

THE IMPACT OF GREEN PRACTICES ON CONSUMER SATISFACTION IN THE FOOD AND RESTAURANT INDUSTRY: THE MEDIATING ROLE OF PERCEIVED VALUE

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Abstract

This research investigates the relationship between green practices, the perceived effectiveness of green practices, and food and restaurant satisfaction, and whether this is mediated by perceived value. Based on stimulus–organism–response model and theory of planned behaviour, a mediation model was tested with the aid of the survey data collected from 203 adult consumers of Punjab, Pakistan, who consumed at restaurants during the three months period prior to the data collection. Partial least squares (PLS) structural equation modelling with 5,000 bootstraps was used to test the hypotheses. Green practices and perceived consumer effectiveness had significant impacts on perceived value, which had a significant impact on consumer satisfaction. The effect of green practices on consumer satisfaction was partially mediated by perceived value, and the effect of perceived consumer effectiveness on consumer satisfaction was completely mediated by perceived value, which was not significant. The model accounted for 34.0% and 25.0% of the variance in perceived value and consumer satisfaction, respectively. The results explain how green restaurant programs can be translated into satisfaction results and provide a set of guidelines for restaurateurs in emerging markets: Perceived consumer effectiveness is rewarded by a restaurant only when it is translated into perceived value, while visible green practices satisfy both directly and because of perceived value.

Keywords: *green practices; perceived value; perceived consumer effectiveness; consumer satisfaction; restaurant industry; PLS-SEM; Pakistan*

1. Introduction

1.1 Background of the Study

Food and restaurant companies are in the midst of a radical change: Environmental sustainability is increasingly becoming a key element of competitive positioning in the global market. At the restaurant level, green practices are increasingly gaining importance and are increasingly visible in the field, including energy conservation, water efficiency, waste reduction, sustainable sourcing, single-use plastic elimination, and eco-friendly infrastructure (Chaturvedi et al., 2024). Restaurants that effectively embed these three aspects of operations, product and communication demonstrate their commitment to the environment to the consumer, and those that do not can lead to a "green gap" where the consumer's perception and trust in the institutional commitment to the environment is not realized.

The perceived value of a product or service, defined by the overall evaluation of the worth a product or service offers to the consumer, is at the heart of the pathway from green practices to favourable consumer responses (Zeithaml, 1988). This judgment is extended to "green perceived value" in sustainable restaurant contexts, defined as the benefits that the diner perceives from dining at an eco-friendly restaurant (Riva et al., 2025). From the stimulus–organism–response perspective, environmental practices serve as the stimulus, perceived value as the organism that

processes the stimulus, and customer satisfaction as the response. Another consumer-side factor is perceived consumer effectiveness—the degree to which consumers feel that their choices and behaviours matter when it comes to environmental issues that dictates the reception and evaluation of sustainability stimuli (Riva et al., 2025; Tanveer et al., 2024).

1.2 Problem Statement

Although more investment is being put into green restaurant projects, the financial benefits for commercial investments are not assured. Communicating the value of the investment, which is as much a function of the communication and consumer interpretation, is as important as the actual practice of restaurants that invest in green infrastructure, and they risk being seen as generating value less than the investment is worth. Moreover, the empirical evidence on the pathway from sustainability to consumer outcomes is mixed. González-Viralta et al. (2023) and Chaturvedi et al. (2024) also found that the positive impacts of green practices on consumer satisfaction were statistically significant. In contrast, Mawardi et al. (2024) concluded that Indonesia's quick-service restaurant consumers did not perceive a significant influence from green practices on their purchases of green products and, in turn, on their satisfaction levels. Shih et al. (2024) reported no direct significant effect of consumers' perceptions of sustainability on their satisfaction, after controlling for perceived value. This difference suggests that the direct effect of green stimuli and the mediating role of consumer environmental dispositions should be ruled out and the latter should be tested directly.

1.3 Research Gap

This study is motivated by three gaps in the literature. Firstly, a contextual gap: most of the studies reviewed are single country analyses of restaurant consumers in Chile, India, Indonesia, and Mongolia, with Pakistani restaurant consumers being a new and rapidly growing market, largely unexplored, due to environmental awareness, urbanization, and increased middle-class income. Secondly, an integration gap exists, as the simultaneous modelling of perceived value as a well-specified mediator that comes between green practices and perceived consumer effectiveness as antecedents has not been tested in a common restaurant-specific framework, and more specifically outside the East Asian and South American context. Third, an evidential gap: the evidence reviewed showed conflicting results of whether green stimuli have a direct impact on satisfaction, or whether the perceived value has a direct impact on satisfaction, and conflicting results on whether consumer environmental dispositions lead to any behavioural outcomes or not (González-Viralta et al., 2023; Shih et al., 2024). Revisiting these pathways using well-established instruments in a new consumer setting adds directly to the solution of this inconsistency.

1.4 Research Questions

In light of the problem outlined above and the gaps identified in the literature, this study seeks to answer the following research questions:

RQ1: Do green practices and perceived consumer effectiveness directly stimulate the formation of perceived value among restaurant consumers in Punjab, Pakistan?

RQ2: Does perceived value significantly increase consumer satisfaction with restaurants?

RQ3: Does perceived value mediate the effects of green practices and perceived consumer effectiveness on consumer satisfaction?

1.5 Research Objectives

Consistent with these research questions, the study pursues the following objectives:

RO1: To analyse the direct impact of green practices and the perceived effectiveness of the restaurant consumer on the development of perceived value for restaurant consumers in Punjab, Pakistan.

RO2: To assess the effect of perceived value on consumer satisfaction with restaurants.

RO3: To determine whether perceived value mediates the effects of green practices and perceived consumer effectiveness on consumer satisfaction.

1.6 Significance of the Study

This study has a theoretical, practical, and contextual importance. It provides, in theory, additional evidence to the still-uncertain pathway of sustainability to satisfaction that is reported in different ways by previous studies: direct (Chaturvedi et al., 2024; González-Viralta et al., 2023), fully value-mediated (Shih et al., 2024), and attenuated or absent (Mawardi et al., 2024). The study examines an integrated model in which green practices and perceived consumer effectiveness are interacted with each other as antecedents of perceived value, and thus elucidates the psychological mechanisms by which green restaurant programs are linked with satisfaction outcomes.

On a practical level, the results offer a practical viewpoint on how to effectively implement a green strategy, beyond symbolic actions, and provide guidance on how to integrate value-communication strategies, such as eco-certifications, clear and transparent sustainability reporting and sensory cues related to eco-quality with green investments. From the theoretical perspective, the study contributes to the existing literature by addressing the dearth of empirical consumer-behaviour research from the restaurant industry in Pakistan, where green identity is increasingly gaining importance as a competitive tool.

1.7 Scope and Delimitations

This study is limited to the restaurant industry of Punjab, Pakistan and four constructs – green practices, perceived consumer effectiveness, perceived value, and consumer satisfaction. Empirically, the study is based on the cross sectional survey data of 214 consumers aged 18 years and above who have eaten out of home in the restaurants in Punjab for last three months before the data collection, analysed by partial least squares structural equation modelling (PLS-SEM).

A number of delimitations limited the results. The study focuses on the main component of the business, the restaurant part, and does not study other hospitality settings (such as hotels or café-only formats as separate segments), it does not measure actual revisit or purchase behaviour, and it does not model potential moderators (such as restaurant format, income tier or visit frequency). The cross-sectional design is unable to capture associations over time; the results are specifically generalizable to adult restaurant customers in the context of the Punjab.

1.8 Structure of the Thesis

This thesis is organized into four chapters, following this introduction. Chapter 2 conducts a literature review of green practices, perceived value, perceived consumer effectiveness and consumer satisfaction and formulates the study hypotheses and conceptual model. The research methodology is described in Chapter 3, which covers the research design, population and sampling, measurement instruments and data analysis strategy. The results of the measurement and structural model assessments are presented in Chapter 4. The conclusions of the study, the theoretical and managerial implications, and limitations of the study, future research directions and discussions about the findings are presented in chapter 5.

2. Literature Review and Hypothesis Development

2.1 Green Practices

Green practices are environmentally conscious operational strategies that are undertaken to reduce the ecological footprint of organisations. These are energy conservation, water efficiency, waste reductions, sustainable sourcing, elimination of one use plastic, and eco-friendly infrastructure in the case of restaurants (Chaturvedi et al., 2024). The construct is multidimensional and covers the three dimensions of operational, product and communicative. If restaurants do not connect all three, they risk having a “green gap” that will not be perceived or trusted by consumers.

González-Viralta et al. (2023) operationalized green practices as observable ecological commitments in food retail businesses, and found that the construct includes three components: energy management, sustainable procurement, and green communication with consumers, in a sample of Chilean supermarket customers, where PLS-SEM was used. However, the supermarket context restricts the transferability to full-service restaurant contexts. To conceptualize green practices in the fast-food industry in Indonesia, Mawardi et al. (2024) used the fast-food product as the basis, defining green practices with an eco-friendly fast-food product, thereby neglecting the process-oriented aspects of green practices that are gaining significance in developed markets, such as the management of kitchen energy consumption.

2.2 Perceived Value

Perceived value is the consumer's general evaluation of the value a product, service brings as compared to the price he, or she pays for the product or service (Zeithaml, 1988). In a sustainable restaurant setting, the construct can be extended to “green perceived value” which refers to the environmental value that a guest attributes to eating at a green restaurant (Riva et al., 2025). This evaluative judgement is not only influenced by the physical elements of the product, like price and food quality, but also the emotional and social values consumers assign to their purchase of goods and services from companies they believe are engaged in environmentally responsible business practices.

Shih et al. (2024) found that perceived value is a crucial link between sustainability perceptions and customer satisfaction, as sustainability perceptions did not significantly influence satisfaction without taking into account perceived value in their study on sustainable product consumers. They found that emotional and social value judgments are the main pathways by which sustainability perceptions can lead to satisfaction outcomes. In the stimulus–organism–response paradigm, perceived value serves as an “organism” which is a part of the internal evaluative process where green stimuli are evaluated prior to the generation of a behavioural or attitudinal response. If the green infrastructure projects are not communicated, then they are not perceived as having generated value and may not have been as successful as they could have been if they had been communicated through the lens of the consumer's interpretation of the project's purpose and success.

2.3 Perceived Consumer Effectiveness

Consumer effectiveness is consumers' belief that their purchasing decisions and consumption patterns can have a positive impact on solving environmental issues. Unlike environmental concern, which reflects a consumer's concern over environmental issues, perceived consumer effectiveness reflects whether a consumer feels that caring for the environment results in an impact. This is not an attitude, but it is a belief of efficacy that influences whether or not ecological concerns translate into consumption-related judgements and actions (Riva et al., 2025; Tanveer et al., 2024).

For the consumers who perceive their food choices as environmentally impactful, environmental sensitivity was found to have strong and positive effect on consumer satisfaction by Chaturvedi et al. (2024) in green restaurants. However, Gonzalez-Viralta et al. (2023) concluded that satisfaction was still a major consequence of green practices even for a much larger group of consumers, not just for eco-sophisticated groups. That is, this implies that while satisfaction effects may be produced with only moderate efficacy beliefs, the satisfaction pathway may be mediated by intermediate evaluative attributions rather than being direct.

2.4 Consumer Satisfaction

Consumer satisfaction in the food and restaurant sector is an aggregate of the affective reaction to the consumption experience, based on previous expectations held by the consumers, which they draw from the brand image, service quality, food quality, and environmental attributes (Chaturvedi et al., 2024; González-Viralta et al., 2023). In sustainability, it includes a “green satisfaction” element, which refers to a positive emotional response that emerges from when the restaurant makes operational decisions that resonate with the individual's eco-values (Mawardi et al., 2024). According to Chaturvedi et al. (2024), food safety, food sustainability, environmental sensitivity, and food quality were all positively and significantly affecting consumer satisfaction regarding the four sustainable restaurant practices dimensions. Satisfaction is a key factor in the service-profit chain: an outcome of perceived value and a driver of revisit intention, word-of-mouth, and willingness to pay (González-Viralta et al., 2023). With the growing focus on green identity in the restaurant industry, satisfaction is increasingly co-determined by whether or not there is a match between the environmental self-concept of the diner and the restaurant's demonstrated commitments to the environment.

2.5 Hypothesis Development

The theoretical framework of the link between green practices and perceived value and consumer satisfaction is based on the stimulus organism response framework, in which the green practices serve as the external stimulus, the perceived value is the internal evaluative organism, and satisfaction is the response. One of the most extensively studied links in the sustainability marketing value chain is the direct connection between green practices and consumer satisfaction. In the context of supermarket customers, González-Viralta et al. (2023) found that green practices positively and significantly influenced consumer satisfaction, and Chaturvedi et al. (2024) supported this for the restaurant industry, showing that food sustainability practices and environmental sensitivity were among the strongest determinants of satisfaction once food quality was controlled for. Green practices need to also create perceived value because consumers get both functional benefits and emotional and social value from the perceived commitment to the environment of an environmentally conscious business (Riva et al., 2025; Shih et al., 2024).

It is believed that perceived consumer effectiveness would largely be manifested in consumers' value judgement. When customers feel they affects the environment through their own actions, they are more likely to identify, understand and value green restaurant characteristics and so more likely to see these as meaningful value for them (Tanveer et al., 2024). The direct link between perceived consumer effectiveness and satisfaction is not as clear: While Chaturvedi et al. (2024) reported a positive direct link between these two variables, Mawardi et al. (2024) found no significant direct relationship between these variables, suggesting that the direct pathway might be weaker in price-sensitive markets. Last, perceived value was also a well-supported link between perceptions of sustainability and satisfaction: Shih et al. (2024) found that the direct path from sustainability perceptions to satisfaction was no longer significant after including perceived value.

This means that green stimuli and consumer attitudes have to be translated into a sense of meaning before satisfaction ensues. Based on this, we have the following hypotheses:

Model:

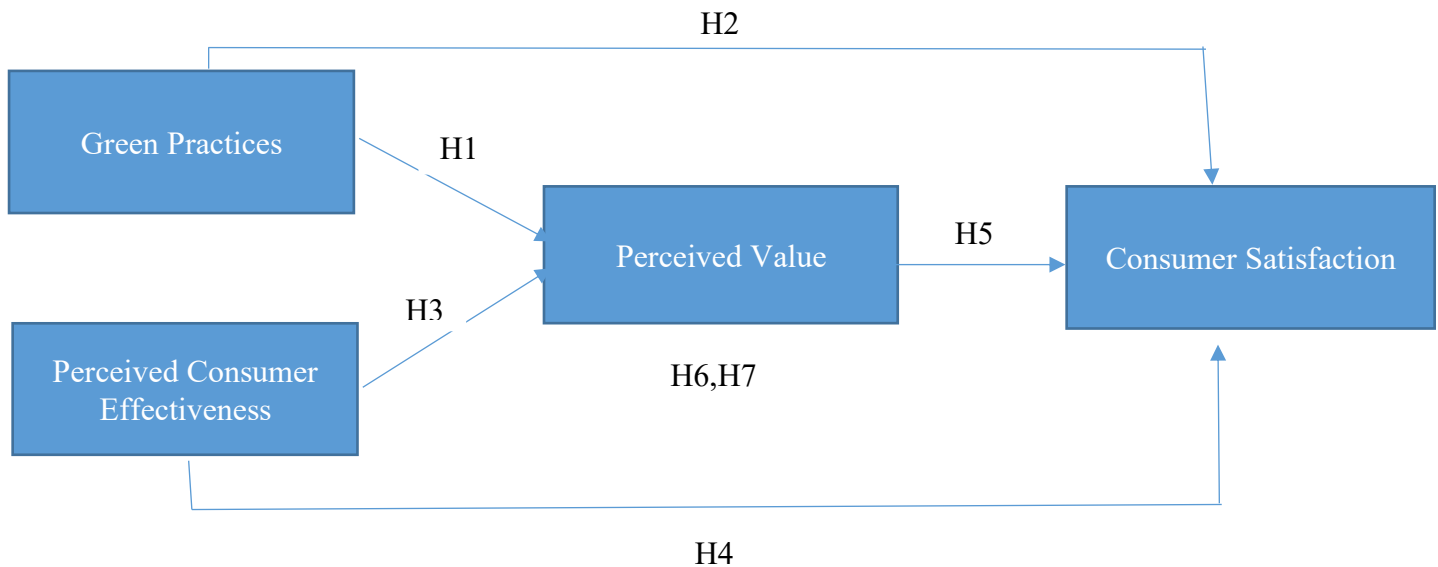


Figure 1. *Conceptual model of the study.*

- H1.** Green practices have a significant positive effect on perceived value.
- H2.** Green practices have a significant positive effect on consumer satisfaction.
- H3.** Perceived consumer effectiveness has a significant positive effect on perceived value.
- H4.** Perceived consumer effectiveness has a significant positive effect on consumer satisfaction.
- H5.** Perceived value has a significant positive effect on consumer satisfaction.
- H6.** Perceived value mediates the relationship between green practices and consumer satisfaction.
- H7.** Perceived value mediates the relationship between perceived consumer effectiveness and consumer satisfaction.

These hypotheses define a mediation model where green practices and perceived consumer effectiveness are the exogenous antecedents, perceived value is the mediating mechanism and consumer satisfaction is the focus of the outcome.

3. Methodology

3.1 Research Design

The current study is of a post-positivist paradigm, which assumes that the social reality is objective, measurable and independent of the researcher's interpretations (Saunders et al., 2019). In keeping with this perspective, the deductive approach to research was used, with the stimulus organism response framework and theory of planned behaviour as the theories to which the hypotheses

advanced from were derived. Green practices and the perceived effectiveness of the practices serve as stimuli, perceived value is the organism, and consumer satisfaction is the response.

The research approach used in this research is quantitative, cross-sectional survey type that is used to collect data from a large number of informants in one single time (Creswell & Creswell, 2018). This method is similar to the same studies conducted by Chaturvedi et al. (2024) and Mawardi et al. (2024) and can be used for testing hypotheses, latent variable measurement, and statistical generalization, but it is recognized that this does not necessarily imply causal relationships. A structured questionnaire was used to ensure measurement was standardized to allow subsequent multivariate analyses to test mediation and structural relationships (Hair et al., 2019).

3.2 Population, Sampling, and Participants

The target population was consumers aged 18 years and above who consumed at least once in the previous three months in the restaurants located in Punjab, Pakistan. This criterion had the advantage of having respondents with first-hand and recent experience of the restaurant environment and the ability to provide meaningful assessments of the value of green practices, perceived value, and satisfaction. The restaurant industry in Punjab is a growing business, due to the increasing urbanization, rising middle-class income and environmental awareness, which offers a contextually apt and attainable environment. Due to the non-ability of maintaining an enumerable list of population, it was decided to use a non-probability sampling method and a purposive and convenience-sampling technique was adopted; this method does not allow for statistical generalization but is widely used and justified in explanatory quantitative research in the hospitality literature, especially when testing structural models (Hair et al., 2019).

To reduce sampling bias, data was gathered at different types of restaurants (fast food, casual dining and café-style) and at different times of day. There were 203 valid responses. The final model yielded 17 indicators, which corresponds to a minimum sample size of 170, and follows the conservative minimum of 200 data points per model recommended by Hair et al. (2019) while also being lower than the initially targeted sample size of 300, further discussed in the limitations.

3.3 Data Collection and Measures

Primary data was gathered using self-administered structured questionnaires, developed by forward and backward translation to achieve conceptual equivalence (Mawardi et al., 2024), distributed using on-site administration by trained research assistants, and distributed online through Google Forms QR codes. Consent for participation was obtained from all participants prior to the survey, and respondents were assured of anonymity and of their voluntary participation in research in line with the standard procedure of ethical research.

The questionnaire had two parts: Sociodemographic data covered by Section A were gender, age, education, income, frequency of visits to restaurants, type of restaurant and knowledge about green awareness. The four constructs were measured with validated Likert-scale items with a 5-point scale ranging from one (strongly disagree) to five (strongly agree) for section B. The items for measuring green practices were adapted from Chaturvedi et al. (2024) and González-Viralta et al. (2023); the items for measuring perceived value were adapted from Shih et al. (2024); the items for measuring perceived consumer effectiveness were adapted from Tanveer et al. (2024); and the items for measuring consumer satisfaction were adapted from Chaturvedi et al. (2024) and González-Viralta et al. (2023). After screening and purification of the data, the 17 indicators were selected from the measurement model, consisting of five indicators for green practices (GP1, GP2, GP3, GP4 and GP5), four indicators for perceived consumer effectiveness (PCE1, PCE2, PCE3 and PCE4), three indicators for perceived value (PV1, PV2 and PV3), and finally five indicators

for consumer satisfaction (CS1, CS2, CS3, CS4 and CS5). The measurement sources are summarized in Table 1, which can be found in the Appendix.

Table 1. *Measurement sources and item allocation.*

Construct	Source	Items	Item codes
Green practices (GP)	Chaturvedi et al. (2024); González-Viralta et al. (2023)	5	GP1–GP5
Perceived consumer effectiveness (PCE)	Tanveer et al. (2024)	4	PCE1–PCE4
Perceived value (PV)	Shih et al. (2024)	3	PV1–PV3
Consumer satisfaction (CS)	Chaturvedi et al. (2024); González-Viralta et al. (2023)	5	CS1–CS5
Total		17	

3.4 Data Analysis Strategy

The data were screened for missing data, outliers, and common method bias, as well as computing descriptive statistics. The main method used in analysis was partial least square structural equation modelling (PLS-SEM) processed by SmartPLS 4 (Ringle et al., 2024). The researcher chose PLS-SEM because it can be used to handle prediction-oriented models, is not sensitive to multivariate normality, and is suitable for medium-sized samples as well as for complex mediation models (Hair et al., 2019).

The analysis adopted two stages “Methodological Best Practices” in testing structural models with mediation (Anderson & Gerbing, 1988; Hair et al., 2019). The measurement model was evaluated in the first stage by measuring the indicator reliability, internal consistency (Cronbach's alpha and composite reliability, $CR \geq 0.70$), convergent validity ($AVE \geq 0.50$), and discriminant validity (heterotrait–monotrait ratio of correlations, $HR \geq 0.70$, Henseler et al., 2015). In the second stage, the structural model was estimated using the path weighting scheme, and the significance of direct and indirect effects were evaluated by the bootstrapping procedure of 5000 subsamples and bias-corrected and accelerated (BCa) confidence interval, based on the recommended procedure for mediation analysis (Hayes, 2018; Preacher & Hayes, 2008). As a consequence of collecting all data from one source at one time, common method bias was addressed in the following ways: (1) respondent anonymity, (2) no correct or incorrect answers, and (3) the use of validated scales as reported by Podsakoff et al., 2003), and collinearity diagnostics were examined as reported in Section 4.3.

4. Results

4.1 Respondent Profile

203 usable responses were analysed. The following table (Table 2) gives the profile of the respondents with regard to the sociodemographic characteristics recorded in Section A of the questionnaire. Frequencies and percentages will be added to the table from the demographic data file when it is available; the SmartPLS dataset provided for analysis only included the 17 measurement indicators.

Table 2. *Respondent profile (n = 203).*

Characteristic	Frequency	%
Gender		
Male	100	49.2
Female	103	50.7
City		
Lahore	109	53.6
Gujrat	32	15.7
Lalamusa	8	3.9
Wazirabad	12	5.9
Khariyan	8	3.9
Okara	2	0.98
Multan	8	3.9
Sargodha	2	0.98
Jehlum	7	3.4
Dinga	4	1.97
Gujranwala	8	3.9
Faisalabad	3	1.47
Age group		
18–24 years	159	78.3
25–34 years	28	13.7
35–44 years	10	4.9
45–54 years	3	1.47
55 years and above	3	1.47
Education level		
Matriculation or below	4	1.97
Intermediate / A-Levels	148	73
Bachelor's degree	30	14.7
Master's degree	18	8.8
PhD or above	3	1.47
Monthly household income (PKR)		
Below 30,000	33	16.25
30,001–60,000	18	8.8

60,001–100,000	47	23.1
100,001–150,000	30	14.7
Above 150,000	75	36.9
Frequency of restaurant visits (per month)		
Rarely (once or less)	44	21.6
Occasionally (2–3 times)	75	36.9
Regularly (4–6 times)	49	24.1
Frequently (7 or more times)	35	17.2
Type of restaurant most often visited		
Fast food / Quick service	101	49.7
Casual dining	21	10.3
Fine dining	49	24.1
Café / Bakery	14	6.8
Street food stall	15	7.3
Awareness of green / eco-friendly restaurants		
Not aware at all	56	27.5
Slightly aware	58	28.5
Moderately aware	57	28.1
Very aware	23	11.3
Extremely aware	9	4.4

4.2 Measurement Model

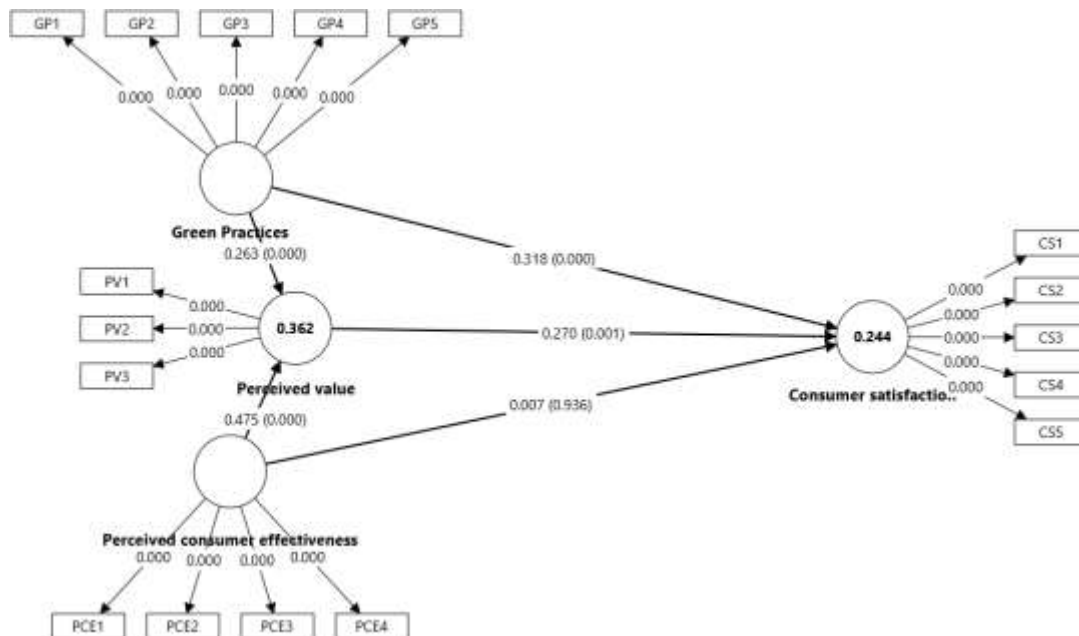
The reliability of the indicators was tested by the outer loadings value above 0.708 (Hair et al., 2020). The loading values ranged from .655 to .858 and were all significant at $p < .001$ (Table 3) with 5,000 samples of the two tailed bootstraps. Another item (GP3, $\lambda = 0.655$) was below the 0.708 cut-off, but was retained based on the case-by-case guidance for retention from Hair et al. (2022) as the construct's composite reliability was above the recommended cut-off and the item's AVE was above the recommended cut-off when added to the construct. Construct reliability was satisfactory: Cronbach's alpha ranged from 0.730 to 0.844, ρ_A from 0.731 to 0.854, and ρ_C from 0.847 to 0.889, all within the recommended 0.70–0.95 band (Hair et al., 2020). AVE scores ranged from 0.539 to 0.649, which is all higher than the value of 0.50, and resulted in convergent validity (Fornell & Larcker, 1981).

Table 3: Descriptive statistics, composite reliability and validity.

Construct/Item	Mean	SD	Kurtosis	Skewness	Outer loadings	α	ρ_A	ρ_C	AVE
Green Practices (GP)						0.790	0.793	0.856	0.544
GP1	3.217	1.042	0.093	-0.918	0.758				
GP2	3.522	0.984	0.882	-0.984	0.747				

GP3	3.768	0.910	2.088	-1.302	0.654				
GP4	3.305	0.995	0.184	-0.765	0.744				
GP5	3.355	0.999	0.281	-0.700	0.780				
Perceived Consumer Effectiveness (PCE)						0.767	0.773	0.851	0.589
PCE1	2.542	0.905	-0.617	0.075	0.800				
PCE2	3.236	0.954	-0.371	-0.318	0.761				
PCE3	3.187	1.014	-0.528	-0.355	0.784				
PCE4	2.773	1.026	-0.472	0.053	0.722				
Perceived Value (PV)						0.726	0.729	0.846	0.646
PV1	3.148	1.030	-0.406	-0.382	0.805				
PV2	3.227	0.946	-0.123	-0.644	0.838				
PV3	3.128	1.116	-0.806	0.002	0.768				
Customer Satisfaction (CS)						0.846	0.856	0.891	0.620
CS1	3.010	1.050	-0.423	-0.020	0.859				
CS2	3.118	0.955	-0.345	-0.103	0.782				
CS3	3.153	0.963	-0.538	-0.078	0.761				
CS4	3.069	1.053	-0.499	-0.062	0.797				
CS5	3.034	1.075	-0.379	-0.141	0.732				

Notes: SD = Standard deviation; Kurtosis = excess kurtosis; α = Cronbach's alpha; ρ_A = composite reliability (ρ_a); ρ_C = composite reliability (ρ_c); AVE = Average variance extracted. All outer loadings are significant at $p < 0.001$ based on 5,000 two-tailed bootstrapping samples. GP = Green Practices; PCE = Perceived Consumer Effectiveness; PV = Perceived Value; CS = Customer Satisfaction.



The heterotrait–monotrait ratio of correlations (HTMT; Henseler et al., 2015) was used to test for discriminant validity. All values of HTMT were below the conservative 0.85 criterion, with the greatest correlation between perceived consumer effectiveness and perceived value being 0.720 (Table 4), which was below the criterion and indicated discriminant validity. The standardized root mean square residual (SRMR) is 0.081, slightly exceeding the strict threshold of 0.080 but still within the more lenient threshold of 0.100 for variance-based SEM, and the measurement model showed good reliability and validity, so it was deemed to be good for the current study’s predictive purposes.

Table 4: Discriminant validity check using the HTMT85 criterion.

Construct	1	2	3	4
(1) Green Practices	–			
(2) Perceived Consumer Effectiveness	0.336	–		
(3) Perceived Value	0.513	0.729	–	
(4) Customer Satisfaction	0.510	0.285	0.500	–

Notes: HTMT = Heterotrait-monotrait ratio based on PLS algorithm and path weighting scheme. All values are below the 0.85 threshold, supporting discriminant validity.

4.3 Structural Model

Multicollinearity did not appear to be a problem in the structural estimates, as the inner variance inflation factor (VIF) values ranged from 1.070 to 1.515, which is much under 3.0 (Hair et al., 2020). The path coefficients were estimated based on 5,000 bootstrap subsamples with BCa values of the confidence intervals and the effect sizes were interpreted according to the conventional benchmarks of f^2 (Cohen, 1988). The results are presented in the following table (Table 5).

Green practices had a positive and significant effect on perceived value ($\beta = 0.228$, $p = .001$, $f^2 = 0.073$), supporting H1, and on consumer satisfaction ($\beta = 0.325$, $p < .001$, $f^2 = 0.123$), supporting H2. In the model, perceived consumer effectiveness had the highest impact on perceived value (β

= 0.481, $p < .001$, $f^2 = 0.328$) which confirmed H3. The direct effect of perceived consumer effectiveness on consumer satisfaction, however, was not significant ($\beta = 0.007$, $p = .929$, $f^2 = 0.000$) and the confidence interval was within the zero range; thus the hypothesis H4 was not supported. This is not a sign of the absence of an effect of perceived consumer effectiveness; in fact, it is the statistical evidence of full mediation—the total effect of perceived consumer effectiveness on consumer satisfaction is the result of the relationship between perceived consumer effectiveness and perceived value being almost completely mediated by the latter. H5 was supported by the perceived value positively influencing consumer satisfaction ($\beta = .278$, $p = .001$, $f^2 = .068$).

About the mediating hypotheses, the perceived value significantly mediated the relationship between green practices and consumer satisfaction ($\beta = 0.063$, $p = .016$, 95% BCa CI [0.020, 0.123]), supporting H6, and the perceived consumer effectiveness significantly mediated the relationship between the perceived value and consumer satisfaction ($\beta = 0.134$, $p = .002$, 95% BCa CI [0.056, 0.229]), supporting H7. Indirect relationship of PCE–satisfaction was significant, and direct relationship was non-significant and, so, perceived value fully mediated the relationship between PCE and satisfaction, while partially mediated the path between green-practices and satisfaction, which direct path was significant. The model accounted for 34.0% of the variance in perceived value ($R^2 = 0.340$) and 25.0% of the variance in the perception of consumer satisfaction ($R^2 = 0.250$).

Table 5: Structural model test results.

Path	VIF	f^2	Path coefficient (p-value)	t-values	CI	Conclusion
<i>Direct effects</i>						
GP → PV	1.078	0.100	0.263(0.000)	3.865	[0.112; 0.384]	Supported
GP → CS	1.186	0.113	0.318(0.000)	4.293	[0.155; 0.452]	Supported
PCE → PV	1.078	0.329	0.475(0.000)	7.474	[0.336; 0.590]	Supported
PCE → CS	1.432	0.000	0.007(0.936)	0.081	[-0.153; 0.166]	Not supported
PV → CS	1.568	0.061	0.270(0.001)	3.208	[0.100; 0.426]	Supported
<i>Mediating (indirect) effects</i>						
GP → PV → CS			0.071(0.010)	2.569	[0.025; 0.134]	Supported
PCE → PV → CS			0.128(0.004)	2.860	[0.047; 0.224]	Supported
R^2						<i>Adjusted R²</i>
PV			0.362			0.356
CS			0.244			0.233

Notes: GP = Green Practices; PCE = Perceived Consumer Effectiveness; PV = Perceived Value; CS = Customer Satisfaction; VIF = inner model variance inflation factor; CI = Confidence interval bias corrected based on 5,000 samples and two-tailed bootstrapping test. Model fit: SRMR = 0.082; NFI = 0.720.

4.4 Robustness checks

To test for possible nonlinear relationships a recommended robustness check (Hair et al., 2019) a quadratic effect (QE) term was added to each structural path following the two-stage approach

described by Sestet et al. (2020) and Hair et al. (2024). As shown in Table 6, none of the quadratic terms were significant in the two-tailed bootstrap test (5,000 subsamples) and all effect sizes were small ($f^2 \leq 0.025$), indicating the strength of the linear specification. The inclusion of the five quadratic terms increased the amount of variance explained by only slightly less than 1% for perceived value (0.362 to 0.379) and consumer satisfaction (0.244 to 0.249). Interestingly, the direct effect of perceived consumer effectiveness on consumer satisfaction (H4) was not significant, but the quadratic term was not significant either, which means that this relationship is not curvilinear but fully mediated by perceived value. The quadratic specification of the perceived-consumer-effectiveness pathway, QE (PCE) $\rightarrow$ PV ($\beta = -0.128$, $p = .073$), was only marginally below conventional levels of significance and its confidence interval included zero, so the linear specification of the perceived-consumer-effectiveness pathway is maintained.

Table 6. Testing for possible nonlinear effects.

Quadratic term	β (p-value)	T	95% CI	f^2	Result
QE (GP) $\rightarrow$ PV	-0.014 (.872)	0.161	[-0.154, 0.202]	0.000	n.s.
QE (PCE) $\rightarrow$ PV	-0.128 (.073)	1.791	[-0.264, 0.020]	0.025	n.s.
QE (GP) $\rightarrow$ CS	-0.080 (.374)	0.889	[-0.257, 0.093]	0.005	n.s.
QE (PCE) $\rightarrow$ CS	0.007 (.930)	0.088	[-0.140, 0.164]	0.000	n.s.
QE (PV) $\rightarrow$ CS	-0.027 (.738)	0.334	[-0.217, 0.112]	0.001	n.s.

Note. n.s. = not significant. GP = green practices; PCE = perceived consumer effectiveness; PV = perceived value; CS = consumer satisfaction; QE = quadratic effect. Quadratic terms were generated using the two-stage approach and entered simultaneously. Confidence intervals are bias-corrected and accelerated, based on 5,000 two-tailed bootstrap subsamples.

5. Discussion

5.1 Discussion of Findings

This study aimed to explore if green practices and perceived consumer effectiveness influence consumer satisfaction of restaurant consumers in Punjab, Pakistan and if the perceived value of green practices acts as a mediating variable. Of the seven hypotheses, six were accepted and the overall pattern of results give a coherent story for how sustainability works in this market.

First, both antecedents were significant predictors of perceived value (H1 and H3), but with significantly varying relative weights: perceived consumer effectiveness was a by far strong predictor of perceived value ($\beta = 0.481$, $f^2 = 0.328$ – a large effect) and green practices contributed a smaller but still significant share. This asymmetry has been consistent with the stimulus–organism–response logic of the model, whereby the value that the diner derives from the eco-friendly restaurant is largely determined by their internal assessment of whether their actions actually make a difference to the environment, but the restaurant's readily observable practices have a supportive rather than primary influence on the internal value judgment of the diner (Riva et al., 2025; Tanveer et al., 2024).

Second, the two antecedents act in different ways to the consumer satisfaction. The direct effect of green practices on satisfaction (H2; $\beta = 0.325$) and perceived value (H6; $\beta = 0.314$) described a pattern of partial mediation and the biggest total effect in the model. Perceived consumer effectiveness, in comparison, did not show any significant direct effect on satisfaction (H4 was rejected; $\beta = 0.007$), but did show a significant indirect effect on satisfaction through perceived

value ($H7$; $\beta = 0.134$), indicating full mediation. In substance, perceived effectiveness of consumers alone is not a satisfactory satisfaction: when customers understand that their individual decisions can affect the environment, they will only feel satisfied if they derive meaningful value from the restaurant because of that perception. Green practices, however, that are visible, on the other hand, are experienced and quality cues that directly influence satisfaction, and they provide the value judgment that has a larger affect (González-Viralta et al., 2023).

The non-significance of the direct path from PCE to satisfaction ($H4$) deserves special mention, as this relationship is not an anomaly, but is expected. There are three reasons for this reading. First, it is exactly what full mediation would expect; the near zero direct mediation effect ($\beta = 0.007$) with a large indirect effect ($H7$), suggests that perceived value completely mediates between the influence of perceived consumer effectiveness. First, it is the pattern that full mediation would predict, with the near zero direct effect ($\beta = 0.007$) and a large indirect effect ($H7$), which suggests that perceived value absorbs the influence of perceived consumer effectiveness almost entirely. Secondly, it is logically consistent. Consumer effectiveness is a distal attribute or belief of consumers, and it will not create satisfaction until it has something to be satisfied about, as experienced in the actual dining situation. If a diner believes that his or her eating decisions have environmental impact, then there is no reason to be satisfied with a restaurant if he does not really feel that the restaurant is environmentally valuable. Third, the findings align with the previous research: Shih et al. (2024) also determined that the perceived value influenced satisfaction instead of the sustainability perceptions directly, while Mawardi et al. (2024) also found that perceived value indirectly affected the intention to purchase eco-friendly products through affective commitment. Rather than undermining the model, the finding that $H4$ was not supported underscores its main assertion that perceived value is not simply one way in which perceived consumer effectiveness leads to satisfaction; it is the only way seen in these data.

Third, the model explained significant proportions of variance in perceived value ($R^2 = 0.340$) and consumer satisfaction ($R^2 = 0.250$) and perceived value itself significantly predicted consumer satisfaction ($H5$: $\beta = 0.278$). Combined with the mediation results, the findings bring perceived value as the main psychological channel that is found to be the mediator for green stimuli and the consumers' disposition to satisfaction outcomes in this market.

5.2 Theoretical Implications

There are three theoretical contributions. Most obviously, it addresses the debatable path from sustainability to satisfaction as found in the marketing literature. In addition, the results support the mediation role of perceived value in the relationship between sustainability-related antecedents and satisfaction, while adding a qualification of the direct effect findings of Chaturvedi et al. (2024) and González-Viralta et al. (2023) by demonstrating that perceived value mediates differently in the relationship with the two types of antecedents, implying that if the antecedent is placed in the Restaurant, it operates directly on satisfaction, whereas if it is placed in the Consumer, it exists only through perceived value. In addition, this study extends the stimulus–organism–response (S–O–R) model and theory of planned behaviour to an emerging-market restaurant context and shows that the organism stage (perceived value) is a critical link in the process of turning consumers' beliefs about their environment (environmental efficacy) into satisfaction. Thirdly, it provides scarce data from Pakistan, which helps balance the geographic focus of the literature largely dominated by Chilean, Indian, Indonesian and Mongolian examples.

5.3 Managerial Implications

The results suggest that for restaurant owners, the value to be derived from green practices goes beyond the compliance mandate, as there are two pathways by which this benefit is realized: First, by being visible, the eco message benefits the customer, and second, by influencing value judgments, which are more convincing. While there are some eco-conscious consumers in existence, it is not the task of the practitioner to look for them; it is the task of the practitioner to make them feel the value of their choice, because of which they feel satisfied with this choice. This perceived value arises only if the perceived effectiveness of the consumer's choice is influenced by this. A restaurant that implements green roof or other green building measures without communicating its efforts to its customer base runs the risk of creating value for its customer that falls short of the value of its investment. In a market, that is witnessing a remarkable growth in the restaurant business, and where green identity is not yet seen as a minimum requirement, there is plenty of room for value-communicating green strategies, in the case of Punjab.

5.4 Limitations and Future Research

These conclusions are subject to a number of qualifications. The cross-sectional design does not allow for causal precedence but longitudinal or experimental designs would allow stronger causal inferences to be drawn on how value judgments are formed and transformed over time. This was a non-probability purposive and convenience sample, which is suitable given that a sampling frame was not available, but the 214 responses received were considered adequate for PLS-SEM, and would have been more representative if a larger probability, based sample had been reached, with the initial target set at 300. Although procedures were taken to reduce common method variance (e.g., respondent anonymity; Podsakoff et al., 2003), all constructs were self-reported and satisfaction was not measured by revisit behaviour. Three items were used to measure perceived value, and this model's SRMR (0.081) was close to the strict 0.080 cut-off. For future research, there is a need to examine perceived consumer effectiveness as a moderator of the green-practices – satisfaction relationship in addition to its role as a predictor; explore the relationship between perceived consumer effectiveness and other construct of the model in the future; and replicate the study in other markets of South Asia.

5.5 Conclusion

Using survey data from 203 restaurant consumers in Punjab, Pakistan, this study tested an integrated mediation model of green restaurant marketing. Perceived value was the most significant predictor of perceived consumer effectiveness, which, in turn, directly predicted consumer satisfaction, while green practices directly predicted consumer satisfaction through perceived value. The results validate perceived value as a key intermediate step between green stimuli and satisfaction in an under-researched new area of the marketplace, and reveal that in being an intermediate step, perceived value is an antecedent-specific process, which explains the mixed findings in the literature recently.

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Appendix: Survey Instrument

Impact of Green Practices on Consumer Satisfaction in the Restaurant Industry

Section A: Demographic information. Respondents selected the most appropriate option for each item: gender (male; female; prefer not to say), age group (18–24; 25–34; 35–44; 45–54; 55 and above), education level (matriculation or below; intermediate / A-Levels; bachelor's degree; master's degree; PhD or above), monthly household income (PKR: below 30,000; 30,001–60,000; 60,001–100,000; 100,001–150,000; above 150,000), frequency of restaurant visits per month, type of restaurant most often visited, and awareness of green / eco-friendly restaurants.

Section B: Measurement scales. All items were rated on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Table A1. *Measurement items.*

Item	Wording
GP	Green practices (Chaturvedi et al., 2024; González-Viralta et al., 2023)
1	This restaurant uses energy-efficient equipment and appliances (e.g., LED lighting, efficient cooking appliances).
2	This restaurant actively reduces food waste through responsible kitchen management and portion control.
3	This restaurant sources its food ingredients from local and sustainable suppliers.
4	This restaurant uses eco-friendly or biodegradable packaging and has eliminated single-use plastics.
5	This restaurant engages in water conservation practices (e.g., efficient dishwashing, low-flow fixtures).
PV	Perceived value (Shih et al., 2024)
6	Dining at this restaurant gives me good value for my money given its eco-friendly offerings.
7	I feel that this restaurant's green practices provide genuine environmental benefits.
8	Overall, I consider the environmental value I receive from this restaurant to be worth the price I pay.
PCE	Perceived consumer effectiveness (Tanveer et al., 2024)
9	I believe that my individual choices as a consumer can make a real difference to environmental problems.
10	There is a great deal that I personally can do to reduce the environmental impact of my consumption.
11	By choosing restaurants that follow green practices, I can personally contribute to protecting the environment.
12	My decision to support eco-friendly restaurants has a genuine effect on the environment.
CS	Consumer satisfaction (Chaturvedi et al., 2024; González-Viralta et al., 2023)
13	Overall, I am satisfied with my dining experience at this restaurant.

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| 14 | This restaurant meets my expectations with respect to the quality of its food and service. |
| 15 | The eco-friendly atmosphere and practices of this restaurant enhance my dining satisfaction. |
| 16 | I feel positive about patronizing a restaurant that actively cares for the environment. |
| 17 | I would rate my overall satisfaction with this restaurant as high. |
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