# Tourist Satisfaction Evaluation of Hot Spring Tourism Using the IPA Model: A Case Study of Shiqian Fodingshan Hot Spring Town

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**Abstract:** Tourist satisfaction can reflect the tourism competitiveness of the destination.Based on IPA analysis and starting from the tourists' perception, from tourists' perceptions, this study investigates Shiqian Fodingshan Hot Spring Town as the case place, and obtain the data through questionnaire survey. SPSS was utilized for IPA analysis and the following conclusions were drawn: (1) The visitor profile consists predominantly of young, educated female intra-provincial tourists with limited spending power, showing high first-time visitation rates and social-media-driven visitation patterns; (2) Significant expectation-satisfaction gaps exist, where infrastructure (highest importance: 4.155) underperformed while cultural value achieved peak satisfaction (3.813); (3) IPA identifies therapeutic efficacy (I-P=0.68) and parking facilities (I-P=0.59) as critical improvement areas, contrasting with the rest environment which exceeded expectations (I-P=-0.01). Practical recommendations include enhancing therapeutic value through water quality management, staff training optimization, and infrastructure upgrades to bridge service gaps.

***Keywords*:** Tourist satisfaction; IPA analysis; Hot spring tourism; Destination competitiveness

## 1. Introduction

In recent years, hot spring tourism has gradually become one of the popular ways of leisure and vacation.Hot spring tourism has emerged as a popular leisure activity, driven by rising living standards and growing demand for recreation. Its development relies not only on natural thermal springs (≥25°C) with therapeutic properties[1], but also on tourist experiences and satisfaction levels - crucial indicators of destination competitiveness that reflect market appeal and sustainable development potential. Analyzing service quality, facilities, and attractions from tourists' perspectives thus holds significant theoretical and practical value.

International research on hot spring tourism began post-WWII, with early studies examining development patterns, therapeutic value, and regional evolution[2-3]. Contemporary research focuses on online attention [4], spatial distribution [5]. The introduction of satisfaction concepts has made tourist satisfaction a key research area, as it directly impacts destination image, visitor loyalty, and revisit rates[6]. Current studies primarily utilize online reviews[7] and survey data[8] to assess satisfaction.

In summary, the current research on hot spring tourism has achieved more results, so this paperthrough the questionnaire survey to obtain the importance of tourists to the various services and satisfaction evaluation, the use of IPA analysis method of service performance matrix, assess the current distribution of strengths and weaknesses of the service program. Accordingly, targeted management and marketing optimization suggestions are put forward to help scenic spots improve visitor satisfaction and the quality of tourism experience.

## 2. Research Methodology and Data Sources

### 2.1 Research Methodology

IPA analysis: Importance-Performance Analysis (IPA) compares tourists' importance ratings with satisfaction levels, creating a matrix with four quadrants: Advantage Zone (high I/high P), Improvement Zone (high I/low P), Opportunity Zone (low I/low P), and Maintenance Zone (low I/high P).

### 2.2 Case Study Area

Shiqian Fodingshan Hot Spring Town, located in Guizhou Province, is one of China's oldest hot spring destinations. Developed in 2018, it is the largest hot spring complex in the province, offering over 60 forest-themed pools. In 2022, it was awarded the "Golden Soup-Level Hot Spring Resort" designation.

## 2.3 Indicator System

Drawing on previous studies and considering the unique resource and environmental characteristics of Shiqian Fodingshan Hot Spring Town, this study identifies four first-level evaluation dimensions: hot spring resources[9]including indicators such as water quality, temperature, output (a1), therapeutic effects (a2), variety and quality of spa programs (a3), and bath characteristics (a4),service quality[10],including staff expertise (b1), service attitude (b2), service efficiency (b3), and pricing (b4) supporting facilities [11]including catering conditions (c1), parking convenience (c2), environmental hygiene (c3), and accessibility of external transportation (c4).and cultural value[9], including local folklore(d1), rest and relaxation environment (d2), and enhancement of tourism-related knowledge(d3). Each primary dimension contains multiple secondary indicators designed to capture tourists' perceptions more comprehensively.The survey is scored on a Likert scale, with five answers given to each secondary indicator factor of importance and satisfaction.

## 2.4 Questionnaire Design

This study targeted tourists visiting Shiqian Fodingshan Hot Spring Town and collected data using the online platform "Questionnaire Star." A total of 223 valid responses were obtained, providing insights into the overall level of tourist satisfaction and helping to identify existing issues within the destination.

# 3. Analysis of results

## 3.1 Basic analysis of the sample

### 3.1.1 Demographic Characterization

According to the valid responses, 42.61% of participants were male and 57.39% were female. The majority of respondents were between 18 and 30 years old (61.43%), followed by those aged 30–45 (25.56%). Educational attainment was generally high, with 64.13% holding a university or college degree and 4.4% holding a master's degree or above. Occupation-wise, students represented the largest group (41.21%), while private business owners accounted for the smallest share (9.09%). Monthly income varied, with 40.36% earning less than 2,000 RMB and 23.32% earning between 6,000 and 10,000 RMB.

### 3.1.2 Characterization of Tourist Behavior

The majority of respondents (80.72%) were from within Guizhou Province, indicating a primarily local or regional tourist base. Only 19.28% came from outside the province, indicating limited national reach. A large proportion (69.51%) were first-time visitors, while repeat visits remained low. In terms of information sources, tourists primarily learned about the site through personal referrals (31.84%) and social media platforms such as Weibo and Xiaohongshu (31.39%), followed by WeChat public accounts (17.94%) and official websites (10.76%). Travel agencies accounted for the least influence (6.73%).

## 3.2 Overall Analysis of Indicator Weights and Satisfaction

The analysis reveals significant expectation-performance gaps across four key dimensions. Hot spring facilities (I=4.155) were deemed most important, followed by services (I=4.140) and resource value (I=4.083), while cultural value ranked lowest (I=3.887). However, satisfaction scores showed an inverse pattern: cultural value scored highest (P=3.813), then facilities (P=3.718), services (P=3.693), and resource value (P=3.575). The largest gap (I-P=0.508) occurred in resource value, indicating substantial unmet expectations. Notably, while services were prioritized pre-visit, cultural elements delivered the highest satisfaction, revealing a service quality shortfall. These mismatches highlight critical areas for operational improvement, particularly in maintaining facilities and enhancing service delivery to align with visitor expectations.

## 3.3 IPA analysis

### 3.3.1 IPA index analysis

(1) Mean difference (I-P) :The I-P values for Fodingshan Hot Springs Town range from -0.01 to 0.68 across 15 indicators (Table 1). All factors except the rest environment ($d_2$=-0.01) showed positive gaps, indicating expectations exceeded actual experiences. The largest discrepancies were found in hot spring efficacy ($a_2$=0.68) and parking facilities ($c_2$=0.59), identifying these as priority improvement areas. Conversely, folk customs ($d_1$=0.03) and knowledge growth ($d_3$=0.2) showed minimal gaps, suggesting under appreciation of cultural values that warrants promotional emphasis.

(2) IPA index :The IPA Index is calculated as $(I - P) / I \times 100$, where I denotes the importance rating and P the performance rating; I as the importance and P as the performance. IPAI is the importance-performance analysis index:IPAI index size is negatively correlated with the degree of satisfaction; IPAI index is a five-level system, and the index is ≤1.00, 1.01-5.00, 5.01-10.00, 10.01-15.00, and ≥15.01, which means Very satisfied, Satisfied, Neutral, Dissatisfied,Very dissatisfied.

**Table 1. Statistical analysis of secondary indicators "importance-satisfaction" of tourists**

| Secondary indicators | I-P | IPA index | level of satisfaction | Secondary indicators | I-P | IPA index | level of satisfaction |
|---|---|---|---|---|---|---|---|
| a1 | 0.53 | 12.62 | Dissatisfied | c1 | 0.27 | 6.59 | Neutral |
| a2 | 0.68 | 16.59 | Very dissatisfied | c2 | 0.59 | 14.05 | Dissatisfied |
| a3 | 0.41 | 10.49 | Dissatisfied | c3 | 0.5 | 11.90 | Dissatisfied |
| a4 | 0.4 | 9.71 | Neutral | c4 | 0.32 | 7.77 | Neutral |
| b1 | 0.48 | 11.71 | Dissatisfied | d1 | 0.03 | 0.78 | Very satisfied |
| b2 | 0.44 | 10.38 | Neutral | d2 | -0.01 | -0.26 | Very satisfied |
| b3 | 0.56 | 13.37 | Dissatisfied | d3 | 0.2 | 4.988 | Satisfied |
| b4 | 0.3 | 7.44 | Neutral | | | | |

The satisfaction analysis revealed five distinct tiers: (1) Very satisfied: folk customs ($d_1$) and relaxation environment ($d_2$); (2) Satisfied: cultural value ($d_3$); (3) Neutral: pool features ($a_4$), staff attitude ($b_2$), accommodation ($c_1$), transportation ($c_4$), and pricing ($b_4$); (4) Dissatisfied: water quality ($a_1$), program diversity ($a_3$), hygiene ($c_3$), staff expertise ($b_1$), service efficiency ($b_3$), and parking ($c_2$); (5) Very dissatisfied: therapeutic effects ($a_2$). Notably, cultural elements dominated the top tiers while service-related factors (particularly staff competency and hot spring efficacy) showed significant dissatisfaction, with therapeutic effects scoring lowest (IPAI=16.59).

**3.3.2 IPA Quadrant Analysis**

The four-quadrant model was plotted by plotting the mean values of pre-trip perceived importance and actual satisfaction for the 15 indicators, and the matrix was divided into four quadrants of dominance, improvement, opportunity, and maintenance with the intersection of the mean value of overall importance of the indicators (4.078) and the mean value of overall satisfaction (3.698).

Maintenance Zone (Quadrant I): Four indicators (b4, d1, d2, d3) had low importance but high satisfaction, indicating strengths to preserve.

Advantage Zone (Quadrant II): Five indicators (a4, b2, c1, c3, c4) demonstrated both high importance and satisfaction, representing core competitive advantages for marketing focus.

Opportunity Zone (Quadrant III): Only spa program diversity (a3) scored low on both dimensions, suggesting potential future development rather than immediate investment.

Improvement Zone (Quadrant IV): Five critical indicators (a1, a2, b1, b3, c2) revealed significant gaps between high importance and low satisfaction, requiring prioritized upgrades in:Resource quality (water conditions, therapeutic effects): Service professionalism (staff expertise, efficiency); Supporting facilities (parking management).

# 4. Conclusion and Discussion

## 4.1 Conclusion

This study is based on questionnaire data collected from tourists in Shiqian Fodingshan Hot Spring Town, and the conclusions are as follows:

(1)Most tourists are educated young women from the province. The proportion of tourists visiting for the first time is high, while the proportion of re-visiting is still low. Social media platforms and word-of-mouth referrals are identified as the main sources of tourist information.

(2)Tourists placed the highest value on amenities (mean = 4.155) but higher actual satisfaction with cultural values (mean = 3.813). This suggests a bias between expected and actual experiences.

(3)Significant gaps were identified in treatment effectiveness and parking facilities, while cultural elements such as rest and relaxation exceeded expectations. These gaps identified key areas for improvement.

## 4.2 Suggestion

(1)Enhance Hot Spring Value: Ensure water quality through standardized management and transparent testing. Develop customized offerings and culturally immersive experiences based on traditional practices.

(2)Upgrade Infrastructure and Safety: Expand parking, improve sanitation, and enforce national standards. Strengthen safety awareness through staff training and visitor education.

(3)Strengthen Marketing and Collaboration: Form regional partnerships to create "hot springs + leisure" packages. Adopt targeted promotions, highlighting health benefits for different tourist segments.

### 4.3 Research Shortcomings and Prospects

This study has three limitations: (1) Sample bias (mostly students via "Questionnaire Star"); (2) Subjective tourist evaluations without objective validation; (3) Focus on only one hot spring town. Future research should diversify samples, incorporate scientific testing, and compare multiple destinations for broader insights.

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