



Tourist Satisfaction Analysis Based on SEM Model – A Case Study of Hunza Valley

Muhammad Haroon^a, Su long gao wa^{b*}

a,b Department of Tourism Inner Mongolia Normal University Hohhot, China

Abstract: With the development of Pakistan's tourism industry, many ecologically protected areas have experienced varying degrees of tourist-driven exploitative development, but there exists both a mutually beneficial relationship and contradictions between ecological protection and tourism development. This paper focuses on the Hunza Valley in the Gilgit-Baltistan region of Pakistan. By conducting on-site survey questionnaires and SEM model analysis, the study found that the ecological tourism development in Hunza Valley significantly impacts overall tourist satisfaction, followed by tourism infrastructure, management quality, and services. The study also reveals that transportation conditions in the area do not significantly affect tourist satisfaction, and that tourist satisfaction determines the repeat visitation rate. In conclusion, this research suggests that ecological tourism plays a significantly positive role in developing the tourism industry. Areas like the Hunza Valley, which primarily rely on ecological resources, should prioritize enriching communication and display methods for ecological tourism, strengthen the quality of tourism services and product offerings, and thus achieve coordinated conservation and development under the premise of protection.

Keywords: Tourist satisfaction, structural equation modeling, ecotourism development, Hunza valley, destination loyalty

1. Introduction

In the 1990s, as customer value theory was gradually introduced into the tourism industry, the notion of customer-perceived value was expanded and attracted extensive attention from the academic community worldwide (Foster, 1999). Customer loyalty theory suggests that customer value and satisfaction, as significant prior variables that determine customer brand loyalty, have become a primary focus in exploring the driving factors of customer loyalty. Against the backdrop of increasing pressure on tourists in current ecological tourism areas, this provides a solid foundation for examining the role of customer loyalty formation in these areas. It not only offers a new cognitive path for scientifically managing tourists in ecological tourism areas but also has practical significance for improving the quality of sustainable development in these areas. Although there has been extensive research on tourist loyalty in tourist areas, studies specifically focusing on the Hunza Valley ecological tourism area are relatively scarce. Given this, the present study selects the Hunza Valley, a key ecological tourism area in Pakistan's Gilgit-Baltistan region, as the research site. Firstly, it constructs a multidimensional factor structure for tourists' perceived value of the Hunza Valley and uses it as an important antecedent variable to explore tourist loyalty in ecological tourism areas. Simultaneously, it introduces tourist satisfaction as a mediating variable and employs structural equation modeling to identify the relationships among tourist loyalty and other factors in ecological tourism areas.

2. Literature Review

The concept of tourist perceived value is primarily derived from the interpretation of customer value in marketing, where customer value is regarded as a strategic tool for attracting and retaining customers and as a key factor in service providers' success (Zeithaml, 1988; Zeithaml et al., 1996). Customer value was initially understood as a balance between what a product delivers and what is received in return (Dodds & Monroe, 1985). Research has also examined the influence of residents' engagement in ecotourism on their ecological behaviors, using questionnaire data from ecotourism demonstration villages in western China and applying

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Corresponding email: 13171001321@162.com (Su long gao wa)

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the PLS-SEM model to address measurement misspecification ([Ren et al., 2021](#)). One of the most representative viewpoints defines customer value as the overall evaluation customers make of a product or service's utility, based on a comparison of the benefits obtained and the costs incurred. A larger gap between perceived “gains” and “losses” indicates greater customer value, meaning that the product or service is more valuable to the customer ([Zeithaml, 1988](#)).

At present, customer perceived value is mainly interpreted from two perspectives: the “loss-gain contrast theory” and the “utility evaluation theory.” The former refers to the basic outcomes customers perceive when evaluating what they gain and what they lose from purchasing a product or service. At the same time, the latter emphasizes the overall evaluation of a product or service's utility based on the comparison of perceived gains and losses. Compared with the loss-gain contrast theory, the utility evaluation theory better reflects customers' value demands during consumption.

The literature generally defines tourist-perceived value as an extension of customer-perceived value, referring to the value tourists perceive when consuming tourism products or services. The conceptualization of tourist perceived value continues to adopt the core structure of customer value while incorporating tourists' specific preferences for tourism products and services. Based on utility evaluation theory, tourists' perceived value in an ecotourism destination reflects their overall assessment of the experiential utility of ecotourism products or services. This evaluation is based on a comparison and balance between the total perceived benefits gained throughout the ecotourism experience and the total perceived costs incurred when purchasing and consuming tourism products or services.

Studies on tourist perceived value have examined its dimensions in various tourism contexts. Research on community-based family tourism categorized tourists' perceived value into five dimensions: functional value (facilities), functional value (price), experiential value (host-guest interaction), experiential value (activities, culture, and knowledge), and emotional value, indicating that functional, experiential, and emotional factors are critical to enhancing overall tourist value ([Jamal et al., 2011](#)). Other studies explored the perceived value of Asian cruise passengers and its impact on satisfaction and behavioral intentions, identifying four sub-dimensions of cognitive perceived value – facilities, food and dining, entertainment, and staff – and confirming that perceived value significantly affects tourist satisfaction and behavioral intentions ([Yi et al., 2014](#)). Research on wetland ecological parks further identified six dimensions of tourist perceived value: environment, distinction, service, management, knowledge education, and cost ([Lee et al., 2020](#)).

Customer loyalty theory suggests that customer-perceived value is the most important antecedent of loyalty toward enterprise products and services ([Parasuraman & Grewal, 2000](#)). This indicates that perceived value directly drives customer loyalty. In practice, whether an ecotourism destination can maintain a sustainable competitive advantage largely depends on its ability to cultivate and retain tourist loyalty continuously. Research on loyalty since the 1990s has generally distinguished between attitudinal loyalty and behavioral loyalty. Behavioral loyalty refers to the frequency with which tourists participate in tourism activities, use tourism facilities, and consume tourism services, reflecting consistency in revisiting and repurchase behaviors. In contrast, attitudinal loyalty reflects tourists' emotional preferences for tourism products and destinations ([Backman & Crompton, 1991](#)). Empirical studies have demonstrated that tourist perceived value has a significant positive effect on revisit intention ([Lee et al., 2007](#); [Petrick, 2002](#)). Accordingly, higher perceived value generated during the consumption of tourism products and services is a prerequisite for fostering tourist loyalty to ecotourism destinations.

Customer satisfaction is defined as the cumulative evaluation of customers' purchasing experiences with a specific product or service ([Fornell, 1992](#)). When customers are satisfied, they are more likely to repeat their purchases, leading to sustained consumption behavior ([Garbarino & Johnson, 1999](#); [Khan, 2013](#); [Mittal & Kamakura, 2001](#)). Research indicates that customer perceived value directly influences customer satisfaction and repurchase intention ([Oh, 1999](#)), and that customer value acts as an antecedent to satisfaction, behavioral intentions, and customer loyalty ([Cronin et al., 2000](#); [Dodds & Monroe, 1985](#)).

In tourism research, tourist satisfaction is often regarded as a key determinant of revisit intention and word-of-mouth recommendations, thereby influencing tourist loyalty ([Yoon & Uysal, 2005](#)). High perceived service



quality significantly affects tourist satisfaction and, in turn, determines tourists' intentions to revisit and recommend a destination (Alegre & Juaneda, 2006). Empirical evidence also shows that tourists' perceived value indirectly and positively influences destination loyalty through the mediating effect of satisfaction (Chi & Qu, 2008). Based on this literature, the present study focuses on tourists' perceptions of management quality and service, tourism infrastructure, transportation conditions, environment and ambiance, ecosystem conservation and presentation, and overall tourist satisfaction.

3. Survey data on Tourist Satisfaction at Hunza Valley

3.1 Evaluation Model and Questionnaire Design

In 1989, the Swedish Customer Satisfaction Barometer was introduced as a tool for enterprises to evaluate their efforts in achieving customer satisfaction (Fornell et al., 1996). Its positive outcomes subsequently inspired the development of the American Customer Satisfaction Index, which has since become one of the most widely adopted theoretical models for measuring customer satisfaction worldwide. This model integrates multiple factors—such as customer expectations, post-purchase perceptions, purchase price, customer loyalty, and customer complaints—into a coherent econometric framework.

A questionnaire survey conducted at a major tourist destination in Eureka Springs, Arkansas, demonstrated that destination image directly influences attribute satisfaction, and that both destination image and attribute satisfaction directly impact overall satisfaction. Furthermore, overall satisfaction and attribute satisfaction were found to positively influence destination loyalty. The main body of the questionnaire consisted of 26 observable indicators across six structural variables, which are summarized in Table 1. A 7-point Likert scale was used to quantify these indicators, with response options ranging from 7 (Very Satisfied), 6 (Satisfied), 5 (Basically Satisfied), 4 (Neutral), 3 (Basically Dissatisfied), 2 (Unsatisfied), to 1 (Very Unsatisfied).

Table 1: Observable variables include:

Q1 Ecological conservation status	Q2 Interpretive signage within the scenic area
Q3 Richness of ecological and cultural displays	Q4 Scenic beauty
Q5 Tourist density in the area	Q6 Honesty of small vendors
Q7 Commercialization level within the area	Q8 Hygiene quality of the environment
Q9 Convenience of tourist shuttle buses	Q10 Arrangement of scenic tour routes
Q11 Pricing of tour transportation	Q12 Safety of tour transportation
Q13 Availability of public toilets	Q14 Public leisure facilities within the area
Q15 Signage and directional indicators	Q16 Safety facilities within the area
Q17 Basic infrastructure, including communication	Q18 Tourism advisory services
Q19 Tourism complaints	Q20 Proactiveness of staff service
Q21 Flexibility of staff service	Q22 Timeliness of staff service
Q23 Overall impression of Hunza Valley	Q24 Expenditures within the scenic area

3.2 Sample Selection and Data Collection

This study targets tourists who have physically visited the Hunza Valley. The questionnaire is designed from the tourists' perspective and is subsequently analyzed. For research purposes and subsequent analysis, it is generally recommended to have a sample size at least 10 times the number of questionnaire items. With a total of 30 questions in the measurement tool for this study, a minimum of 300 samples is suggested. In this study, 330 questionnaires were distributed, yielding 312 usable responses, for an effective response rate of approximately 95%. The survey was conducted online using the popular survey tool SurveyMonkey, and the survey period was from October 2023 to November 2023.

3.3 Demographic Characteristics Analysis of Tourists

Among the 312 collected samples, the gender distribution is approximately equal, with 58% (181 samples) being male and 42% (131 samples) female. In terms of age, 78% of respondents in the effective questionnaires fall within the 20-40 age group. Regarding education, the highest proportion is among the college-educated, accounting for 48%. The following are high school and vocational high school at 26%, those with education beyond college at 11.8%, and junior high school at 6.4%. The samples obtained in this study encompass various educational backgrounds.

In terms of occupation, the highest proportion is professional and technical personnel at 23.4%, followed by service and sales personnel at 16.3%. Most respondents have a monthly income of 200-400 US dollars, accounting for 37.5%.

3.4 Overall Tourist Satisfaction

Overall, tourists are relatively satisfied with their trip to the Hunza Valley, with 70.8% rating it as "basically satisfied" or "satisfied." Additionally, 13.4% of tourists rated their experience as "very satisfying," indicating generally positive perceptions of the Hunza Valley. These satisfaction levels are illustrated in Figure 1, which summarizes the distribution of tourists' overall satisfaction ratings.

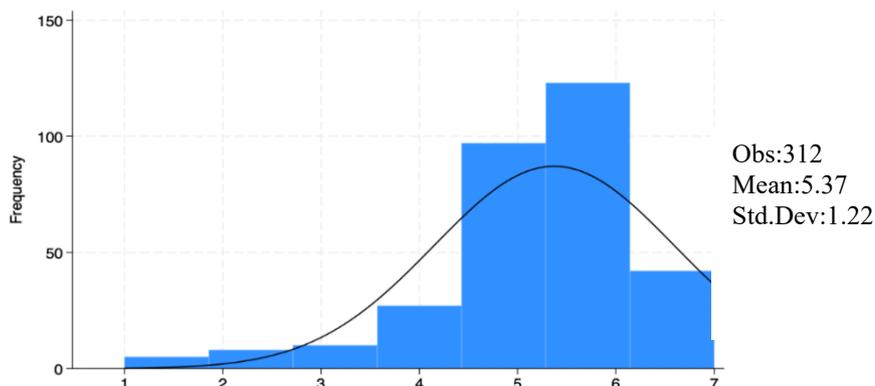


Figure 1: Histogram of the Mean Distribution of Overall Tourist Evaluation of the Hunza Valley

Satisfaction with Destination Elements

According to the survey results, tourists express high satisfaction with the ecological conservation status of the Hunza Valley, the richness of ecological and cultural displays, tourist density in the area, honesty of small vendors, arrangement of scenic tour routes, pricing of tour transportation, tourism advisory services, and overall impression of Hunza, all scoring above 5.2 points on average. However, the availability of public toilets and public leisure facilities within the area is relatively low, with scores below 4.8. During the survey, many tourists noted that there are few information boards in the Hunza Valley, leading to a lack of clarity about tour routes for visitors. These results are summarized in Table 3, which presents the mean scores for each surveyed attribute.

4. Factor Analysis and Reliability Analysis

4.1 Kaiser-Meyer-Olkin (KMO) Sample Adequacy Measure and Bartlett's Sphericity Test

To identify the primary factors influencing tourist satisfaction, a KMO sampling adequacy and Bartlett's test of sphericity were examined on the 21 measurement items. The results are presented in Table 2.

Table 2: KMO Measure of sampling adequacy and Bartlett's test of sphericity

KMO Measure of Sampling Adequacy		.902
	Approx. Chi-Square	3120.424
Bartlett's test of sphericity		
	df	278
	Sig.	.000



The results indicate that the KMO value for the sample is 0.902, suggesting a high level of correlation among the variables and indicating that the data are suitable for factor analysis. Additionally, the significance probability for Bartlett's sphericity test on the survey results is 0.000, which is less than 0.01. The rejection of the spherical hypothesis suggests that factor analysis is appropriate.

Table 3: Tourists' Perceived Satisfaction Evaluation of the Elements of the Hunza Valley

Variable	Obs	Mean	Std. dev.	Min	Max
Q1	312	4.862179	1.895225	1	7
Q2	312	5.060897	1.778618	1	7
Q3	312	5.221154	1.708444	1	7
Q4	312	5.060897	1.544457	1	7
Q5	312	5.423077	1.705065	1	7
Q6	312	5.285256	1.758409	1	7
Q7	312	4.907051	1.882654	1	7
Q8	312	5.009615	1.77783	1	7
Q9	312	4.814103	1.842005	1	7
Q10	312	5.24359	1.469395	1	7
Q11	312	5.224359	1.463703	1	7
Q12	312	4.932692	1.815959	1	7
Q13	312	4.605769	1.707285	1	7
Q14	312	4.538462	1.789159	1	7
Q15	312	4.951923	1.494124	1	7
Q16	312	5.051282	1.638739	1	7
Q17	312	4.842949	1.644737	1	7
Q18	312	5.266026	1.309034	1	7
Q19	312	5.112179	1.612924	1	7
Q20	312	4.871795	1.790356	1	7
Q21	312	4.804487	1.763395	1	7
Q22	312	4.951923	1.667043	1	7
Q23	312	5.36859	1.563873	1	7
Q24	312	4.88141	1.686539	1	7

4.2 Factor Extraction

The primary goal of factor analysis is to unravel a few latent, unobservable factors hidden within many observable variables. By condensing numerous original observed variables into a few factors through factor analysis, researchers can use these factors instead of the original observed variables for further statistical analysis. The results of the factor analysis indicate that one observed variable, "Tourism complaints," has a relatively low factor loading of 0.413. However, it does not meet the deletion criteria (factor loading below 0.4). After organizing the factor analysis results, 22 observed variables were extracted into 5 main factors: Management Quality and Service (F1), Tourism Infrastructure (F2), Intra-Area and External Transportation Conditions (F3), Scenic Area Environment and Ambiance (F4), and Ecosystem Conservation and Display (F5). Refer to Table 4 for details.

Table 4: Factor loading Table

Observed Variable	Factor loading	Latent Variable	Eigenvalue	% of Variance	Cumulative % of Variance
Q21	.853	F1	7.981	38.312	38.312
Q22	.869				
Q20	.825				
Q19	.719				
Q18	.605				
Q17	.691	F2	1.523	7.261	45.573
Q16	.675				
Q13	.671				
Q14	.601				
Q15	.524				
Q10	.751	F3	1.449	6.95	52.523
Q9	.739				

Q12	.692				
Q11	.621				
Q5	.685	F4	1.351	5.818	57.341
Q7	.662				
Q6	.599				
Q1	.781	F5	1.186	5.028	64.369
Q3	.706				
Q4	.627				
Q2	.502				

4.3 Reliability analysis

Table 5 presents the evaluation of data reliability using Cronbach’s Alpha, which is the most commonly used method for this purpose. In exploratory research, this coefficient may be lower than 0.7 but should be higher than 0.5. When the coefficient exceeds 0.5, the scale is considered to have relatively high internal consistency. In this study, the Cronbach’s Alpha values for each factor, calculated using SPSS 26.0, were all above 0.6, indicating that the data were reasonably reliable.

Table 5: Reliability analysis table

Latent Variable	Number of Observed Variables	Cronbach's Alpha
F1	5	.905
F2	5	.861
F3	4	.802
F4	3	.716
F5	4	.693
Tourist loyalty	2	.825

5. Testing Based on the Structural Equation Model

5.1 Hypotheses of the Structural Equation Model

Building upon the statistical analysis, the study proposes the following research hypotheses:

H1: Management Quality and Service have a significant positive impact on overall tourist satisfaction (SAT).

H2: Tourism Infrastructure has a significant positive impact on SAT.

H3: Intra-area and External Transportation Conditions have a significant positive impact on SAT.

H4: Scenic Area Environment and Ambiance have a significant positive impact on SAT.

H5: Ecosystem Conservation and Display have a significant positive impact on SAT.

H6: The number of tourists has a significant positive impact on tourist loyalty.

5.2 Hypothesis Testing

A quantitative model that includes a set of independent variables and one or more dependent variables can typically be represented by an equation for each dependent variable, specifying the relationships among the independent and dependent variables. When causal relationships are incorporated, this quantitative model is referred to as a Structural Equation Model (SEM). In this study, AMOS 22.0 was used to analyze the structural equation model. The conceptual model, developed based on relevant theories and literature, was validated, and the framework is illustrated in Figure 2.

The outcomes of the fit model analysis are illustrated in Tables 5 and 6. From these tables, it can be observed that the model's fitness is quite good, with the CMIN/DF ratio below 4. Additionally, indices such as GFI, NFI, IFI, and CFI are very close to 1, and the Root Mean Square Error of Approximation (RMSEA) is below 0.1, indicating a good fit.

Table 6: Initial goodness of fit of the SEM model

Index	Chi Square	GFI	NFI	IFI	CFI	RESEA
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Quantity	CMIN	CMIN/DF	.825	.833	.882	.838	.091
	465.712	3.713					

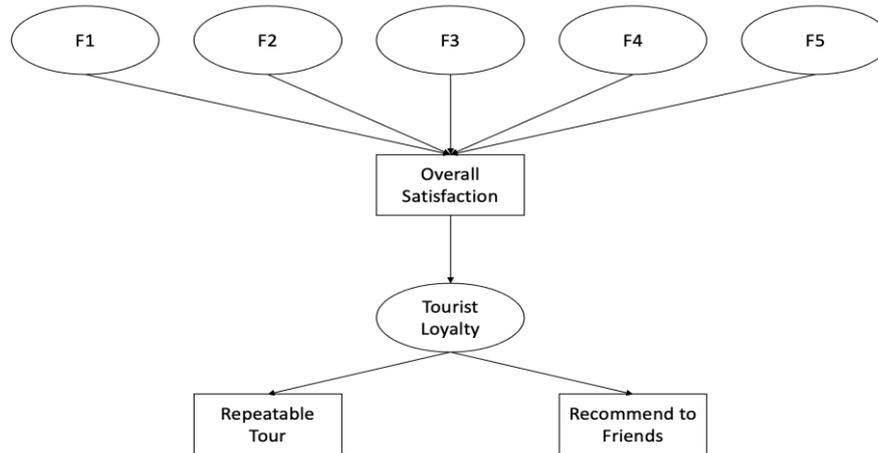


Figure 2: Prototype Model

Table 7: Initial Regression Result

	Coefficient	S.E.	Standardized Coefficient	C.R.	P value
SAT ← F5	.622	.118	.447	5.092	***
SAT ← F3	.016	.125	.018	.121	.915
SAT ← F2	.295	.153	.275	2.153	.039
SAT ← F4	.039	.115	.042	.339	.775
SAT ← F1	.119	.052	.184	2.315	.031
Loyalty ← SAT	.801	.071	.071	10.915	***

Tables 7 and 8 illustrate the outcome of the adjusted SEM model achieved by using AMOS 22.0 after dropping two insignificant paths, which have less than 1.65 C.R. values or less than 0.1 P values.

Table 8: Adjusted goodness of fit of the SEM model

Index	Chi-Square	GFI	NFI	IFI	CFI	RESEA
Quantity	CMIN	CMIN/DF	.805	.813	.862	.798
	761.316	3.095				.085

Table 9: Adjusted Regression Result

	Coefficient	S.E.	Standardized Coefficient	C.R.	P value
SAT ← F5	.648	.138	.437	5.292	***
SAT ← F2	.346	.095	.308	3.621	***
SAT ← F1	.109	.055	.164	2.151	.029
Loyalty ← SAT	.801	.068	1.000	11.455	***

5.3 Hypothesis Testing Results and Interpretation

Summarizing the results of the hypothesis examined in the study, as illustrated in the following table.

Table 10: Result of Hypotheses Analysis

No.	Hypotheses	Accept/Reject
H1	Management Quality and Service have a significant positive impact on SAT.	Accepted
H2	Tourism Infrastructure has a significant positive impact on SAT.	Accepted
H3	Intra-Area and External Transportation Conditions have a significant positive impact on SAT.	Rejected
H4	Scenic Area Environment and Ambiance have a significant positive impact on SAT.	Rejected
H5	Ecosystem Conservation and Display have a significant positive relationship with SAT.	Accepted
H6	The SAT of tourists has a significant positive impact on tourist loyalty.	Accepted

Table 10 presents the results of the SEM analysis, which reveal that the factors influencing overall tourist satisfaction in the Hunza Valley, in order of importance, are Ecosystem Protection and Display, Tourism Infrastructure, and Management Quality and Service. Factors traditionally considered influential, such as Scenic Environment and Atmosphere and Intra- and Inter-Area Transportation Conditions, do not have a significant impact on overall tourist satisfaction, leading to the rejection of hypotheses H3 and H4. Additionally, overall tourist satisfaction has a significant positive influence on tourist loyalty.

6. Conclusion and discussion

The correlation coefficient between ecosystem conservation, display, and overall tourist satisfaction is 0.648. This suggests that the quality of ecological conservation and display significantly influences tourists' satisfaction with the entire tourism experience. This research finding is of vital significance for unravelling the persistent contradiction between ecological conservation and tourism development in the management philosophy of ecological conservation areas.

Implications

Key to Enhancing Tourist Satisfaction: Ecological Conservation and Display. The pivotal factor in improving tourist satisfaction is the conservation and display of the ecological environment. Despite being the most crucial factor influencing tourist satisfaction, Pakistan's development of ecological tourism is currently relatively weak. Balancing Measures for Environmental Conditions and Transportation.

If measures taken in aspects such as "Scenic Environment and Atmosphere" and "Intra- and Inter-Area Transportation Conditions" (e.g., building cable cars) adversely affect the quality of ecological conservation, priority should be given to protecting the environment. This is because these two factors do not significantly impact overall tourist satisfaction. Emphasizing Ecological Conservation Education in Protected Areas. Protected areas should focus on enhancing the interpretation of ecological conservation. Uncovering the meaning and value of ecological conservation, diversifying how ecological tourism is presented, and extending the tourism industry chain are essential for sustainable development.

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Data availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.



Declarations

Ethics approval and consent to participate

This study was conducted in accordance with ethical guidelines, and all necessary approvals were obtained.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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