influence behavioral intentions; however, their effect on perceived quality may differ depending on the restaurant type (Namkung & Jang, 2017). Green practices, particularly in food safety, food sustainability and environment sensitivity, have been found to have a significant impact on consumer satisfaction and revisit intention (Chaturvedi et al., 2024). Eco-friendly food and menu labelling strategies have been recognized as efficient ways to minimize greenhouse gas emissions while improving consumer experience and potentially transforming diners' perception of sustainable meals (Visschers & Siegrist, 2015).

The implementation of green practices presents significant challenges. Restaurant operators in Malaysia face obstacles in executing green practices despite recognizing their importance (Tan et al., 2019). By contrast, casual restaurants in the United States prioritize cost-effective green initiatives that enhance customer perception with formal sustainability policies driving increased adoption (Baloglu et al., 2022).

Customer behavior and willingness to pay for green initiatives vary by region. In Vietnam, green practices positively affect customers' emotional attachment, satisfaction and attitudes, thus increasing their willingness to pay premium prices for green products (Mai et al., 2023). However, studies in the Midwestern United States reveal that quick-service restaurant customers, while valuing green practices, resist paying high prices; however, people with established green habits at home are likely to patronize green restaurants (DiPietro et al., 2013). These findings highlight the need for tailored approaches that consider local context, customer perceptions and operational constraints. Studying restaurants in Thai tourist areas specifically addresses this gap, as these establishments must balance environmental sustainability with the diverse expectations of international visitors while operating in a tourism-dependent economy. This context provides valuable insights for developing localized green strategies that can enhance both ecological image and customer loyalty in similar Southeast Asian tourist destinations.

Green Consumerism

Sustainable consumer behavior represents actions that satisfy present needs while simultaneously benefiting or limiting environmental harm. Building on Trudel's (2019) work, we define green consumerism as the extent to which individuals consider and integrate environmental impact consequences into their purchasing decisions and lifestyle choices. This construct can be measured through the degree to which consumers demonstrate preferences for products and services that minimise environmental harm, conserve resources and promote sustainable practices (Joshi & Rahman, 2015).

Green consumerism manifests along a spectrum, which ranges from minimal to extensive engagement, where individuals select environmentally friendly and sustainable products and services to varying degrees. This selection behavior is influenced by consumers' level of concern about the environmental impact of business activities and their commitment to social responsibility (Chekima et al., 2016; Rizomyliotis et al., 2021; Warburg et al., 2021; Yeh et al., 2021). The intensity of green consumerism can be assessed through measuring specific behavior, such as frequency of ecofriendly purchases, willingness to pay premiums for sustainable products and depth of research into companies' environmental practices.

As Mansvelt and Robbins (2011) examined, green consumerism can be analyzed across multiple dimensions, including its varied forms, implementation challenges and observable practices. Their framework provides insights into the social, geographical, and environmental dimensions of this construct, thus allowing researchers to quantify the potential for meaningful change at individual and collective levels. By conceptualizing green consumerism as a measurable characteristic with varying levels of intensity rather than a binary descriptor of people, we can accurately assess its relationship with other constructs in our study.

In the context of restaurants, green consumerism manifests as consumers' patronage of eateries that engage in green practices, such as using organic or locally produced ingredients, implementing energy-efficient operations, reducing waste and promoting sustainable packaging and recycling practices (DiPietro et al., 2013). According to Jacobs et al. (2018) and Pohjolainen et al. (2016), green consumers typically prefer plant-based cuisine, sustainably sourced seafood and restaurants with environmental certifications.

Green consumers favor energy-efficient equipment, water-saving fixtures and ecofriendly cleaning solutions in restaurants, which extend beyond food preferences. Research shows that customers recognize restaurants' environmental initiatives and will pay premium prices for green dining experiences (Schubert et al., 2010). Consumers highly value green practices in food service and restaurant operations, thus demonstrating increased willingness to spend, wait for an extended period and travel far to support ecofriendly establishments (Kwok et al., 2016). Jeng and Yeh (2016) identified key ecological features that are valued by restaurant customers, including food quality, recyclable materials, local sourcing, energy conservation and carbon reduction initiatives. Notably, consumers associate green practices with enhanced personal health and quality of life.

The relationship between green consumerism and consumer behavior is complex and typically presents a moral dilemma, that is, balancing personal gain against

environmental benefits, which can promote or hinder green consumerism depending on individual values and societal norms (Mazar & Zhong, 2010; Sachdeva et al., 2015). Paradoxically, although exposure to green products can increase altruism, the purchase of such products may lead to less altruistic behavior (Mazar & Zhong, 2010).

Green consumerism mediates the relationship between green practices and customer loyalty through emotional attachment, satisfaction, and attitudes towards eco-friendly initiatives. Emotional bonds and satisfaction from green practices increase customers' willingness to pay premium prices for eco-friendly offerings, thus strengthening loyalty (Khuong et al., 2023; Mai et al., 2023). Customer attitudes towards green practices, which are shaped, influence consumer choices and drive loyalty (Line et al., 2016; Teng & Wu, 2019). Pro-environmental emotional attachment acts as a key mediator with sustainable practices, such as recycling and organic material use, thus reinforcing customers' commitment to environmental initiatives (Khuong et al., 2023).

Multiple factors drive customer loyalty to green restaurants. Consumer knowledge of sustainable practices and environmental concerns predicts support for eco-conscious businesses (Hu et al., 2010), thereby strengthening loyalty to sustainable establishments. Perceived value encompasses both hedonic and utilitarian dimensions that shape consumer responses to green practices. Hedonic value refers to the emotional satisfaction and enjoyment consumers derive from patronizing environmentally responsible establishments, while utilitarian value relates to the functional benefits and practical outcomes of green services (Teng & Wu, 2019). This dual nature of perceived value is particularly important in green consumption contexts, where consumers evaluate both the emotional rewards of supporting sustainable businesses and the tangible benefits of eco-friendly products and services.

Research has demonstrated the significant impact of green practices on consumer behavior. Rustam et al. (2020) found that firm sustainability efforts influence green consumption. Meanwhile, Shabbir et al. (2020) confirmed that eco-labelling and green packaging positively affect consumer environmental beliefs. Yang and Chai (2022) showed that green marketing enhances environmental awareness and consumption. Additionally, García-Salirrosas and Rondon-Eusebio (2022) noted that social normalization promotes eco-friendly practices. In restaurants, Namkung and Jang (2013) linked green practices to increased customer spending and loyalty. This evidence supports our hypothesis:

H1: Green practices have a direct and positive influence on green consumerism.

Customer Loyalty towards Green Restaurants

Customer loyalty, which is defined as sustained positive attitudes and repeat patronage despite alternatives (Fornell, 1992), drives cost-effective retention (McMullan & Gilmore, 2008). In Thailand's tourism sector, brand loyalty strongly predicts revisit intentions (Intuluck et al., 2024). For green restaurants, loyalty indicates consumer alignment with sustainability values, which links eco-conscious practices to business success. In green restaurants, customer loyalty encompasses the willingness to return, recommend and maintain positive attitudes towards eco-friendly establishments. This loyalty manifests through repeat patronage and active support of sustainable operations (Han et al., 2011; Kim & Hall, 2020). Such loyalty has become essential to sustainable hospitality businesses, thus reflecting increasing customer interest in ecologically friendly dining options. Moreover, customer loyalty towards green restaurants is positively correlated with green perceived value. Customers who perceive high value in a restaurant's green initiatives will likely demonstrate strong loyalty to the establishment (Konuk, 2019). This loyalty is typically exhibited as increased revisit intention, positive word-of-mouth behavior and readiness to pay high prices for green dining experiences (Namkung & Jang, 2017).

The strength of such relationships may be influenced by several factors, including the visibility and credibility of a restaurant's green practices, the overall dining experience, and the characteristics of individual customers (Jang et al., 2015; Kwok et al., 2016; Mai et al., 2023). Thus, restaurants that are seeking to encourage customer loyalty through green efforts should focus on effectively expressing their environmental commitment and ensuring that their policies can improve consumers' overall dining experience. According to Kim and Hall (2020), when consumers enjoy and benefit from eating at sustainable restaurants, they will likely engage in green practices while remaining loyal to the restaurants, which will result in high restaurant revisit intention.

Research has also demonstrated the relationship between green practices and customer loyalty. Jang et al. (2015) found that green practices in coffee shops positively influence consumers' attachment and loyalty: highly green-conscious consumers have shown strong attachment and loyalty to green stores and products. Extending this notion to business relationships, Gelderman et al. (2021) confirmed the impact of green practices on green satisfaction and green loyalty in a business-to-business context. These findings suggest that consumers who embrace green values (green consumerism) are likely to develop loyalty towards businesses that align with those values. Customer loyalty towards green restaurants emerges as a complex construct that is significantly linked with

consumers' green consciousness and behavioral patterns. Based on this evidence connecting green consumer identity with loyalty behavior, we propose the following:

H2: Green consumerism will have a positive influence on customer loyalty towards green restaurants.

Green Perceived Value

Perceived value is a consumer's overall evaluation of the net benefit of a product, service or market offering (Patterson & Spreng, 1997; Zeithaml, 1988), which is crucial for determining consumer satisfaction and post-purchase behavior (Teng & Wu, 2019). Green perceived value refers to a consumer's assessment of a product or a service based on its environmental benefits (Juliana et al., 2020). Green perceived value can directly enhance customers' green loyalty (Chen, 2013; Hur et al., 2013; Wu et al., 2021). Various factors, such as experiential quality, green emotional attachment, green image and switching experience, can increase green experiential loyalty to green restaurants (Wu et al., 2021). In addition, perceived social, emotional, and functional values can significantly increase customer satisfaction and loyalty to green innovation (Hur et al., 2013). Research has shown that increasing consumers' green perceived value, satisfaction and trust can enhance their green loyalty; perceived value has a direct impact, whereas satisfaction and trust have indirect effects (Chen, 2013). Consumers will generally appreciate products and services with environmental benefits (Gunnarsson et al., 2017). Their perception of these green benefits can significantly influence their brand loyalty (Lin et al., 2017).

In the hospitality industry, green practices significantly enhance consumers' perceived value of a brand or product, thus fostering strong loyalty and satisfaction. For instance, environment-friendly strategies in hotels boost customers' green perceived value, which positively influences their citizenship behavior (Abdou et al., 2020). Atzori et al. (2018) demonstrated that visible green practices, such as those by Starbucks, create a perception of broad environmental responsibility, thus enhancing customer trust. Similarly, green practices in hotels can positively affect customers' perceived value, which leads to attitudinal loyalty (Ahn & Kwon, 2020), and satisfaction with green initiatives, such as those in beach clubs, thereby further driving guest loyalty (Merli et al., 2019b)

Research has consistently demonstrated that green practices significantly impact consumers' value perceptions and loyalty behavior. Chen (2013), Hur et al. (2013), Wang et al. (2019) and Wu et al. (2021) found that beyond satisfaction, green perceived value directly impacts green loyalty and environmentally responsible behavior. Wang et al. (2019) highlighted how perceived behavioral control influences tourists' environmentally

responsible behavior, thus emphasizing the importance of effective green value communication.

This relationship is further supported by Moise et al. (2021), who confirmed that hotel green practices have a significantly positive impact on guests' functional value. Similarly, Tharaka and Munasinghe (2022) found that tourists look beyond tangible demonstrations of eco-friendly hotels towards a high aesthetic value that judges the greenness of such hotels. Paulose and Shakeel (2022) verified that guest loyalty continues to be positively influenced by perception of value and service experience. Meanwhile, Moise et al. (2021) established that green practices positively affect perceived value, satisfaction, intention to revisit and word-of-mouth recommendations.

Despite growing consumer demand, the green restaurant market remains underdeveloped. Rising environmental awareness and consumers' willingness to pay premium prices for green practices present significant business opportunities (Schubert et al., 2010). Based on this compelling evidence linking green practices to value perceptions and subsequent loyalty, we propose the following:

H3: Green practices have a direct and positive influence on green perceived value.

H4: Green perceived value has a positive influence on customer loyalty towards green restaurants.

Mediating Roles

Green consumerism and green perceived value play a significant role in the hospitality industry particularly in green restaurants. Consumers' knowledge of green practices and environmental concerns are key determinants of their intention to patronize green restaurants (Hu et al., 2010; Line et al., 2016). Wang and Wang (2016) found that commitment, perceived behavioral control and knowledge of green food and beverage behaviors are the most influential factors in green consumption.

Green practices significantly influence consumer loyalty by creating a strong emotional link to the establishment. In the context of eco-friendly restaurants and cafes, such activities frequently increase consumer attachment, contentment, and loyalty especially among environmentally aware customers (Mai et al., 2023). Green measures, such as energy and water saving, waste reduction and sustainable sourcing, not only demonstrate environmental responsibility but also influence a brand's perception as being socially responsible, thus enhancing customer loyalty (Merli et al., 2019a; Moise et al., 2021).

Green consumerism, as a behavior motivated by environmental concerns, serves as an important mediator in sustainability relationships. Consumers who appreciate environmental

values are inclined to support businesses that are aligned with their ecological ideals, which results in long-term loyalty (Joshi & Rahman, 2015). This connection encourages consumers to select organizations that adopt environmentally friendly methods, thus creating a robust link between green practices and customer loyalty (Chekima et al., 2016). Research demonstrates that when consumers perceive a restaurant's green activities as congruent with their personal beliefs, their loyalty strengthens, which is reinforced by their participation in green consumerism (Yeh et al., 2021).

While Jang et al. (2015) found that green practices in coffee shops positively influence consumer attachment and loyalty, Chou et al. (2020) emphasized that such effects depend on clear benefit communication rather than mere appeals to social duty. Customers maintain loyalty when green practices deliver both environmental and service quality benefits.

In the hospitality sector, green practices influence perceived value and satisfaction, which drive customer loyalty. Kim and Hall (2020) confirmed that green consumerism mediates this relationship because sustainability-minded consumers favor and revisit businesses that demonstrate green initiatives. Similarly, García-Salirrosas and Rondon-Eusebio (2022) established that green consumerism aligns corporate practices with consumer demand for sustainable options, thus enhancing loyalty. Kim and Hall (2020) further demonstrated that sustainable restaurant practices positively influence customer loyalty by enhancing perceived value through the integration of hedonic and utilitarian values, which are key components of perceived value in green contexts.

Based on this comprehensive evidence that establishes green consumerism and perceived value as connective mechanisms between practices and loyalty, we propose the following:

H5: Green consumerism mediates the relationship between green practices and customer loyalty towards green restaurants.

H6: Green perceived value mediates the relationship between green practices and customer loyalty towards green restaurants.

Perception of Ecological Image and Its Moderating Role

The ecological image of green restaurants has gained attention as a key factor in consumer behavior and loyalty. Consumers' perception of ecological image reflects their assessment of a company's environmental commitment (Chen, 2010). This perception is connected to green perceived value: the overall evaluation of products or services based on environmental benefits and customer needs (Chen & Chang, 2012). Studies show that green perceived value positively affects customer loyalty; this correlation

is mediated by ecological image (Khairy et al., 2023). A restaurant's environmental reputation significantly impacts its green initiative's effectiveness and customer retention. A positive ecological image enhances consumers' perceived value and willingness to pay for green offerings (Martínez, 2015) while influencing satisfaction and loyalty (Han et al., 2020; Namkung & Jang, 2017).

The perception of ecological image plays a critical moderating role in sustainable consumption relationships, thus warranting its central position in our conceptual model. Ecological image represents consumers' mental schema regarding an organization's environmental commitments and has emerged as a significant factor that influences green consumption behavior.

Recent research has provided substantial evidence for the moderating function of ecological image. Konuk (2019) established that environmental image moderates the relationship between perceived value and purchase intention in organic food settings, thus demonstrating its ability to strengthen or weaken value–behavior connections. Wu and Chen (2020) further confirmed the moderating role of ecological image in the relationship between experience quality and loyalty, thus showing how positive environmental perceptions amplify the impact of quality experiences on customer loyalty.

Mahasuweerachai and Suttikun (2022) discovered that ecological image affects loyalty to green restaurants by actively shaping environmental quality perceptions, thereby illustrating how it functions as a cognitive filter through which consumers interpret green initiatives. Aziz and Niazi (2023) demonstrated that destination image and perceived destination value influence environmentally responsible behavior; different components of image (affective, conative, and cognitive) have varied impacts on behavioral outcomes.

The moderating capacity of ecological image is further supported by Jang (2016), who found that green images enhance behavioral intentions through perceived quality and satisfaction, thus suggesting that these mediators strengthen the relationship between these variables. Jeong et al. (2014) documented how ecological image influences customer attitudes towards green practices by either amplifying or diminishing their effect based on image congruence.

Zulvianti et al. (2023) showed that green self-identity, which is closely related to ecological image perception, strengthens customer loyalty through environmentally conscious spending. Armutcu et al. (2024) demonstrated how social media amplifies the effect of ecological image, as evidenced by digital interactions that promote green food purchases.

Despite these advances, significant research gaps remain in understanding how ecological image moderates the relationships among green consumption, perceived value,

and loyalty in restaurant settings. As Mishra et al. (2021) suggested, strong ecological images may offset several factors, such as limited ecological literacy in promoting sustainable behavior, thus highlighting the critical moderating function of image in sustainable consumption frameworks. Our study addresses this gap by positioning the perception of ecological image as a key moderator in green restaurant loyalty formation.

Based on our hypotheses, ecological image moderates the relationships among green practices, perceived value, and customer loyalty in green restaurants. We propose these hypotheses:

H7: The perception of ecological image moderates the relationship between green consumerism and customer loyalty towards green restaurants.

H8: The perception of ecological image moderates the relationship between green perceived value and customer loyalty towards green restaurants.
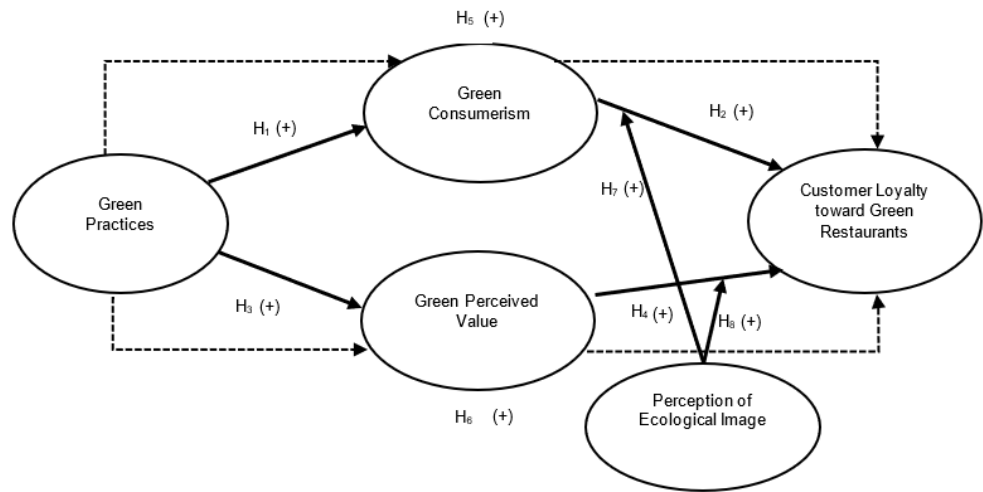

Figure 1 Conceptual model

Note: -------------- Moderated Mediation Effect

Source: Authors's analysis

Methodology

This study employed a stepwise approach to investigate the relationship among green practices, consumer perceptions and customer loyalty towards green restaurants. The methodology was structured into the following stages:

Focus Group

This study adopted the focus group method to explore the appropriateness of the measurement scales used for assessing constructs, such as green practices, green consumerism, green perceived value, perception of ecological image and customer loyalty. This approach has been widely employed in previous studies that address green practices and consumer behavior, thus proving effective in capturing nuanced insights and ensuring the relevance of constructs across different cultural and industry contexts.

Jeong and Jang (2010) used focus groups to refine restaurant green practice measurements, which demonstrated the method's value in validating constructs. Riva et al. (2022) similarly employed focus groups to adapt scales for green consumerism and perceived value in hospitality contexts. Our study's focus groups provided rich exploratory feedback from academic, industry and customer participants.

The focus group composition, which included four restaurant representatives, two academic experts and one experienced diner, was strategically designed to balance practical industry knowledge with theoretical expertise. While traditional qualitative research often emphasizes equal distribution across categories, our approach prioritized industry perspective (57% restaurant representatives) given the study's practical application focus while still incorporating academic rigor (29% experts), and consumer viewpoint (14%). This proportional representation aligns with Krueger and Casey's (2015) recommendation that focus group composition should reflect the relative importance of stakeholder perspectives to the research objectives rather than strict numerical equality. Table 1 provides a detailed summary of the instruments used in this study.

Measurement Instruments and Control Variables

All the scales used correspond to their theoretical definitions. The questionnaire consisted of three sections: the project introduction; the construct measurement items and the demographic information, general environmental attitudes, and green restaurant awareness. The introduction provided a brief study overview, estimated the respondents' completion time, and assured confidentiality. Participants were informed that participation was voluntary and that non-participation would incur no penalties. The design ensured ethical data collection and encouraged honest responses from the participants.

The construct measurement items for green consumerism and customer loyalty towards green restaurants were scored on a five-point Likert-type scale ranging from 0 (not at all) to 4 (frequently, if not always). Meanwhile, items for green practices, green perceived value and perception of ecological image were scored on a five-point Likert-type scale that ranged from 0 (strongly disagree) to 4 (strongly agree). Table 1 summarizes the

sources of the measurement scales used in the study. The scales for green practices were adapted from Jeong and Jang (2010). The scales used to evaluate green consumerism and green perceived value were adapted from Riva et al. (2022). The scale to measure the perception of ecological image was adapted from Jeong and Jang (2010). Finally, Riva et al.'s (2022) proposal was used to assess guest loyalty towards green restaurants.

Table 1 Scales used

Latent Variable	Number of Questions	References
Green Practices	10	Jeong and Jang (2010)
Green Consumerism	5	Riva et al. (2022)
Green Perceived Value	5	Riva et al. (2022)
Perception of Ecological Image	4	Jeong and Jang (2010)
Customer Loyalty toward Green Restaurants	2	Riva et al. (2022)

Source: Authors's analysis

Validity and Scale Reliability

We performed confirmatory factor analysis (CFA) using partial least squares structural equation modelling (PLS-SEM) to refine the scales. The least relevant indicators were eliminated following the scale refinement process based on the structures of the latent variables assumed for each construct (Hair et al., 2019). Indicators that did not meet the strong convergence condition were removed, that is, all indicators with standardized factor loading below 0.7. This process led us to remove nine indicators. Finally, after eliminating each indicator, we monitored the evolution of the main model fit measurements.

Pretest

A pre-test with 30 restaurant customers (15 Thai and 15 international) evaluated the questionnaires' clarity, reliability, and cultural appropriateness. The respondents' feedback guided minor adjustments. We accommodated Thai and international tourists by developing the questionnaire in two languages. Two experienced translators independently converted the English questionnaire to Thai, which was followed by a back-translation to English by two different translators to ensure conceptual equivalence. Both versions underwent pre-testing with their respective language groups, which resulted in further refinements. Statistical analysis of pilot responses from both language groups (n = 40) revealed no significant differences in response patterns (p > 0.05), thus confirming that data from both groups could be combined without introducing confounding variables.

For the data analysis, the measurements were assessed by conducting exploratory factor analysis (EFA). The Kaiser–Meyer–Olkin value was larger than 0.931, and the p-value of Bartlett's test was less than 0.000, which indicated a sufficient condition for the EFA (Hair et al., 2019). The results showed that all the factor loadings were greater than 0.781. The Cronbach's alpha of the five constructs was higher than 0.930, which demonstrated favorable internal reliability.

Effective Sampling Strategy, Data Collection and Analysis

Using simple random sampling, we collected data from customers at 14 green-certified restaurants across Koh Samui. These restaurants were randomly selected from different geographic areas: five in Chaweng Beach, three in Lamai Beach, two in Bophut (Fisherman's Village), two in Maenam Beach and two in Nathon Town. This distribution ensured representation from the island's major tourist zones and commercial centers. The sample included Thai and international tourists to reflect island demographics.

In this study, systematic random sampling was used to acquire data from tourists at each restaurant location. After randomly selecting the first participant from the first three tourists encountered, every third tourist was gradually added to the sample. This probability sampling technique ensured random and systematic coverage of the tourist population while minimizing potential selection bias. The systematic interval (k = 3) was chosen based on tourist density and sample size requirements, thus allowing for efficient field data collecting while ensuring statistical validity for analysis.

We distributed structured questionnaires to 760 tourists in Koh Samui, Thailand from March to May 2024, thus yielding 358 valid responses. Using the inverse square root method at the 5% significance level, an effective approach for the sample size determination for PLS-SEM was obtained (Kock & Hadaya, 2018). We established 358 as an adequate sample size. Of the 456 completed questionnaires (60% response rate), 358 were retained after excluding incomplete or suspicious responses.

Using SmartPLS 4.0, we conducted PLS-SEM analysis to evaluate measurement and structural models. We employed a measured-marker variable to assess common method bias (CMB) (Podsakoff et al., 2003). Additionally, under Hayes' (2017) framework, we tested two moderated mediation models using SmartPLS 4.0 and examined how ecological image moderates the relationships between (1) green perceived value and customer loyalty and (2) green consumerism and customer loyalty.

Common Method Bias

We assessed CMB using Harman's one-factor test. The single factor accounted for 41.885% of total variance, which was below the 50% threshold, thus indicating that

CMB was not a significant concern (Podsakoff et al., 2003). In addition to the statistical procedure, we implemented non-statistical measures, as recommended by Podsakoff et al. (2012), such as ensuring psychological separation between the scales and protecting our respondents' identity. For instance, we instructed the participants to fold their completed questionnaire before returning it directly to the survey administrators. We took such steps to minimize potential biases and enhance the validity of our data collection process. The statistical and procedural precautions helped strengthen the reliability of our findings by addressing potential sources of bias in our research methodology.

Study Area and Context

This study was conducted in restaurants on Koh Samui, Thailand. Samui Island was selected as one of the sites where the '7 Greens' (green heart, green logistics, green attraction, green community, green activity, green service and green plus) policy was initiated by the Tourism Authority of Thailand (TAT) to increase the sustainability of the country's tourism industry. The pilot project for the island was conducted from May to September 2012. The TAT considered the Samui pilot project as the most successful among all the projects implemented in the other sites (Muangasame & McKercher, 2015).

Given the growing importance of environmental sustainability in the tourism and hospitality industry, restaurants have adopted green practices as a strategic method to remain competitive and meet consumers' expectations. Understanding how green practices can be transformed into actual customer experiences and how they can affect restaurants' performance and customers' loyalty is crucial for restaurant owners and managers. As an island destination that is heavily reliant on tourism, Koh Samui serves as an appropriate framework for investigating the impact of green practices on consumers' behavior and restaurants' performance.

This study focused on restaurant customers in Koh Samui, Thailand, which was selected for several strategic reasons. As a popular international tourist destination, Koh Samui attracts diverse global travelers with varying degrees of environmental awareness and expectations on eco-friendly practices. The island's unique ecosystem faces specific environmental challenges, which has heightened the importance of green initiatives in the restaurant industry. Koh Samui is also the subject of multiple research and development projects on innovative renewable energy technologies, including tidal, hydrogen, fuel cell, and geothermal energy sources (Sirasoontorn & Koomsup, 2017). Furthermore, the island boasts a wide array of dining establishments ranging from small local eateries to international chain restaurants; thus, it offers a comprehensive view of how green practices are perceived and implemented across different types of food service businesses

(Selivanov, 2020). The island's diverse culinary landscape can provide valuable insights into the adoption and impact of green practices in the restaurant industry. Given that this study focused on a particular island destination, it accounted for the potential geographical implications of the green practice-performance transition process while capturing a varied range of restaurant experiences and consumer perspectives.

Data Analysis

Descriptive Statistics

The mean values, which ranged from 2.702 to 3.073 on a five-point scale (0–4), suggested a moderate level of agreement or frequency across all the variables. The standard deviation values indicated the spread of the responses with green consumerism showing the highest variability (1.099) and green perceived value demonstrating the lowest value (0.856).

Profile of Respondents

Among the 358 restaurant customers surveyed, the majority were female (63.1%), while 34.9% were male, and 2.0% provided no gender information. Furthermore, 50.27% of the respondents were international tourists, and 49.73% were domestic tourists.

The age distribution was diverse: the participants who were younger than 25 years (27.7%) and those who were 55 years or above (27.1%) accounted for the largest groups. The other age groups were as follows: 25–34 years (18.7%), 35–44 years (10.9%), and 45–54 years (14.0%). In terms of education, most of the respondents (59.8%) held a four-year college degree followed by those with a two-year college education (17.0%) and those who graduated from high school or a lower level (14.2%).

Regarding their family structure, slightly more than half of the respondents (54.7%) had no children, and 44.1% had at least one child. The participants' environmental concerns varied with 36.0% being a little concerned, 24.9% being concerned, 19.0% being very concerned and 19.8% being not at all concerned about environmental issues.

The survey revealed the respondents' strong preference for green restaurants: 60.9% expressed that they were likely to dine at a green or sustainable restaurant. However, 32.7% of the participants were unsure, and 6.1% were not likely to opt for such establishments. Regarding willingness to pay high prices to dine at green restaurants, the participants' opinions varied widely.

Measurement Model

Table 2 shows the results of the confirmatory factor analysis (CFA), which was performed to determine the reliability and validity of the measurement variables. We evaluated the measurement model by using the guidelines developed by Hair et al. (2019) to verify whether our instruments were reliable and valid. Then, we used the PLS-SEM for the hypothesis testing and examined the loadings, the average variance extracted (AVE), and the composite reliability (CR) values. The standardized factor loadings were well above the required threshold of 0.7, the AVE values were greater than 0.5, and the CR values were above the 0.7 cutoff (Hair et al., 2019). Thus, the internal consistency and convergent validity were confirmed. In addition, the inner VIF ranged from 1.689 to 2.992, which indicated the absence of multi-collinearity (Hair et al., 2019). For the green practices construct, four indicators had outer loadings that were over the threshold, including offering recycling bins for plastic cups, paper cups and cup sleeves in the store; using takeout containers that are recyclable and using environmentally friendly cleaners for tables and floors. For the green consumerism and green perceived value constructs, four metrics had outer loadings that exceeded the limit. Meanwhile, for the perception of ecological image construct, three indicators had outer loadings that were higher than the cut-off (Hair et al., 2019). In addition, the two indictors for the customer loyalty towards green restaurants construct had outer loadings over the threshold. Table 2 shows that the Cronbach's alpha values in the model varied from 0.838 to 0.891 and the CR values (CR Rho_a and Rho_C) ranged from 0.839 to 0.949, which are higher than the threshold (0.7).

We determined the discriminant validity by using the Fornell-Larcker criterion (Fornell & Larcker, 1981). Table 3 reveals that the square root of the AVE (shown on the diagonal) was greater than the related inter-construct correlations in the construct correlation matrix, thus indicating that the model demonstrated appropriate discriminant validity. All the hetero-trait-mono-trait (HTMT) ratio of correlation values fell below the recommended 0.9 threshold (Table 4), which suggested a potential connection between the indicators and the constructs (Henseler et al., 2015). Overall, the measurement model demonstrated sufficient convergent and discriminant validity.

Table 2 CFA results

Construct and Measurement Items	(CFA) Standardized factor loading	VIF	CA	CR (Rho_a)	CR (Rho_C)	AVE
	>0.7	<3	>0.7	>0.7	>0.7	>0.5
Green Practice			0.838	0.839	0.891	0.673
Offer recycling bins for plastic cups, paper cups, and cup sleeves in the store.	0.814	1.883				
Use of take-out containers that are recyclable.	0.812	1.939				
Use of environmentally friendly cleaners for tables and floor.	0.826	2.103				
Use of environmentally friendly cleaners for mugs, glasses, and utensils.	0.827	2.077				
Green Consumerism			0.845	0.850	0.896	0.683
I search for food that is locally grown or organic.	0.836	2.019				
I am interested in taking part in any protest of my locality related to environmental issues.	0.845	1.999				
I use less water whenever possible.	0.781	1.689				
I am interested in buying products with less packaging.	0.843	1.991				
Green Perceived Value			0.848	0.852	0.897	0.686
The restaurant offers expected environment-friendly	0.836	1.938				

Table 2 CFA results (continued)

Construct and Measurement Items	(CFA) Standardized factor loading	VIF	CA	CR (Rho_a)	CR (Rho_C)	AVE
	>0.7	<3	>0.7	>0.7	>0.7	>0.5
The restaurant saves my time while I put order here.	0.840	2.223				
The effort needed to purchase from this restaurant is low.	0.817	2.085				
The food that I purchase here is a good buy in terms of green attributes and my money.	0.820	1.922				
Perception of Ecological Image			0.877	0.880	0.924	0.803
I have the impression that restaurants are very responsive to environmental issues.	0.899	2.548				
The restaurants are concerned about the preservation of the environment.	0.923	2.992				
I have the feeling that the restaurants are not only concerned about the profit but also concerned about the environment and other consumers.	0.865	2.087				
Customer loyalty toward Green Restaurants			0.891	0.892	0.949	0.902
I would come back to a restaurant that implements good environmental practices.	0.948	2.831				

Construct and Measurement Items	(CFA) Standardized factor loading	VIF	CA	CR (Rho_a)	CR (Rho_C)	AVE
	>0.7	<3	>0.7	>0.7	>0.7	>0.5
I would recommend a restaurant that implements good environmental practices.	0.952	2.831				

Source: Authors's analysis

Table 3 Fornell–Larcker discriminant validity criterion

	1	2	3	4	5
Green Practices	**0.820**				
Green Consumerism	0.607	**0.827**			
Green Perceived Value	0.497	0.488	**0.828**		
Perception of Ecological Image	0.476	0.531	0.708	**0.896**	
Customer Loyalty toward Green restaurants	0.545	0.617	0.605	0.558	**0.950**

Source: Authors's analysis

Table 4 HTMT discriminant validity criterion

	1	2	3	4	5
Green Practices					
Green Consumerism	0.716				
Green Perceived Value	0.587	0.567			
Perception of Ecological Image	0.555	0.615	0.817		
Customer Loyalty toward Green Restaurants	0.630	0.709	0.691	0.630	

Source: Authors's analysis

We assessed the importance of the route coefficients by evaluating the structural model with 10,000 sub-samples by using the bootstrapping approach (Hair et al., 2019). Table 5 indicates that green practices positively influenced green consumerism ($\beta = 0.609$, $p < 0.001$), green consumerism positively affected customer loyalty towards green

restaurants ($\beta = 0.360$, p < 0.001), green practices positively influenced green perceived value ($\beta = 0.500$, p < 0.001), and green perceived value positively affected customer loyalty towards green restaurants ($\beta = 0.366$, p < 0.001).

Table 5 Structural equation model results

Hypothesis	B	STDEV	t	P	2.50%	97.50%	Result
H1: Green Practices -> Green Consumerism	0.609	0.037	16.337	0.000	0.532	0.678	Supported
H2: Green Consumerism -> Customer loyalty toward Green Restaurants	0.360	0.046	7.858	0.000	0.268	0.448	Supported
H3: Green Practices -> Green Perceived Value	0.500	0.049	10.173	0.000	0.400	0.591	Supported
H4: Green Perceived Value -> Customer loyalty toward Green Restaurants	0.366	0.055	6.603	0.000	0.256	0.473	Supported
Mediation Analysis							
H5: Green Practices -> Green Consumerism-> Customer Loyalty toward Green Restaurants	0.219	0.032	6.824	0.000	0.157	0.283	Supported
H6: Green Practices -> Green Perceived Value -> Customer Loyalty toward Green Restaurants	0.183	0.033	5.474	0.000	0.121	0.251	Supported
Moderated Mediation Analysis							
H7: Perception of Ecological Image X Green Consumerism -> Customer Loyalty toward Green Restaurants	-0.049	0.045	1.129	0.259	-0.133	0.042	Not Supported
H8: Perception of Ecological Image X Green Perceived Value -> Customer Loyalty toward Green Restaurants	0.108	0.046	2.456	0.014	0.014	0.191	Supported

Note: 10,000 bootstrap samples were used for bias-corrected bootstrap confidence intervals

β: Standardized regression coefficient, STDV: Standard Deviation, t: t-statistic, P: p-value

Source: Authors's analysis

Analyses for mediation and moderated mediation were conducted using SmartPLS 4.0 software. For both analyses, we employed a bootstrap procedure with 10,000 re-samples to estimate the indirect effects and 95% confidence intervals (CI). Following Hayes (2017), an effect was determined to be statistically significant when the 95% CI excluded zero. Table 5 highlights the significance of green consumerism and green perceived value as mediators in the link between green practices and customer loyalty towards green restaurants. The results indicated that green consumerism mediated the relationship between green practices and customer loyalty (β = 0.219, p < 0.001, 95% CI [0.157,0.283]). Meanwhile, green perceived value mediated the relationship between green practices and customer loyalty (β = 0.183, p < 0.001, 95% CI [0.121,0.251]). These values were all significant. Thus, H5 and H6 were accepted.

The conditional indirect effect of the moderating variable, perception of ecological image, on the relationship between green consumerism and customer loyalty towards green restaurants and the indirect effect of the perception of ecological image on the relationship between green perceived value and customer loyalty towards green restaurants were tested using moderated mediation analyses. The results discuss the moderation–mediation effect regarding H7 and H8. The overall results indicate that the moderated mediation model was not supported in the interaction of perception of ecological image on green consumerism to customer loyalty towards green restaurants, which had an index of β = −0.049 (95% CI = −0.133; 0.042). Given that zero lies within the CI, the perception of ecological image had an insignificant moderating effect on green consumerism through customer loyalty towards green restaurants (Hayes, 2017). In the case of perception of ecological image on green perceived value to customer loyalty towards green restaurants interaction, the moderated mediation model was supported with an index of β = 0.108 (95% CI = 0.014; 0.191) because zero did not lie within the CI.

The results further showed the role of perception of ecological image as a moderating variable. The perception of ecological image moderated the relationship between green consumerism and customer loyalty towards green restaurants (β = −0.049, p = 0.259), while the perception of ecological image moderated the relationship between green perceived value and customer loyalty towards green restaurants (β = 0.108, p = 0.014). The negative coefficient for H7 suggested that perception of ecological image slightly weakened the relationship between green consumerism and customer loyalty. However, the effect was not statistically significant (p > 0.05). Hence, H7 was not supported. Meanwhile, the positive coefficient for H8 indicated that strong perception of ecological image enhanced the positive effect of green perceived value on customer loyalty.

In this study, we used a two-way interaction framework to display the correlations between the key variables. Figure 2 depicts the interactions based on the β-value results. The graph shows how customer loyalty towards green restaurants was influenced by the perception of ecological image and green perceived value. The visual representation demonstrates that the association between green perceived value and customer loyalty towards green restaurants was positive but low for the customers with a low perception of ecological image than for those with a high perception. The finding implied that customer loyalty towards green restaurants increased as customers' green perceived value increased with their strong perception of ecological image slightly increasing the effect. The findings underscored the importance of implementing green practices, promoting sustainable consumption, and effectively communicating and maintaining a restaurant's environmental image to enhance customer loyalty. Restaurant managers can offer a highly compelling value proposition to environmentally conscious customers by addressing the aspects holistically.

The results indicated that restaurants' green practices can positively influence customer loyalty directly and indirectly through green consumerism and green perceived value. The perception of ecological image played a moderating role particularly in strengthening the relationship between green perceived value and customer loyalty.
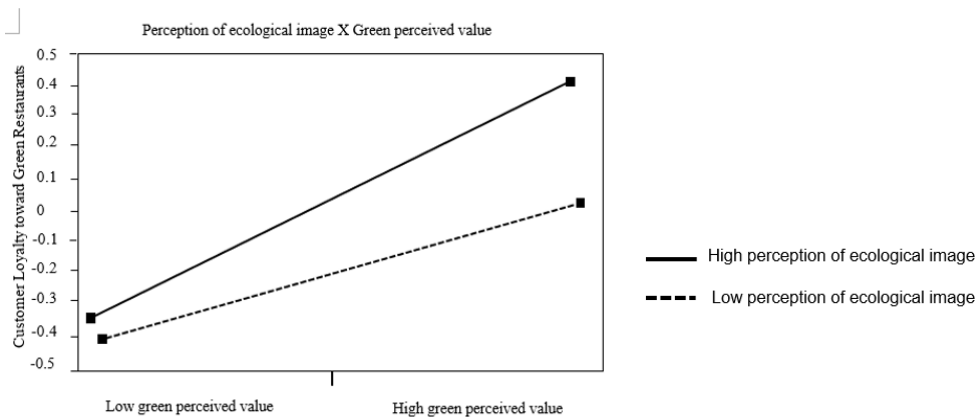

Figure 2 Moderated mediating effect of perception of ecological image on the relationship between green perceived value and customer loyalty towards green restaurants.

Source: Authors's analysis

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Discussion and Conclusion

Theoretical Implications

Survey findings indicate that most participants are concerned about restaurants' environmental impact. However, 41% of the respondents do not believe that the restaurant industry is exerting considerable effort to address environmental concerns. The structural equation model offers several significant insights into the dynamics of green practices in the restaurant industry and their impact on consumer behavior. The findings underscore the importance of green initiatives in shaping consumer perceptions and loyalty.

We examined the direct effect of green practices, green consumerism, green perceived value, and customer loyalty towards green restaurants; the mediating effect of green consumerism and green perceived value on the relationship between green practices and customer loyalty towards green restaurants; the moderating effect of perception of ecological image on the relationship between green consumerism and customer loyalty towards green restaurants and the moderating effect of perception of ecological image on the relationship between green perceived value and customer loyalty towards green restaurants.

The results reveal that green practices can positively influence green consumerism and green perceived value, which supports and confirms the findings of previous studies (Abdou et al., 2020; García-Salirrosas & Rondon-Eusebio, 2022; Namkung & Jang, 2013; Yang & Chai, 2022). In addition, green consumerism is positively associated with customer loyalty towards green restaurants, while green perceived value is positively associated with customer loyalty towards green restaurants, which is consistent with the findings of previous research (Chen & Tung, 2014; Chen, 2013; Hur et al., 2013; Jang et al., 2015; Konuk, 2019; Wu et al., 2021; Yadav et al., 2019).

Furthermore, green consumerism has a significant mediating effect on the relationship between green practices and customer loyalty towards green restaurants. Meanwhile, green perceived value has a significant mediating effect on the relationship between green practices and customer loyalty towards green restaurants. This conclusion advances the findings of the literature (Line et al., 2016; Mai et al., 2023) and reveals the indirect effect of green practices and customer loyalty towards green restaurants through green consumerism and green perceived value. Moreover, the perception of ecological image moderates the mediating effect of green perceived value and customer loyalty towards green restaurants. The moderator influences the strength or direction of the mediation process. The strength of green consumerism's role in connecting green practices to customer loyalty can depend on the level of the restaurant's ecological image,

which is consistent with the findings of several studies (Khairy et al., 2023; Mahasuweerachai & Suttikun, 2022). The negative coefficient for H7 suggested that perception of ecological image slightly weakened the relationship between green consumerism and customer loyalty; however, the effect was not statistically significant ($p > 0.05$).

Our findings indicate that H7 was not supported. The interaction term perception in ecological image on green consumerism to customer loyalty towards green restaurant showed a negative and nonsignificant effect ($\beta = -0.049$, 95% CI = -0.133; 0.042) because the confidence interval includes zero. We can imply that the perception of ecological image does not play a significant role in the relationship between green consumerism and customer loyalty to green restaurants. Instead, it has a direct influence on client views and loyalty. Environmental concerns, green self-identity, and perceived value serve as primary drivers of customer loyalty rather than mitigating the relationship between green consumption and loyalty.

These findings align with the previous research by Martínez (2015), who found that green image directly influences customer attitude formation but does not necessarily strengthen or weaken existing relationships between environmentally conscious consumption and loyalty. Our results suggest that in the green restaurant context, ecological image functions as an independent predictor rather than a boundary condition that alters the strength of relationships between other variables (Baron & Kenny, 1986).

This study also has several theoretical implications. The empirical results reveal that the positive relationship can strengthen the relationship between green perceived value and customer loyalty. The results underscore the importance of implementing green practices and effectively communicating a restaurant's ecological image to customers. Thus, green practices are an important factor that can influence green consumerism, green perceived value, and customer loyalty towards green restaurants. In addition, the perception of ecological image is an important external force that can increase customers' green perceived value and loyalty to green restaurants. The findings can provide valuable insights for restaurant managers and marketers and highlight the need for comprehensive green strategies to implement sustainable practices and effectively communicate establishments' value to consumers to enhance their loyalty and gain a competitive edge in the increasingly environmentally conscious market.

Practical Implications

The study results indicate that consumers (Thai and foreign tourists) are largely concerned about environmental issues and tend to select restaurants that emphasize environmental sustainability or eco-friendliness. Findings from the PLS-SEM provide several key insights regarding green management approaches in restaurant businesses and their impact on consumer behavior. The research emphasizes the importance of environmental management initiatives in restaurants as determinants of consumer perception and loyalty towards green restaurant businesses. The study also found that green management approaches are the primary variables influencing green consumption, thus affecting the perception of environmental value, and building customer loyalty to green restaurants. Consumer behavior becomes pronounced when they perceive the ecological image of restaurants that prioritize environmental conservation through ecofriendly business management practices.

A favorable perception of environmental friendliness increases its positive impact on consumption behavior. When customers understand that a business values environmental care, their consumption patterns are influenced, thus leading to increased patronage and fostering future loyalty to environmentally friendly restaurant businesses.

For restaurant businesses that are aiming to shift consumer behavior towards green practices through the role of ecological images must establish efficient and visible green management approaches that clearly impact customers' perception of environmental value. Key management areas include:

1. **Recycling bin management**: Restaurants need efficient recycling systems with strategically placed, clearly labelled bins for plastics, paper, and general waste that are accessible to customers and staff. Visual examples of each waste category should be displayed on the respective bins. Staff should be assigned to check waste separation regularly to ensure compliance with environmental standards.

2. **Takeaway container management**: Restaurants should focus on environmentally friendly packaging and recycled materials, such as recycled paper boxes. Special discount programs should be offered to customers who bring their own containers. Plastic bags should be replaced with paper or cloth bags to reduce plastic waste and promote sustainable consumption.

3. **Eco-friendly cleaning products**: Businesses should use environmentally friendly cleaning products in two main areas: general area cleaning (tables and floors) using naturally derived products with appropriate dilution ratios to reduce chemical use and glassware/equipment cleaning using biodegradable dish soap

with water-saving washing systems and reusable cleaning tools. The systematic tracking of water and cleaning product usage helps maximize efficiency.

Restaurant operators should implement supplementary environmental measures, including staff training on the proper use of ecofriendly cleaning products, raising environmental awareness through informational signage, communicating environmental policies to customers, setting clear waste reduction targets, and conducting regular performance evaluations to ensure effective and sustainable environmental operations.

Under environmentally friendly restaurant businesses, consumer behavior changes when they perceive the value of environmental management practices linked to multiple dimensions of green practices. For example, efficient recycling systems reduce landfill or incineration waste, which are significant sources of greenhouse gas emissions. Eco-friendly packaging reduces single-use plastics whose production and disposal emit greenhouse gases. Using biological cleaning agents and water-saving systems reduces energy and chemical usage that impact the environment. Additionally, supplementary measures, such as staff training and customer communication, help raise awareness and transform consumption behaviors to become environmentally friendly, thus forming an essential foundation for developing green practices.

Conclusion, Limitations and Future Study

This study investigated relationships among green practices, perceived value, and customer loyalty in green restaurants through data collected in Koh Samui. Results reveal key mediating and moderating factors that link green practices to loyalty. Our findings demonstrate that comprehensive sustainability initiatives enhance operational efficiency and consumer appeal. These insights advance theoretical understanding while providing practical guidance for implementing sustainable practices to build customer loyalty.

Several limitations should be acknowledged. Data collection focused exclusively on Koh Samui, thus limiting generalizability to other tourism destinations. The cross-sectional design prevented the examination of long-term changes in consumer behavior. Self-reported data may introduce response bias, while language barriers can have affected international tourists' responses. Additionally, data collection during peak season may not represent year-round consumer patterns. Our measurement of green practices was also narrower than our conceptual discussion, thus focusing only on recycled containers and eco-friendly cleaners rather than the full spectrum of sustainability initiatives. Future research should expand to diverse locations, employ longitudinal designs, develop comprehensive measurement scales, and consider seasonal variations in consumer responses.

Future research should also examine green restaurant practices across diverse settings beyond our single-destination study. Cross-cultural comparisons between Eastern and Western markets can reveal global variations in sustainability values. Studies should investigate digital platforms' influence on ecological image and green initiatives' long-term financial impact. Research on green certification systems and sustainable technologies can advance the understanding of environmental practices. Finally, examining the effect of local food sourcing on perceived value and loyalty can contribute to this growing field.

Acknowledgements

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