

Article

Balancing Residents and Tourists: Evaluating Public Building Spaces in Ancient Towns of Fujian, China, Using the IPA–Kano Model

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Abstract

Ancient town tourism has become an important component of cultural tourism in China. However, rapid tourism growth has intensified differences in the use of public spaces between residents and tourists, leading to increasing spatial tensions in historic urban areas. This study evaluates public building spaces in ancient towns from the perspectives of residents and tourists and identifies their differentiated needs. Three representative ancient towns in Fujian Province, China, with different tourism resource types and development characteristics, were selected as case studies. The IPA–KANO approach was used to examine differences in user perceptions and priority needs. Based on a literature review, an evaluation system was developed with three dimensions: traditional style, sensory experience, and supporting facilities. The results reveal clear resident–tourist differences in public space priorities and show that these differences vary across ancient towns with different tourism development contexts. Residents place greater emphasis on the maintenance of the environment and facilities and on everyday usability, whereas tourists are more sensitive to public toilet settings and sun and rain shelter facilities. These findings indicate that resident–tourist divergence is context dependent rather than fixed and provide a basis for differentiated spatial optimization and sustainable management.

Keywords: public building space; ancient town; resident–tourist perception differences; IPA–Kano model; space evaluation



Academic Editor: Haifeng Liao

Received: 13 March 2026

Revised: 28 April 2026

Accepted: 1 May 2026

Published: 6 May 2026

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1. Introduction

1.1. Research Background

Cultural tourism has become one of the fastest-growing segments of the tourism industry and occupies an increasingly important position in tourism development [1]. Ancient towns, as distinctive destinations that combine historical heritage, local culture, and tourism experiences, are highly favored by both domestic and international tourists.

In China, this trend is particularly evident. The China Ancient Town Tourism Development Report (2024) indicates that 93.4% of respondents have participated in ancient town tourism [2], highlighting its significance in the Chinese tourism market.

Beyond their importance as tourism destinations, ancient towns result from long-term human settlements under specific natural environments, historical periods, and cultural backgrounds. Their spaces preserve historical traces of various lifestyles and production patterns across different periods, representing the continuation of traditional cultural heritage [3]. The development of ancient town tourism increases residents' income and employment opportunities, enhances local pride, and promotes local social and economic development [4,5]. For tourists, it helps deepen their understanding of local history and culture [6] and strengthen their sense of place identity [7], thereby contributing to economic benefits and the promotion of local construction technology [8–10]. Therefore, ancient towns should be understood as both tourism destinations and living heritage environments that connect cultural memory, everyday life, and local development.

Among the various elements of ancient towns, public spaces are particularly important because they serve as key settings for tourists' activities and as part of residents' daily lives. With the growth of tourism, the users of public spaces in ancient towns have shifted from indigenous residents to a coexisting pattern involving both residents and tourists [11]. Residents' traditional lifestyles and daily interactions shape the distinctive character of these historic environments and constitute a core source of tourism attractiveness [12]. This transformation has intensified interactions between residents and tourists in shared public spaces, thereby laying the foundation for potential conflicts.

As tourism intensity increases, the relationship between residents and tourists becomes more complex. Several studies indicate that the influx of tourists leads to overcrowding in public spaces of ancient towns [11,13,14], which can be understood as a manifestation of overtourism. According to the United Nations World Tourism Organization (UNWTO), overtourism refers to tourism impacts that negatively affect residents' quality of life and visitors' experiences [15]. In this study, resident–tourist conflicts are understood as spatial, functional, and behavioral conflicts arising from competing uses of public spaces. Residents often perceive tourists' occupation of public spaces as reducing safety and order [16], while tourists may perceive unclear boundaries between tourism and residential areas [17]. Moreover, profit-driven motives and insufficient conservation awareness among residents have resulted in excessive commercialization of ancient towns and their public spaces [18]. This trend negatively influences tourists' attitudes and their willingness to visit [19]. These issues also give rise to the demand for engineering support in the protection of historical buildings and the safe operation of tourism in ancient urban public spaces [20–25]. These issues indicate that the quality and management of public spaces have become increasingly important to the sustainable development of ancient towns.

To alleviate conflicts between residents and tourists in the public spaces of ancient towns, some scholars have proposed the concept of “host–guest sharing,” which advocates the designation of specific public spaces within historic towns [26]. Through appropriate planning and design, this approach helps preserve residents' daily lives while enabling tourists to enjoy high-quality experiences and more efficient spatial use. By comparing the spatial demands of residents and tourists, several studies have proposed differentiated strategies to balance public space vitality, including improving road network accessibility, increasing the diversity of plant colors, rationally arranging leisure facilities, and comprehensively planning service facilities [27]. Other researchers argue that spatial layout influences the degree of integration between residents and tourists [19]. Creating more interactive, participatory, and shared public spaces can provide tourists with deeper cultural experiences while also enhancing residents' sense of engagement [8]. Furthermore,

it is also necessary to consider sustainable construction and the application of intelligent materials in buildings [28–30]. The conceptual framework for the research background is summarized in Figure 1.



Figure 1. Conceptual framework for the research background. The figure was generated using an AI-assisted tool for visualization purposes. All scientific content was verified by the authors.

However, despite these efforts, there remains a need for a more systematic understanding of how different user groups evaluate public spaces under different tourism development contexts. Existing studies have proposed planning concepts and improvement strategies for shared spaces in ancient towns, but less attention has been paid to comparing residents' and tourists' perceptions within a unified analytical framework. This limitation is important because tensions in ancient-town public spaces are shaped not only by differences in user needs but also by variations in tourism resource types, development characteristics, and service conditions across places.

More broadly, these tensions in ancient-town public spaces can also be understood as governance issues involving the coordination of multiple stakeholders, including residents, tourists, businesses, and local authorities. In historic and heritage destinations, decisions concerning facility provision, visitor flow, cultural expression, and environmental maintenance directly affect both community life and tourism development. From this perspective, public-space evaluation is not only a matter of environmental quality or visitor satisfaction but also part of the broader challenge of achieving more sustainable and balanced destination management [31,32]. Against this background, this study selects three representative ancient towns in Fujian Province as case studies and focuses on residents and tourists as the key user groups. Using the IPA–KANO model, the study examines differences in user perceptions and priority needs and further explores optimization directions for public spaces in ancient towns.

1.2. Dimensions of Public Building Space Evaluation in Ancient Towns

Existing studies have evaluated public spaces in ancient towns from multiple perspectives. Chen et al. [33] examined public space through architectural aspects, historical and cultural style, satisfaction of usage needs, folk culture, social impact, and economic impact. The dimensions of architectural aspects, historical and cultural style, and folk culture reflect the traditional style of the ancient town. The indicators of social and economic impact are

closely related to the sensory experiences of residents and tourists. Satisfaction of usage needs refers to the adequacy of supporting facilities. Song et al. [34] emphasized cultural spirit, physical environment, and psychological perception, while Ding et al. [35] focused on material factors, spatial atmosphere, and subjective emotion. Ma et al. [36] further incorporated spatial landscape, infrastructure, spatial culture, and management services, and Yu [37] highlighted facility safety, psychological perception, and cultural aesthetics.

Based on these studies and the characteristics of ancient towns in Fujian Province, this study identifies three core dimensions of public space evaluation: traditional style, sensory experience, and supporting facilities.

1.3. Indicators of Public Building Space Evaluation in Ancient Towns

Existing studies on public space evaluation have evolved from single physical indicators to multidimensional frameworks integrating cultural, social, and management factors. Within the dimension of traditional style, scholars emphasize cultural authenticity and local expression. Chen et al. [33] argued that the authenticity of traditional architecture and the holding of folk activities are key to sustaining cultural identity and spatial vitality. Song et al. [34] further noted that while folk activities enhance residents' sense of identity, their lack of continuity and organization may reduce satisfaction. Zagroba et al. [38] highlighted the importance of coordination between old and new architectural styles in shaping public perception of historic towns. Yu [37] and Xiong et al. [39] demonstrated that the characteristic degree of landscape sketches significantly influences both resident and tourist satisfaction. Zheng et al. [40] demonstrated that the number of aborigines enhances the resilience and functional diversity of public spaces in tourist towns. Wang [41] identified the impact of online publicity as an important external driver. Overall, these factors constitute key indicators within the dimension of traditional style.

Within the sensory experience dimension, research focuses on the influence of spatial form and environmental elements on user perception. Zhao et al. [42] identified the integrity of walking paths, the scale of the space, the size of the space, the crowd density, and paving material for the floor as key factors affecting satisfaction. Gao et al. [43] and Xiong et al. [39] further emphasized the sequential changes in space, the number of plants, and the abundance of plants, which influence accessibility and spatial diversity. In addition, plant quantity and diversity are widely recognized as key indicators of perceptual quality [44]. Overall, spatial continuity, appropriate scale, and ecological configuration are critical to enhancing user experience.

Within the supporting facilities dimension, research emphasizes service provision and maintenance. Kamińska & Mularczyk [45] highlighted the importance of rest facilities, the types of business, night lighting settings, monitoring facility settings, and public toilet settings in meeting functional needs and strengthening social connections. Fang & Zhu [46] showed that facility configuration, including trash bins, influenced residents' leisure behavior and safety. Yu [37] indicated that tourists paid high attention to rest facilities, map guidance, the types of business, public toilet settings, trash bin settings, and sun and rain shelter facilities. Ma et al. [36] further emphasized the importance of maintenance of environment and facilities, noting that inadequate management undermined positive public space experience. Overall, these factors constitute key indicators of functional support.

In summary, existing research has established a multidimensional evaluation framework encompassing cultural expression, spatial perception, and functional support, which together shape the quality and vitality of public spaces in ancient towns.

1.4. Research Gap and Research Objectives

Despite these contributions, several limitations remain. First, existing studies largely rely on qualitative approaches and lack systematic quantitative frameworks for comparing the perceptions of residents and tourists. Second, limited attention has been given to incorporating overtourism perspectives into the evaluation of public spaces in ancient towns. Third, few studies consider traditional features, sensory experience, and supporting facilities within a unified analytical framework, while also linking public-space evaluation to broader issues of destination governance, stakeholder coordination, and sustainable management in ancient-town contexts.

To address these gaps, this study aims to develop a systematic evaluation framework for public building spaces in ancient towns using the IPA–KANO approach. Specifically, the study seeks to: (1) identify key evaluation indicators of public building spaces in ancient towns; (2) examine differences in perceptions and priority needs between residents and tourists; and (3) propose optimization strategies based on the comparative results. The findings are expected to provide both theoretical support and practical guidance for sustainable public space management in historic urban areas.

2. Research Methodology

2.1. Research Objectives and Analytical Framework

This study adopts a comparative case-study design to examine public building spaces in ancient towns from the perspectives of residents and tourists. The analytical framework was developed in alignment with the three research objectives. First, a literature review and field investigation were used to identify and refine the evaluation indicators of public building spaces. Second, questionnaire data collected from residents and tourists in three representative ancient towns were analyzed to compare their perceptions of importance, satisfaction, and improvement priorities. Third, the IPA–KANO model was employed to classify public space attributes and support the formulation of optimization strategies based on the comparative findings.

As this study is exploratory in nature and focuses primarily on identifying user perceptions and priority factors through the IPA–KANO model, the analysis is based mainly on structured descriptive comparison. To further support the interpretation of resident–tourist differences, supplementary independent-samples *t*-tests were conducted for the shared indicators identified in each case town. Overall, the analytical framework is structured around the comparison between the two respondent groups across the three case towns. This framework allows the study to identify both shared concerns and group-specific priorities, while also capturing differences among ancient towns with distinct tourism development characteristics, tourism resource structures, and service environments.

2.2. IPA–Kano Model

The IPA–Kano model is a common method for assessing customer needs. It evaluates service quality by identifying the relationship between service attributes and user demands. Based on this relationship, it proposes targeted optimization strategies [47]. The IPA–Kano model integrates importance–performance analysis (IPA) and the Kano model. It addresses the limitations of using either method alone. On the one hand, it overcomes the weakness of IPA, which considers attributes only from a one-dimensional perspective [48]. On the other hand, it avoids the limitation of the Kano model, which neglects attribute performance and importance. The IPA–Kano model captures users' perceptions of all elements more accurately. It supports the formulation of appropriate response strategies. In simple terms, it enables more precise classification and prioritization of evaluation attributes [49]. It also improves the identification of priority rankings among environmental characteris-

3. The quadrant diagram is drawn by combining explicit importance and implicit importance.
4. Key factors were identified based on the quadrant classification results and the priority ranking of satisfaction (see Table 1). In this study, satisfaction was divided into three levels. Ranks 1–8 indicate good satisfaction. Ranks 9–15 represent average satisfaction performance. Ranks 16–23 reflect poor satisfaction.

Table 1. Defining optimization priorities. Source: Authors’ own elaboration.

Priority	Factors	Satisfaction Ranking
1	Basic factors	16–23
2	Key performance factors	16–23
3	Excitement factors	16–23
4	Basic factors	9–15
5	Key performance factors	9–15
6	Excitement factors	9–15

5. Conduct a comparative analysis of the experimental results.

2.3. Establishing the Evaluation System

Based on a literature review and supported by field investigations of the extracted indicators, this study identified three dimensions: traditional style, sensory experience, and supporting facilities [33–37]. From the perspective of shared concerns of residents and tourists, 23 factors influencing the evaluation of public spaces in ancient towns were selected as research indicators. An evaluation system for public spaces in ancient towns of Fujian was thus established (see Table 2).

2.4. Questionnaire Design

The questionnaire for this study was designed to gather data from both residents and tourists in three ancient towns: Anhui, Hukeng, and Huotong. The purpose of the questionnaire was to assess the perceptions of residents and tourists regarding various elements of public spaces within these towns. It consisted of two main sections: basic respondent information and evaluations of public space elements.

The first section of the questionnaire collected basic respondent information, including gender and respondent category (whether the respondent was a resident or a tourist). This allowed for a clear distinction between the two groups and supported the comparative analysis of their responses. The respondent profile is summarized in Table 3.

The second section of the questionnaire contained 46 questions focusing on the importance and satisfaction of various public space elements within the ancient towns. These questions were designed based on 23 indicators identified through the literature review. The purpose of including both importance and satisfaction questions was to provide a comprehensive assessment of each element. By gathering responses on importance, the study aimed to understand respondents’ preferences and the perceived value of each element in public space. For example, one question asked, “How important is it to preserve the authenticity of traditional buildings in the ancient town?” This question sought to capture the perceived importance of maintaining traditional architectural features.

Table 2. Evaluation system of public space in Fujian ancient towns. Source: Authors' own elaboration.

Dimensions	Indicators	Indicator Explanation
A1 Traditional Style [33,34,36,37]	B1 The authenticity of traditional architecture [33]	The preservation status of traditional buildings reflects their authenticity. They have maintained their historical style and architectural features.
	B2 The degree of coordination between new and old architectural styles [38]	The new buildings are in harmony with the historical buildings, avoiding the destruction of the overall style of the ancient town.
	B3 Number of aborigines [40]	The number of local residents who have lived long-term in areas where historical buildings are concentrated is significant.
	B4 The holding of folk activities [33,34]	Various folk activities are held frequently, such as festivals and traditional ceremonies, enhancing the ancient town's cultural atmosphere and enriching the experience of residents and tourists.
	B5 The characteristic degree of landscape sketches [37,39]	The landscape sketches in the ancient town's public spaces have distinct features, such as sculptures, installation artworks, and frescos, which can reflect the regional culture.
	B6 The impact of online publicity [41]	Promote the ancient town's traditional features through online channels such as official websites, social media, and tourism platforms.
A2 Sensory Experience [33–37]	B7 The integrity of walking paths [42]	The design of walking paths is coherent and clear, seamlessly connecting various locations to facilitate convenient pedestrian movement.
	B8 The scale of the space [42]	The public space's height-to-width ratio is appropriate, so residents and tourists will not feel uncomfortable when it is too open or narrow.
	B9 Sequential changes in space [39,43]	The public space is rich in visual and functional changes, with a strong sense of layering and interest.
	B10 The size of the space [42]	The size of the public space is appropriate to meet the needs of both residents and tourists.
	B11 The crowd density [42]	The public space maintains an appropriate crowd density throughout different periods, with its design effectively dispersing crowds to prevent overcrowding, thereby ensuring people's comfort and safety.
	B12 Paving material for the floor [42]	The flooring material in public spaces is comfortable, flat, and non-slip.

Table 2. *Cont.*

Dimensions	Indicators	Indicator Explanation
A2 Sensory Experience [33–37]	B13 The number of plants [39,43,44]	The appropriate quantity of plants in public spaces reflects the degree of greening and ecological value of the area.
	B14 The abundance of plants [39,43,44]	The public spaces boast a wealth of plant species and layers, enhancing their ecological diversity and aesthetics.
	B15 Rest facilities [37,45,46]	The quantity and materials of seating, pavilions, and other rest facilities in public spaces fulfil the needs of residents and tourists.
	B16 Map guidance [37]	Public spaces have sufficient signs and maps with precise information, ensuring that residents and tourists can quickly understand the ancient town's layout.
A3 Supporting Facilities [33,36,37]	B17 The types of business [37,45,46]	Commercial activities in public spaces are diverse, with various shops and restaurants catering to different groups.
	B18 Night lighting settings [45,46]	The public space has a comprehensive lighting system with adequate lighting equipment and well-planned locations to ensure the safety and visibility of nighttime activities.
	B19 Monitoring facility settings [45,46]	In public spaces, there is a comprehensive surveillance system with ample cameras strategically placed to ensure the area's safety.
	B20 Public toilet settings [37,45,46]	There are sufficient clean and well-maintained public toilets in public spaces, including an adequate number of female squatting cubicles inside.
	B21 Trash bin settings [37,46]	The number of garbage bins in public spaces is sufficient, and their placement is logical, which helps maintain a tidy environment.
	B22 Sun and rain shelter facilities [37]	Shading and rain shelters are installed in public spaces to protect individuals from harsh weather conditions.
	B23 Maintenance of environment and facilities [36]	There are regular cleaning and maintenance needs for public spaces, including cleaning, garbage disposal, greening maintenance, and upkeep of public facilities.

Table 3. Respondent profile. Source: Authors’ own calculation.

Variable	Category	Anhai Ancient Town	Hukeng Ancient Town	Huotong Ancient Town	Total
Respondent category	Residents	464 (49.95%)	464 (50.22%)	464 (50.22%)	1392 (50.13%)
	Tourists	465 (50.05%)	460 (49.78%)	460 (49.78%)	1385 (49.87%)
Gender (Residents)	Male	215 (46.34%)	237 (51.08%)	215 (46.34%)	667 (47.92%)
	Female	249 (53.66%)	227 (48.92%)	249 (53.66%)	725 (52.08%)
Gender (Tourists)	Male	219 (47.10%)	228 (49.57%)	238 (51.74%)	685 (49.46%)
	Female	246 (52.90%)	232 (50.43%)	222 (48.26%)	700 (50.54%)

Satisfaction questions, by contrast, were designed to capture respondents’ evaluations of the actual performance of these elements. For instance, the question, “How satisfied are you with the effectiveness of promoting traditional features of the ancient town through online channels such as official websites, social media, and tourism platforms?” aimed to evaluate how well these features were being preserved and communicated. The combination of importance and satisfaction questions allowed for a more nuanced understanding of both residents’ and tourists’ perceptions, from ideal expectations to actual experiences. Because some indicators were conceptually specific, the indicator explanations presented in Table 2 were used to guide questionnaire wording and administration, and clarification was provided to respondents when necessary to reduce ambiguity in interpretation.

The questionnaire used a 9-point Likert scale for both the importance and satisfaction questions. The scale ranged from 1 = not important/completely dissatisfied to 9 = extremely important/completely satisfied. A total of 2800 questionnaires were distributed across the three ancient towns from May 2023 to June 2024. After screening for incomplete or invalid responses, 2777 valid questionnaires were retained, resulting in an effective response rate of 99.18%.

The reliability and validity of the questionnaire were analyzed, as shown in Table 4. Reliability analysis was conducted using Cronbach’s α coefficients, and validity was assessed using the Kaiser–Meyer–Olkin (KMO) test and Bartlett’s test of sphericity. The results indicate that both resident and tourist groups across all three ancient towns achieved Cronbach’s α coefficients and KMO values exceeding 0.9, demonstrating high internal consistency and sampling adequacy. In addition, Bartlett’s test yielded $p = 0.000$, confirming that the data was suitable for factor analysis. These results collectively indicate that the questionnaire has strong reliability and validity.

Table 4. Reliability and validity analysis. Source: Authors’ own calculation.

Sample Source	Cronbach α Coefficient	KMO Value/ p Value
Anhai Ancient Town residents	0.993	0.992/0.000
Anhai Ancient Town tourists	0.983	0.987/0.000
Hukeng Ancient Town residents	0.983	0.987/0.000
Hukeng Ancient Town tourists	0.985	0.990/0.000
Huotong Ancient Town residents	0.974	0.982/0.000
Huotong Ancient Town tourists	0.989	0.992/0.000

2.5. Study Area

Fujian Province is located on the southeast coast of China and has historically served as an important hub for maritime trade. The province contains a large number of nationally and provincially recognized historic towns. In this study, three nationally recognized ancient towns—Anhai, Hukeng, and Huotong—were selected as case studies

(see Figure 3). These cases were chosen because they differed in tourism resource types, tourism development characteristics, population scale, and broader tourism service conditions. Specifically, Anhai represents a commercially developed ancient town with relatively mature tourism support, Hukeng represents a heritage-driven tourism destination with the strongest World-Heritage-oriented tourism identity, and Huotong represents a relatively less-commercialized historic settlement. A comparative summary of the three case towns is provided in Table 5.

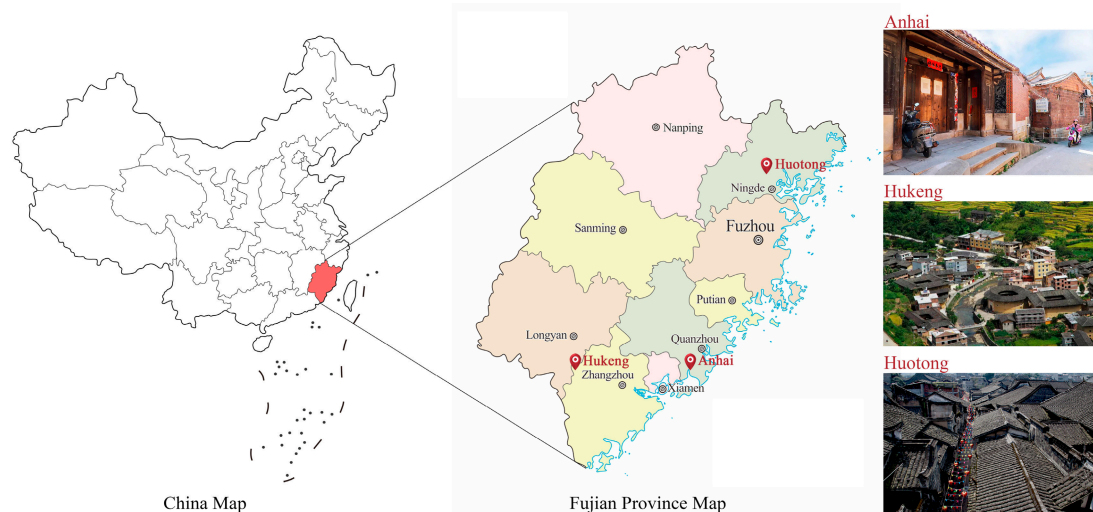


Figure 3. Location map of the study area. Source: Authors' own creation.

Table 5. Comparative contextual characteristics of the three case study towns. Source: Authors' own elaboration.

Case Study	Administrative Area (km ²)	Permanent Population (Approx.)	Main Tourist Attractions	Tourism Resource Types	National/International Recognitions	Tourist Arrivals in the Prefecture-Level City (2023, Million)	Number of Star-Rated Hotels in the Prefecture-Level City
Anhai Ancient Town	55.72	230,000	Anping Bridge (component of a World Cultural Heritage property), Longshan Temple, and Shijing Academy	Historical–cultural tourism + ecological sightseeing	National Historic and Cultural Town; China National AAAA Tourist Attraction (Anping Bridge)	86.53	51
Hukeng Ancient Town	96.5	26,000	Fujian Tulou (World Cultural Heritage)	World Heritage tourism + Hakka cultural tourism + ecological sightseeing	World Cultural Heritage; National Historic and Cultural Town; China National AAAAA Tourist Attraction	64.10	22
Huotong Ancient Town	167	35,000	Ming and Qing Ancient Street, the Huangju Irrigation Project (World Heritage Irrigation Structure), and Huayan Temple	Natural landscape tourism + historical–cultural tourism + religious–cultural tourism	National Historic and Cultural Town; World Heritage Irrigation Structure	62.07	10

Anhai Ancient Town is located in the southwest of Jinjiang City, Quanzhou, covering an administrative area of 55.72 km² with a permanent population of approximately 230,000 [54]. Its main tourist attractions include Anping Bridge, Longshan Temple, and Shijing Academy. In terms of tourism resource type, Anhai is characterized mainly by historical–cultural tourism and ecological sightseeing. Compared with the other two cases,

Anhai is supported by a relatively stronger tourism service environment, as reflected by the higher tourist arrivals and larger number of star-rated hotels in its prefecture-level city (see Table 5) [55,56]. Recent reports further indicate that during the 2026 Spring Festival holiday, Anhai Ancient Town attracted over 1.2 million visitors and generated more than 70 million RMB in tourism consumption [57], indicating its high level of tourism intensity.

Hukeng Ancient Town is located in the southeastern Yongding District of Longyan City, with an administrative area of 96.5 km² and a permanent population of approximately 26,000 [58]. Hukeng is one of the core areas of Fujian Tulou, which has been inscribed as a UNESCO World Cultural Heritage site [58]. Widely known as the “Hometown of Tulou,” its tourism appeal is strongly centered on Fujian Tulou, and its tourism resources are characterized by World Heritage tourism, Hakka cultural tourism, and ecological sightseeing. Compared with the other two cases, Hukeng shows the strongest World-Heritage-oriented tourism identity, while its broader tourism service environment is comparatively moderate (see Table 5) [55,59].

Huotong Ancient Town is located in Jiaocheng District, Ningde City, covering 167 km² with a permanent population of approximately 35,000 [60]. In 2023, the town received approximately 600,000 tourists and generated 120 million RMB in tourism-related service revenue [61]. Its main tourist attractions include Ming and Qing Ancient Street, the Huangju Irrigation Project, and Huayan Temple. Unlike Hukeng, Huotong does not rely on a single dominant heritage attraction; instead, its tourism resources are distributed across natural landscape tourism, historical–cultural tourism, and religious–cultural tourism. As shown in Table 5, Huotong is embedded in a comparatively less developed tourism service environment [55,62], making it a useful case for examining resident–tourist interactions under a less intensive tourism development context.

3. Result Analysis

3.1. Anhai Ancient Town

3.1.1. Importance and Satisfaction Results of Anhai

The importance and satisfaction scores of public space indicators for residents and tourists in Anhai Ancient Town are presented in Tables 6 and 7. As shown in Table 6, among residents of Anhai, B18 (night lighting settings) received the highest importance score, whereas B3 (number of aborigines) received the lowest. Among tourists in Anhai, B21 (trash bin settings) ranked the highest in importance, while B1 (the authenticity of traditional architecture) ranked the lowest.

As shown in Table 7, among residents in Anhai, B6 (the impact of online publicity) achieved the highest satisfaction, whereas B22 (sun and rain shelter facilities) recorded the lowest satisfaction. Among tourists in Anhai Ancient Town, B14 (the abundance of plants) showed the highest satisfaction, while B11 (crowd density) ranked the lowest.

3.1.2. Quadrant Attribution Results of Anhai

Based on the bivariate correlation analysis between importance and satisfaction, the implicit importance of public space indicators in Anhai Ancient Town was obtained (see Table 8). The *p*-values indicate a significant linear relationship between importance and satisfaction, which supports the quadrant classification of the indicators. As shown in Figures 4 and 5 and Table 9, the quadrant attribution results in Anhai Ancient Town reveal both commonalities and differences between residents and tourists. Compared with residents, tourists had a larger number of indicators classified as basic factors. B23 (maintenance of environment and facilities) was identified as a common basic factor by both groups. Regarding key performance factors, residents and tourists identified the same number of indicators, with both groups paying particular attention to B14 (the abundance

of plants) and B21 (trash bin settings). For excitement factors, residents identified more indicators than tourists. B1 (the authenticity of traditional architecture) and B2 (the degree of coordination between new and old architectural styles) were shared concerns in this quadrant. As for unimportant performance factors, the two groups again identified the same number of indicators, and both regarded B9 (sequential changes in space) as a common low-priority indicator.

Table 6. Importance of ancient town residents and tourists. Source: Authors' own calculation.

Dimensions	Indicators	Anhai Ancient Town		Hukeng Ancient Town		Huotong Ancient Town	
		Residents	Tourists	Residents	Tourists	Residents	Tourists
		Average Score of Importance	Average Score of Importance	Average Score of Importance	Average Score of Importance	Average Score of Importance	Average Score of Importance
A1	B1	6.338	5.871	7.335	7.267	7.448	6.854
	B2	6.438	6.196	6.854	7.124	7.476	7.107
	B3	6.188	5.978	7.022	7.115	7.438	6.580
	B4	6.636	6.260	7.073	6.950	7.731	6.757
	B5	6.481	6.305	6.770	6.902	7.778	6.643
	B6	6.295	6.630	7.378	7.120	7.787	6.757
A2	B7	6.418	6.716	7.469	7.228	8.058	6.633
	B8	6.377	6.654	7.047	7.098	7.748	6.676
	B9	6.203	6.254	7.049	7.128	7.782	7.009
	B10	6.416	6.600	7.488	7.241	7.720	6.624
	B11	6.435	6.667	7.426	7.200	7.774	7.143
	B12	6.231	5.987	7.475	7.278	8.056	7.183
	B13	6.662	5.959	7.043	7.122	8.060	6.643
	B14	6.649	6.718	6.692	7.087	7.705	6.685
A3	B15	6.665	6.637	7.312	7.202	7.761	6.652
	B16	6.394	6.701	7.422	7.070	7.774	6.670
	B17	6.438	6.804	6.897	7.150	7.746	6.600
	B18	6.688	6.290	7.099	7.150	8.138	6.950
	B19	6.671	6.088	7.060	7.739	8.093	6.761
	B20	6.671	6.757	7.514	7.672	8.067	7.004
	B21	6.630	6.918	7.138	7.704	8.110	7.009
	B22	6.414	6.176	7.273	7.687	7.664	6.904
	B23	6.476	6.467	7.525	7.715	7.756	7.302

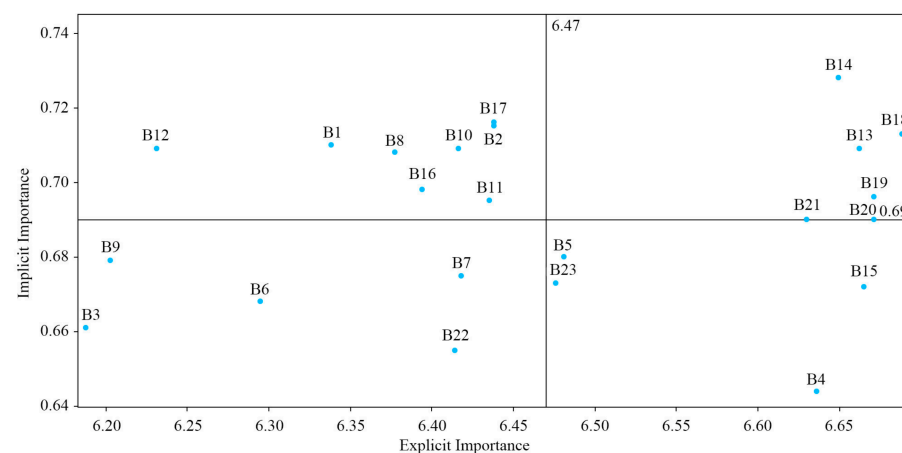


Figure 4. Anhai Ancient Town residents' quadrant chart. Source: Authors' own creation.

Table 7. Satisfaction of residents and tourists in the ancient town. Source: Authors’ own calculation.

Dimensions	Indicators	Anhai Ancient Town				Hukeng Ancient Town				Huotong Ancient Town			
		Residents		Tourists		Residents		Tourists		Residents		Tourists	
		Average Score of Satisfaction	Sort	Average Score of Satisfaction	Sort	Average Score of Satisfaction	Sort	Average Score of Satisfaction	Sort	Average Score of Satisfaction	Sort	Average Score of Satisfaction	Sort
A1	B1	6.381	15	6.411	9	7.622	1	7.237	11	7.720	11	7.561	2
	B2	6.416	10	6.665	7	7.103	6	7.143	19	7.709	12	7.143	21
	B3	6.241	21	5.985	14	6.819	23	7.315	8	7.726	10	7.185	17
	B4	6.287	19	6.374	10	6.948	13	7.059	23	7.744	8	7.539	3
	B5	6.403	12	5.978	15	7.351	2	7.141	20	7.295	19	6.878	23
	B6	6.747	1	6.576	8	7.084	7	7.459	2	7.468	18	7.043	22
A2	B7	6.405	11	6.065	13	7.282	3	7.135	21	7.517	14	7.474	6
	B8	6.241	22	6.232	11	6.882	18	7.426	5	7.487	17	7.372	7
	B9	6.621	2	5.841	22	6.875	20	7.443	3	7.489	16	7.200	16
	B10	6.401	13	6.222	12	6.832	22	7.315	9	7.509	15	7.146	20
	B11	6.431	8	5.828	23	6.957	12	7.437	4	7.134	22	7.170	19
	B12	6.468	6	6.716	3	6.942	14	7.148	16	7.765	6	7.578	1
	B13	6.377	16	5.892	20	7.172	5	7.146	17	7.772	5	7.491	5
	B14	6.610	3	6.748	1	6.996	9	7.298	10	7.789	3	7.511	4
A3	B15	6.397	14	5.961	16	7.028	8	7.330	7	7.733	9	7.348	8
	B16	6.541	5	6.669	6	6.905	17	7.207	13	7.776	4	7.178	18
	B17	6.429	9	5.875	21	6.938	15	7.343	6	7.802	1	7.209	15
	B18	6.466	7	6.675	5	6.882	19	7.150	15	7.746	7	7.298	10
	B19	6.597	4	5.935	18	6.994	10	7.176	14	7.685	13	7.278	13
	B20	6.360	17	5.931	19	6.927	16	7.146	18	7.802	2	7.280	12
	B21	6.313	18	6.682	4	7.189	4	7.217	12	7.147	21	7.239	14
	B22	6.237	23	5.951	17	6.854	21	7.087	22	7.121	23	7.309	9
	B23	6.244	20	6.733	2	6.961	11	7.509	1	7.185	20	7.283	11

Table 8. The implicit importance of the residents and tourists of the ancient town. Source: Authors’ own calculation.

Dimensions	Indicators	Anhai Ancient Town		Hukeng Ancient Town		Huotong Ancient Town	
		Residents	Tourists	Residents	Tourists	Residents	Tourists
		Implicit Importance	Implicit Importance	Implicit Importance	Implicit Importance	Implicit Importance	Implicit Importance
A1	B1	0.710 **	0.530 **	0.530 **	0.437 **	0.384 **	0.693 **
	B2	0.715 **	0.549 **	0.520 **	0.510 **	0.375 **	0.636 **
	B3	0.661 **	0.597 **	0.490 **	0.514 **	0.441 **	0.586 **
	B4	0.644 **	0.461 **	0.549 **	0.534 **	0.382 **	0.604 **
	B5	0.680 **	0.516 **	0.445 **	0.476 **	0.279 **	0.595 **
	B6	0.668 **	0.568 **	0.549 **	0.554 **	0.342 **	0.616 **
A2	B7	0.675 **	0.473 **	0.447 **	0.522 **	0.428 **	0.534 **
	B8	0.708 **	0.450 **	0.622 **	0.498 **	0.371 **	0.590 **
	B9	0.679 **	0.495 **	0.556 **	0.565 **	0.384 **	0.629 **
	B10	0.709 **	0.455 **	0.587 **	0.504 **	0.370 **	0.603 **
	B11	0.695 **	0.523 **	0.550 **	0.495 **	0.369 **	0.640 **
	B12	0.709 **	0.446 **	0.494 **	0.507 **	0.476 **	0.615 **
	B13	0.709 **	0.524 **	0.598 **	0.490 **	0.438 **	0.597 **
	B14	0.728 **	0.547 **	0.484 **	0.485 **	0.357 **	0.638 **
A3	B15	0.672 **	0.510 **	0.523 **	0.547 **	0.399 **	0.647 **
	B16	0.698 **	0.534 **	0.496 **	0.529 **	0.316 **	0.612 **
	B17	0.716 **	0.490 **	0.540 **	0.533 **	0.361 **	0.570 **
	B18	0.713 **	0.457 **	0.574 **	0.520 **	0.430 **	0.607 **
	B19	0.696 **	0.473 **	0.475 **	0.533 **	0.443 **	0.581 **
	B20	0.690 **	0.490 **	0.400 **	0.502 **	0.444 **	0.620 **
	B21	0.690 **	0.520 **	0.497 **	0.510 **	0.533 **	0.689 **
	B22	0.655 **	0.544 **	0.390 **	0.514 **	0.398 **	0.698 **
	B23	0.673 **	0.491 **	0.386 **	0.556 **	0.411 **	0.768 **

Note: ** $p < 0.01$.

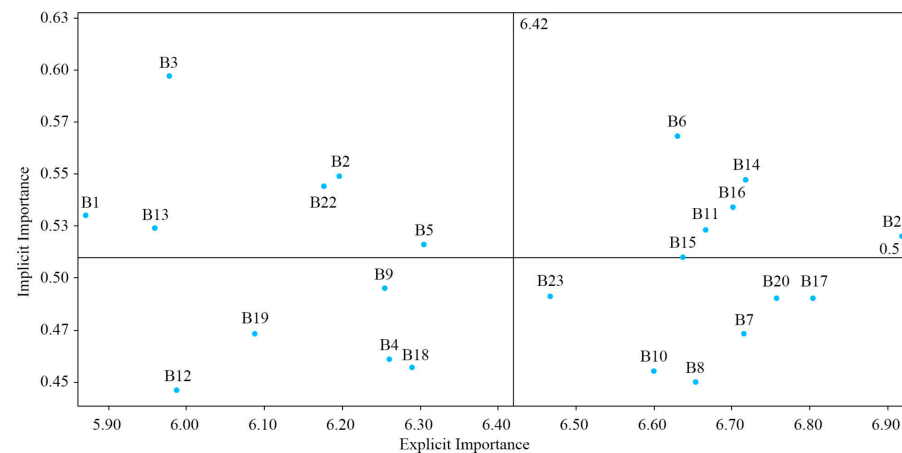


Figure 5. Anhai Ancient Town tourists' quadrant chart. Source: Authors' own creation.

3.1.3. Priority Results of Anhai

By integrating the quadrant attribution results with the satisfaction priority ranking (see Table 1), key indicators reflecting residents' and tourists' concerns regarding public spaces in Anhai Ancient Town were identified (see Table 10). The findings reveal distinct differences in improvement priorities between residents and tourists in Anhai, particularly with regard to commercial facilities and public amenities.

There are eight common indicators identified by both residents and tourists in the public spaces of Anhai Ancient Town, namely B1 (the authenticity of traditional architecture), B5 (the characteristic degree of landscape sketches), B8 (the scale of the space), B10 (the size of the space), B13 (the number of plants), B15 (rest facilities), B17 (the types of business), and B20 (public toilet settings). Among these shared indicators, tourists prioritize B17 (the types of business) and B20 (public toilet settings), assigning them to the first-level improvement zone. This reflects tourists' direct need for convenience and comfort during their visits. In contrast, residents assign B17 (the types of business) to the sixth-level improvement zone, as they may feel that existing local businesses already meet their daily needs and do not see further commercial development as beneficial to their everyday lives. Differences also emerge in B15 (rest facilities), where tourists rank it as a second-level improvement zone and residents place it at the fourth level, reflecting tourists' demand for immediate comfort. Meanwhile, residents emphasize B13 (the number of plants) and B8 (the scale of the space), indicating their concern for the everyday environmental quality and spatial experience. Both groups agree that B1 (the authenticity of traditional architecture) belongs in the sixth-level improvement zone, showing shared respect for preserving Anhai's traditional architectural character.

3.2. Hukeng Ancient Town

3.2.1. Importance and Satisfaction Results of Hukeng

The importance and satisfaction scores of public space indicators for residents and tourists in Hukeng Ancient Town are presented in Tables 6 and 7. As shown in Table 6, for residents of Hukeng, B23 (maintenance of environment and facilities) had the highest importance score, whereas B14 (the abundance of plants) had the lowest. Among tourists in Hukeng, B19 (monitoring facility settings) was rated as the most important, whereas B5 (the characteristic degree of landscape sketches) was rated as the least important.

Table 9. Indicator attribution for residents and tourists in ancient towns. Authors’ own elaboration.

Quadrant Name	Anhai Ancient Town		Hukeng Ancient Town		Huotong Ancient Town	
	Residents	Tourists	Residents	Tourists	Residents	Tourists
	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution
Basic factors	B4 The holding of folk activities B5 The characteristic degree of landscape sketches B15 Rest facilities B23 Maintenance of environment and facilities	B7 The integrity of walking paths B8 The scale of the space B10 The size of the space B17 The types of business B20 Public toilet settings B23 Maintenance of environment and facilities	B7 The integrity of walking paths B12 Paving material for the floor B16 Map guidance B20 Public toilet settings B22 Sun and rain shelter facilities B23 Maintenance of environment and facilities	B1 The authenticity of traditional architecture B12 Paving material for the floor B20 Public toilet settings		
Key performance factors	B13 The number of plants B14 The abundance of plants B18 Night lighting settings B19 Monitoring facility settings B20 Public toilet settings B21 Trash bin settings	B6 The impact of online publicity B11 The crowd density B14 The abundance of plants B15 Rest facilities B16 Map guidance B21 Trash bin settings	B1 The authenticity of traditional architecture B6 The impact of online publicity B10 The size of the space B11 The crowd density B15 Rest facilities	B19 Monitoring facility settings B21 Trash bin settings B22 Sun and rain shelter facilities B23 Maintenance of environment and facilities		
Excitement factors	B1 The authenticity of traditional architecture B2 The degree of coordination between new and old architectural styles B8 The scale of the space B10 The size of the space B11 The crowd density B12 Paving material for the floor B16 Map guidance B17 The types of business	B1 The authenticity of traditional architecture B2 The degree of coordination between new and old architectural styles B3 Number of aborigines B5 The characteristic degree of landscape sketches B13 The number of plants B22 Sun and rain shelter facilities	B2 The degree of coordination between new and old architectural styles B4 The holding of folk activities B8 The scale of the space B9 Sequential changes in space B13 The number of plants B17 The types of business B18 Night lighting settings	B2 The degree of coordination between new and old architectural styles B3 Number of aborigines B4 The holding of folk activities B6 The impact of online publicity B7 The integrity of walking paths B9 Sequential changes in space B15 Rest facilities B16 Map guidance B17 The types of business B18 Night lighting settings	B3 Number of aborigines B15 Rest facilities B22 Sun and rain shelter facilities B23 Maintenance of environment and facilities	B14 The abundance of plants B15 Rest facilities

Table 9. Cont.

Quadrant Name	Anhai Ancient Town		Hukeng Ancient Town		Huotong Ancient Town	
	Residents	Tourists	Residents	Tourists	Residents	Tourists
	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution	Indicator Attribution
Unimportant performance factors	B3 Number of aborigines B6 The impact of online publicity B7 The integrity of walking paths B9 Sequential changes in space B22 Sun and rain shelter facilities	B4 The holding of folk activities B9 Sequential changes in space B12 Paving material for the floor B18 Night lighting settings B19 Monitoring facility settings	B3 Number of aborigines B5 The characteristic degree of landscape sketches B14 The abundance of plants B19 Monitoring facility settings B21 Trash bin settings	B5 The characteristic degree of landscape sketches B8 The scale of the space B10 The size of the space B11 The crowd density B13 The number of plants B14 The abundance of plants	B1 The authenticity of traditional architecture B2 The degree of coordination between new and old architectural styles B4 The holding of folk activities B5 The characteristic degree of landscape sketches B6 The impact of online publicity B8 The scale of the space B9 Sequential changes in space B10 The size of the space B11 The crowd density B14 The abundance of plants B16 Map guidance B17 The types of business	B3 Number of aborigines B4 The holding of folk activities B5 The characteristic degree of landscape sketches B6 The impact of online publicity B7 The integrity of walking paths B8 The scale of the space B10 The size of the space B13 The number of plants B16 Map guidance B17 The types of business B19 Monitoring facility settings

As shown in Table 7, among residents in Hukeng, B1 (the authenticity of traditional architecture) received the highest satisfaction, whereas B3 (number of aborigines) showed the lowest satisfaction. Among tourists in Hukeng Ancient Town, B23 (maintenance of environment and facilities) achieved the highest satisfaction, whereas B4 (the holding of folk activities) recorded the lowest.

3.2.2. Quadrant Attribution Results of Hukeng

Based on the implicit importance values in Table 8 and the quadrant attribution results shown in Figures 6 and 7 and Table 9, the classification of public space indicators reveals both shared patterns and clear differences between residents and tourists in Hukeng Ancient Town. Regarding the basic factors of public spaces in Hukeng Ancient Town, residents identified more indicators than tourists, and B12 (paving material for the floor) and B20 (public toilet settings) were common basic factors for both groups. For key performance factors, residents and tourists identified a similar number of indicators, although no shared indicator was found between the two groups. In the excitement factor quadrant, tourists identified significantly more indicators than residents. Five indicators were common to both groups in this quadrant, namely B2 (the degree of coordination between new and old architectural styles), B4 (the holding of folk activities), B9 (sequential changes in space), B17 (the types of business), and B18 (night lighting settings). As for unimportant performance factors, both groups identified a comparable number of indicators, and both regarded B5 (the characteristic degree of landscape sketches) and B14 (the abundance of plants) as low-priority indicators in the evaluation of public space.

Table 10. The optimization indicators of residents and tourists of ancient towns. Authors' own calculation.

Priority	Anhai Ancient Town		Hukeng Ancient Town		Huotong Ancient Town	
	Residents	Tourists	Residents	Tourists	Residents	Tourists
	Indicators	Indicators	Indicators	Indicators	Indicators	Indicators
1	B4 The holding of folk activities B23 Maintenance of environment and facilities	B17 The types of business B20 Public toilet settings	B16 Map guidance B20 Public toilet settings B22 Sun and rain shelter facilities	B12 Paving material for the floor B20 Public toilet settings		
2	B13 The number of plants B20 Public toilet settings B21 Trash bin settings	B11 The crowd density B15 Rest facilities	B10 The size of the space	B22 Sun and rain shelter facilities	B21 Trash bin settings	B2 The degree of coordination between new and old architectural styles B9 Sequential changes in space B11 The crowd density
3	B8 The scale of the space	B13 The number of plants B22 Sun and rain shelter facilities	B8 The scale of the space B9 Sequential changes in space B18 Night lighting settings	B2 The degree of coordination between new and old architectural styles B4 The holding of folk activities B7 The integrity of walking paths	B22 Sun and rain shelter facilities B23 Maintenance of environment and facilities	
4	B5 The characteristic degree of landscape sketches B15 Rest facilities	B7 The integrity of walking paths B8 The scale of the space B10 The size of the space	B12 Paving material for the floor B23 Maintenance of environment and facilities	B1 The authenticity of traditional architecture		B18 Night lighting settings
5			B11 The crowd density	B19 Monitoring facility settings B21 Trash bin settings	B7 The integrity of walking paths B19 Monitoring facility settings	B20 Public toilet settings B21 Trash bin settings B22 Sun and rain shelter facilities B23 Maintenance of environment and facilities
6	B1 The authenticity of traditional architecture B2 The degree of coordination between new and old architectural styles B10 The size of the space B17 The types of business	B1 The authenticity of traditional architecture B3 Number of aborigines B5 The characteristic degree of landscape sketches	B4 The holding of folk activities B17 The types of business	B16 Map guidance B18 Night lighting settings	B3 Number of aborigines B15 Rest facilities	

3.2.3. Priority Results of Hukeng

By integrating the quadrant attribution results with the satisfaction priority ranking (see Table 1), key indicators reflecting residents' and tourists' concerns regarding public spaces in Hukeng Ancient Town were identified (see Table 10). The results reveal clear differences in how residents and tourists prioritize public space improvement in Hukeng, particularly in relation to functional convenience, walking comfort, and cultural experience.

There are six common indicators identified by both residents and tourists in the public spaces of Hukeng Ancient Town, namely B4 (the holding of folk activities), B12 (paving material for the floor), B16 (map guidance), B18 (night lighting settings), B20 (public toilet settings), and B22 (sun and rain shelter facilities). Both groups place B20 (public toilet settings) in the first-level improvement zone, indicating that the shortage of such

facilities has become a shared and urgent problem in Hukeng's public spaces. Beyond this common concern, residents prioritize B16 (map guidance) and B22 (sun and rain shelter facilities), whereas tourists pay more attention to B12 (paving material for the floor). This difference implies that residents are more concerned with the overall usability and functional convenience of public space, while tourists place greater emphasis on walking comfort and the immediate physical experience of the visiting environment. Interestingly, tourists rank B4 (the holding of folk activities) as a third-level improvement and B18 (night lighting settings) as a sixth-level improvement, whereas residents hold the opposite view. This contrast suggests that tourists expect public spaces in Hukeng to provide a stronger cultural atmosphere and richer experiential value, while residents are more concerned with practical needs related to daily use, such as visibility and safety at night.

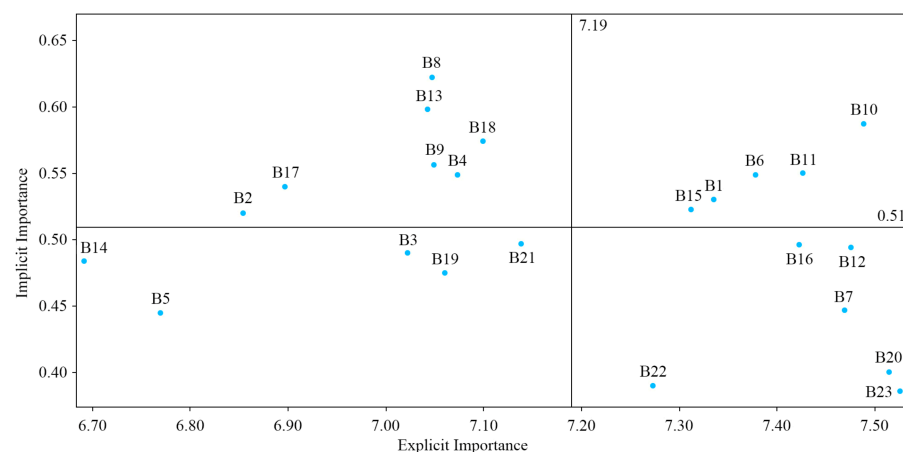


Figure 6. Hukeng Ancient Town residents' quadrant chart. Source: Authors' own creation.

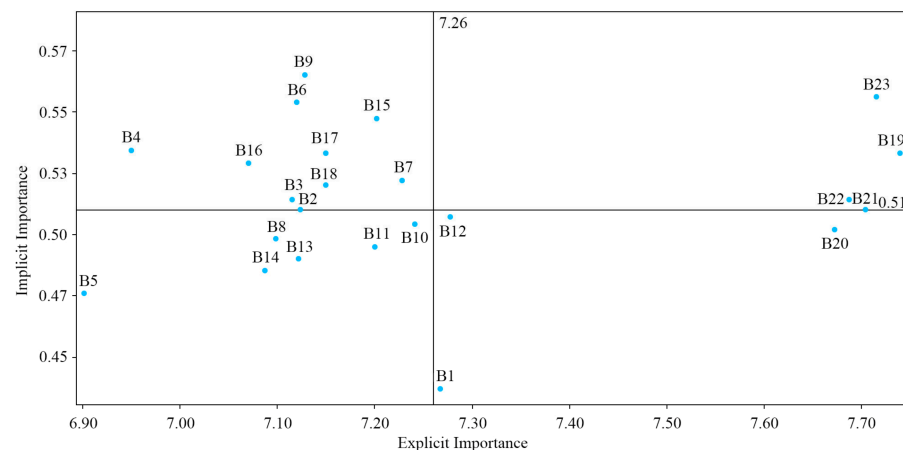


Figure 7. Hukeng Ancient Town tourists' quadrant chart. Source: Authors' own creation.

3.3. Huotong Ancient Town

3.3.1. Importance and Satisfaction Results of Huotong

The questionnaire survey obtained the average scores of importance and satisfaction assigned by residents and tourists in Huotong Ancient Town (see Tables 6 and 7). As shown in Table 6, for residents of Huotong, B18 (night lighting settings) received the highest importance score, whereas B3 (number of aborigines) received the lowest. Among tourists in Huotong, B23 (maintenance of environment and facilities) was rated as the most important, whereas B3 (number of aborigines) was rated as the least important.

As shown in Table 7, residents in Huotong Ancient Town reported the highest satisfaction with B17 (the types of business), whereas B22 (sun and rain shelter facilities) received

the lowest satisfaction. Among tourists in Huotong Ancient Town, B12 (paving material for the floor) ranked the highest, while B5 (the characteristic degree of landscape sketches) ranked the lowest.

3.3.2. Quadrant Attribution Results of Huotong

Based on the implicit importance values in Table 8 and the quadrant attribution results shown in Figures 8 and 9 and Table 9, the classification of public space indicators reveals distinct patterns of concern between residents and tourists in Huotong Ancient Town. Regarding the basic factors of public spaces in Huotong Ancient Town, residents identified no indicators in this quadrant, whereas tourists identified two. For key performance factors, tourists identified more indicators than residents, and both groups shared B20 (public toilet settings) and B21 (trash bin settings) in this quadrant. In the excitement factor quadrant, residents identified more indicators than tourists, and B15 (rest facilities) was a common concern for both groups. As for unimportant performance factors, both residents and tourists identified the largest number of indicators in this quadrant, with more than ten indicators reported by each group. Seven indicators were common to both groups, namely B4 (the holding of folk activities), B5 (the characteristic degree of landscape sketches), B6 (the impact of online publicity), B8 (the scale of the space), B10 (the size of the space), B16 (map guidance), and B17 (the types of business), indicating that these elements were regarded as relatively low-priority in the evaluation of public space.

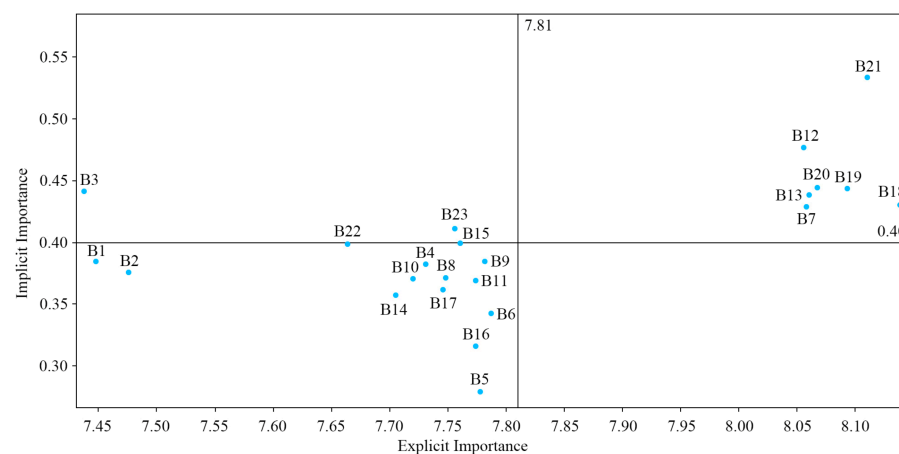


Figure 8. Huotong Ancient Town residents' quadrant chart. Source: Authors' own creation.

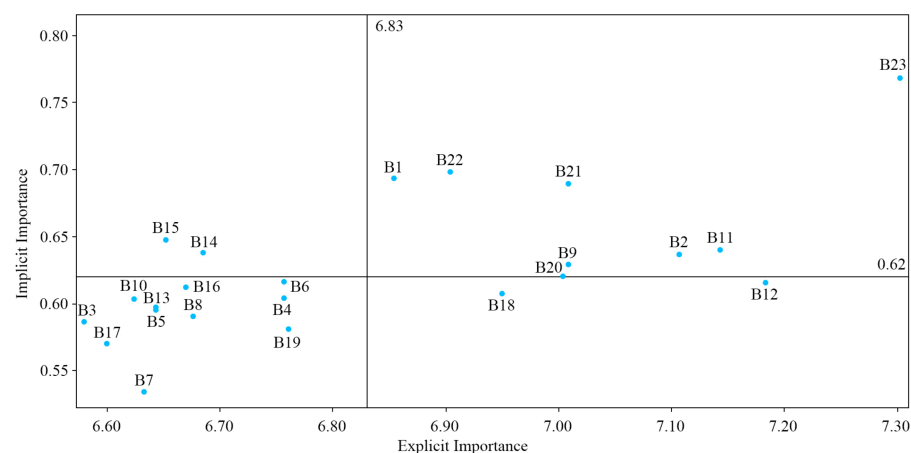


Figure 9. Huotong Ancient Town tourists' quadrant chart. Source: Authors' own creation.

3.3.3. Priority Results of Huotong

By integrating the quadrant attribution results with the satisfaction priority ranking (see Table 1), key indicators reflecting residents' and tourists' concerns regarding public spaces in Huotong Ancient Town were identified (see Table 10). The findings reveal clear differences between residents and tourists, with residents placing greater emphasis on practical improvements such as cleanliness, comfort, and maintenance.

There are only three common indicators identified by both residents and tourists in the public spaces of Huotong Ancient Town, namely B21 (trash bin settings), B22 (sun and rain shelter facilities), and B23 (maintenance of environment and facilities). Residents have a high expectation of improvement for these three indicators, with B21 (trash bin settings) placed at the second-level improvement and B22 (sun and rain shelter facilities) and B23 (maintenance of environment and facilities) placed at the third-level improvement. On the other hand, tourists categorized all three indicators as fifth-level improvements. This disparity suggests that residents place greater importance on the practical aspects of public space, such as cleanliness, comfort, and maintenance, while tourists are less concerned with these aspects, likely prioritizing other factors of the tourist experience.

3.4. Comparative Results Across the Three Ancient Towns

3.4.1. Overall Comparison of Importance and Satisfaction

A cross-town comparison of the importance and satisfaction results reveals variations in public space evaluation across resident and tourist groups in the three ancient towns. Based on the average importance and satisfaction scores presented in Tables 6 and 7, residents in both Anhui and Huotong identified B18 (night lighting settings) as the most important indicator for public space evaluation. By contrast, residents in Hukeng and tourists in Huotong attached the greatest importance to B23 (maintenance of environment and facilities). Regarding the least important indicators, residents in Anhui and both residents and tourists in Huotong assigned the lowest importance to B3 (number of aborigines).

3.4.2. Comparison of Quadrant Attribution Results

Based on the quadrant attribution results shown in Figures 4–9 and Table 9, a cross-town comparison was conducted to examine similarities and differences in the classification of public space indicators among residents and tourists in Anhui, Hukeng, and Huotong Ancient Towns.

Among residents, differences emerge when the same indicators are classified into different quadrants across the three ancient towns. For example, B23 (maintenance of environment and facilities) is regarded as a basic factor by residents in both Anhui and Hukeng, whereas residents in Huotong classify it as an excitement factor. Regarding key performance factors, residents in Anhui and Huotong share five common indicators, namely B13 (the number of plants), B18 (night lighting settings), B19 (monitoring facility settings), B20 (public toilet settings), and B21 (trash bin settings). In contrast, among residents in Hukeng, B20 (public toilet settings) is classified as a basic factor, B13 (the number of plants) and B18 (night lighting settings) are regarded as excitement factors, and B19 (monitoring facility settings) and B21 (trash bin settings) fall into the unimportant performance quadrant.

For excitement factors, residents in Anhui and Hukeng share three indicators, namely B2 (the degree of coordination between new and old architectural styles), B8 (the scale of the space), and B17 (the types of business), whereas residents in Huotong classify these indicators as unimportant performance factors. Regarding unimportant performance factors, residents in Anhui and Hukeng share B3 (number of aborigines), residents in Anhui and Huotong share B6 (the impact of online publicity) and B9 (sequential changes in space),

and residents in Hukeng and Huotong share B5 (the characteristic degree of landscape sketches) and B14 (the abundance of plants). Although some indicators overlap between towns, most remain locally specific. For instance, B7 (the integrity of walking paths) is classified differently across the three towns: it is regarded as an unimportant performance factor in Anhai, a basic factor in Hukeng, and a key performance factor in Huotong.

Among tourists, both commonalities and differences can be observed across the three ancient towns. Tourists in Anhai and Hukeng regard B20 (public toilet settings) as a basic factor, whereas tourists in Huotong classify it as a key performance factor. Similarly, tourists in Hukeng and Huotong regard B12 (paving material for the floor) as a basic factor, while tourists in Anhai place it in the unimportant performance quadrant. Regarding key performance factors, B21 (trash bin settings) is commonly identified by tourists in Anhai, Hukeng, and Huotong. In the excitement factor quadrant, tourists in Anhai and Hukeng share two common indicators, namely B2 (the degree of coordination between new and old architectural styles) and B3 (number of aborigines), while B15 (rest facilities) is shared by tourists in Hukeng and Huotong. In the unimportant performance quadrant, tourists in Huotong overlap with tourists in Anhai on B4 (the holding of folk activities) and B19 (monitoring facility settings) and with tourists in Hukeng on B5 (the characteristic degree of landscape sketches), B8 (the scale of the space), B10 (the size of the space), and B13 (the number of plants). These six indicators are regarded as low-priority by tourists and have limited influence on the overall performance of public space.

3.4.3. Cross-Town Comparison of Priority Indicators

A comparison of Table 10 further reveals differences in improvement priorities across the three ancient towns. Across all cases, residents tended to prioritize indicators related to maintenance, everyday usability, and environmental quality, whereas tourists more frequently prioritized facilities associated with immediate comfort and travel convenience, such as public toilets, paving material, rest facilities, and sun and rain shelter facilities. Among the three towns, Hukeng showed the greatest overlap between residents and tourists in priority indicators, suggesting a relatively shared concern for functional public space quality. By contrast, Huotong showed the smallest overlap, indicating a clearer divergence between local daily-use needs and tourist-oriented expectations. Anhai occupied an intermediate position, where residents and tourists shared a number of indicators but assigned substantially different improvement levels to them, especially for commercial facilities and public amenities.

Overall, these differences show that improvement priorities are shaped not only by user group but also by the distinct development contexts of the three case towns. This cross-town comparison moves beyond the expected distinction between residents' functional concerns and tourists' experiential focus reported in previous studies [63,64] by showing that the degree of overlap, the urgency of shared needs, and the role of the same indicators vary across contexts characterized by different levels of commercialization, heritage orientation, and tourism service maturity.

3.4.4. Supplementary Statistical Validation of Shared Indicators

To complement the IPA–KANO-based identification of shared priority indicators, independent-samples *t*-tests were additionally conducted for the importance and satisfaction scores of the shared indicators in each case town. Because the improvement priorities in this study were derived from the integration of quadrant attribution and satisfaction ranking, these tests were not intended to replace the IPA–KANO analysis. Instead, they were used to examine whether residents and tourists differed significantly in their underlying evaluations of the selected shared indicators. The results are summarized in Table 11.

Table 11. Independent-samples *t*-test results for shared indicators across the three ancient towns.
Source: Authors' own calculation.

Ancient Town	Indicator	Measure	Residents (Mean $\pm$ SD)	Tourists (Mean $\pm$ SD)	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
Anhai	B1	Importance	6.34 $\pm$ 2.28	5.87 $\pm$ 1.48	3.703	<0.001	0.245
	B1	Satisfaction	6.38 $\pm$ 2.23	6.41 $\pm$ 1.53	−0.234	0.815	−0.016
	B5	Importance	6.48 $\pm$ 2.11	6.31 $\pm$ 1.44	1.478	0.140	0.094
	B5	Satisfaction	6.40 $\pm$ 2.18	5.98 $\pm$ 1.53	3.437	0.001	0.223
	B8	Importance	6.38 $\pm$ 2.31	6.65 $\pm$ 1.71	−2.078	0.038	−0.133
	B8	Satisfaction	6.24 $\pm$ 2.21	6.23 $\pm$ 1.46	0.074	0.941	0.005
	B10	Importance	6.42 $\pm$ 2.26	6.60 $\pm$ 1.71	−1.401	0.162	−0.090
	B10	Satisfaction	6.40 $\pm$ 2.18	6.22 $\pm$ 1.50	1.462	0.144	0.096
	B13	Importance	6.66 $\pm$ 2.06	5.96 $\pm$ 1.54	5.891	<0.001	0.385
	B13	Satisfaction	6.38 $\pm$ 2.30	5.89 $\pm$ 1.55	3.765	<0.001	0.250
	B15	Importance	6.67 $\pm$ 2.06	6.64 $\pm$ 1.64	0.276	0.783	0.016
	B15	Satisfaction	6.40 $\pm$ 2.16	5.96 $\pm$ 1.58	3.509	<0.001	0.233
	B17	Importance	6.44 $\pm$ 2.19	6.80 $\pm$ 1.82	−2.776	0.006	−0.179
	B17	Satisfaction	6.43 $\pm$ 2.22	5.88 $\pm$ 1.44	4.504	<0.001	0.294
	B20	Importance	6.67 $\pm$ 2.08	6.76 $\pm$ 1.65	−0.704	0.481	−0.048
	B20	Satisfaction	6.36 $\pm$ 2.20	5.93 $\pm$ 1.53	3.452	0.001	0.227
Hukeng	B4	Importance	7.07 $\pm$ 1.74	6.95 $\pm$ 1.51	1.151	0.250	0.074
	B4	Satisfaction	6.95 $\pm$ 1.67	7.06 $\pm$ 1.51	−1.054	0.292	−0.069
	B12	Importance	7.48 $\pm$ 1.58	7.28 $\pm$ 1.66	1.856	0.064	0.123
	B12	Satisfaction	6.94 $\pm$ 1.51	7.15 $\pm$ 1.65	−1.981	0.048	−0.133
	B16	Importance	7.42 $\pm$ 1.74	7.07 $\pm$ 1.59	3.218	0.001	0.210
	B16	Satisfaction	6.91 $\pm$ 1.68	7.21 $\pm$ 1.50	−2.882	0.004	−0.188
	B18	Importance	7.10 $\pm$ 1.70	7.15 $\pm$ 1.67	−0.459	0.647	−0.030
	B18	Satisfaction	6.88 $\pm$ 1.61	7.15 $\pm$ 1.63	−2.513	0.012	−0.167
	B20	Importance	7.51 $\pm$ 1.45	7.67 $\pm$ 1.63	−1.563	0.118	−0.104
	B20	Satisfaction	6.93 $\pm$ 1.71	7.15 $\pm$ 1.57	−2.026	0.043	−0.134
	B22	Importance	7.27 $\pm$ 1.62	7.69 $\pm$ 1.65	−3.855	<0.001	−0.257
	B22	Satisfaction	6.85 $\pm$ 1.68	7.09 $\pm$ 1.54	−2.199	0.028	−0.149
Huotong	B21	Importance	8.11 $\pm$ 0.96	7.01 $\pm$ 1.81	11.512	<0.001	0.760
	B21	Satisfaction	7.15 $\pm$ 0.69	7.24 $\pm$ 1.77	−1.047	0.296	−0.067
	B22	Importance	7.66 $\pm$ 1.20	6.90 $\pm$ 1.87	7.344	<0.001	0.484
	B22	Satisfaction	7.12 $\pm$ 0.72	7.31 $\pm$ 1.72	−2.168	0.031	−0.144
	B23	Importance	7.76 $\pm$ 1.21	7.30 $\pm$ 1.86	4.384	<0.001	0.293
	B23	Satisfaction	7.19 $\pm$ 0.72	7.28 $\pm$ 1.77	−1.095	0.274	−0.067

Note: Independent-samples *t*-tests were conducted for the importance and satisfaction scores of the shared indicators identified through the IPA–KANO framework. Indicator codes correspond to those listed in Table 2. Anhai: residents *n* = 464, tourists *n* = 465; Hukeng: residents *n* = 464, tourists *n* = 460; Huotong: residents *n* = 464, tourists *n* = 460. Cohen's *d* values indicate effect size. Positive Cohen's *d* values indicate higher mean scores for residents, whereas negative values indicate higher mean scores for tourists.

Overall, the supplementary tests showed that several shared indicators exhibited statistically significant resident–tourist differences, although the corresponding effect sizes were generally small. In Anhui, statistically significant resident–tourist differences were observed in both importance and satisfaction scores. Significant differences in importance were found for B1, B8, B13, and B17, whereas significant differences in satisfaction were found for B5, B13, B15, B17, and B20. In Hukeng, statistically significant resident–tourist differences were also observed in both importance and satisfaction scores. Significant differences in importance were found for B16 and B22, whereas significant differences in satisfaction were found for B12, B16, B18, B20, and B22. In Huotong, statistically significant resident–tourist differences were found for all three shared indicators in importance, namely B21, B22, and B23, whereas in satisfaction, a significant difference was found only for B22. These results provide inferential support for the descriptive patterns identified through the IPA–KANO framework, while also suggesting that the strength of resident–tourist divergence varies across different ancient-town contexts.

4. Discussion

4.1. Overall Differences Between Residents and Tourists

The results reveal clear differences between residents and tourists across the three ancient towns. Residents paid greater attention to the maintenance of environment and facilities, whereas tourists showed stronger concern for public toilets and sun and rain shelter facilities. This pattern suggests that the two groups evaluate public space from different usage perspectives. Residents are more closely connected to the long-term daily use of public space, while tourists are more sensitive to short-term convenience and immediate physical comfort during visits [64,65].

Residents' stronger concern with maintenance is understandable because environmental quality and facility conditions directly affect everyday usability, perceived safety, and the social quality of public space. Recent studies have shown that maintenance and cleanliness are important components of public-space satisfaction [66]. In historic settings such as ancient towns, these issues are especially relevant because public space functions not only as a tourism environment but also as part of residents' everyday living environment [67]. Clean and orderly public spaces can also encourage community participation and support social interaction among residents [68]. Moreover, well-maintained public spaces can contribute positively to well-being and social cohesion [69].

By contrast, tourists place greater emphasis on public toilets because their location, adequacy, cleanliness, and ease of use directly affect comfort and convenience during temporary stays. Song & Dai [70] emphasized that tourists paid particular attention to the location of public toilets so that they could find them quickly in urgent situations. Rapid access to and ease of use of public toilets are therefore key concerns for tourists [70]. In addition, public toilet provision is not only a matter of basic infrastructure but also an important component of tourism service quality. Due to physiological differences and gender-specific needs, women often require more time and more supportive toilet facilities than men [71]. However, public toilet environments often do not adequately address women's menstruation-related and other gender-specific needs [72]. Design practices that provide equal space and occupancy for both genders may therefore lead to long queues for women during peak periods, causing physical discomfort and negatively affecting their travel experience [73]. For this reason, public toilet provision becomes a prominent concern for tourists. They care not only about the number and location of toilets but also about whether these facilities are clean, accessible, and designed in a gender-sensitive manner. In contrast, residents often pay less attention to this issue because, living in the ancient town with private home toilets, they do not rely on public facilities for daily physiological needs.

Tourists also show stronger concern for sun and rain shelter facilities. In China, most people travel according to holiday schedules [74], and booked trips are rarely canceled due to normal weather changes. Fujian Province has a typical subtropical monsoon climate, with long, hot summers, short and mild winters, and abundant rainfall. Under such conditions, sun and rain shelter facilities in public spaces become particularly important because they directly affect tourists' comfort and safety during outdoor activities. Wang [75] noted that among all public space services, tourists' demand for sun and rain protection is the highest. Similarly, Yu [37] found that tourists regarded basic public-space facilities as essential, especially sun and rain shelters, and that female tourists showed a higher demand for sun protection than male tourists. These findings help explain why weather-protection facilities emerged as a prominent concern for tourists in the present study. Residents, in contrast, often pay less attention to these facilities because their daily activity patterns are more stable and they are more familiar with available shelter options in everyday life. As a result, tourists tend to be more sensitive to short-term weather-protection needs, whereas residents are better adapted to local environmental conditions.

Taken together, these differences suggest that public space in ancient towns should not be managed only for tourism consumption but also for residents' everyday use. In this sense, the key issue is not simply whether residents and tourists have different preferences, but how public-space management can balance short-term visitor needs with long-term community needs. This is particularly important for sustainable destination management, where improving visitor experience should not come at the expense of residents' daily quality of life [76]. These patterns are further supported by the supplementary *t*-test results, which indicate statistically significant resident–tourist differences for several shared indicators across the three case towns, although the corresponding effect sizes are generally small.

4.2. Interpretation of Town-Specific Patterns

Although the three ancient towns share some common resident–tourist differences, each town also shows a distinct pattern. In Anhai, tourists assigned higher priority to the types of business, public toilet settings, and rest facilities, whereas residents placed greater emphasis on plants and spatial scale. This suggests that in a commercially developed ancient town with relatively mature tourism support, tourists are more sensitive to convenience and service support, while residents remain more concerned with everyday environmental quality [64,65].

In Hukeng, both residents and tourists placed public toilet settings in the first-level improvement zone, indicating that this was a shared and urgent issue. At the same time, the two groups differed in their priorities for paving material, map guidance, folk activities, and night lighting. This pattern suggests that Hukeng, as a heritage-driven tourism destination with the strongest World-Heritage-oriented tourism identity, needs to support both practical functionality and heritage experience. In other words, public space optimization in Hukeng should be approached through a sustainable tourism framework that integrates spatial planning, community engagement, and tourism infrastructure [77–79].

Huotong presents a different pattern. Residents showed stronger concern for trash bin settings, sun and rain shelter facilities, and the maintenance of environment and facilities, whereas tourists assigned lower improvement priorities to these indicators. This suggests that in a relatively less-commercialized historic settlement, public space is evaluated more strongly in relation to daily living needs, and the gap between local use and tourist expectations becomes more apparent. Compared with Anhai and Hukeng, Huotong reflects a context in which residents' everyday experience plays a more central role in judging public space quality [80].

Overall, the town-specific patterns suggest that resident–tourist differences in public-space evaluation should be interpreted in relation to local tourism development conditions rather than as a uniform contrast between functional and experiential preferences. In this sense, the same indicator may acquire different levels of urgency depending on how local development characteristics interact with the needs of different user groups.

4.3. Space Optimization Strategies for Ancient Towns

Based on the town-specific patterns identified above, public space optimization in ancient towns should adopt differentiated strategies rather than a uniform improvement model. For Anhai, priority should be given to visitor-oriented service facilities while maintaining the environmental quality of shared public space. The results show that tourists assigned higher priority to the types of business, public toilet settings, and rest facilities, whereas residents placed greater emphasis on plants and spatial scale. In a commercially developed ancient town with relatively mature tourism support, this pattern suggests that public toilet provision, rest facilities, and the regulation of commercial spillover should be treated as priority intervention items. This need is further reinforced by Anhai’s broader heritage context, as Anping Bridge in Anhai Ancient Town forms part of Quanzhou’s World Heritage property. Recent research has shown that Quanzhou has implemented a suite of measures, including diversified business models and strengthened brand marketing, to advance the preservation and dissemination of its World Heritage culture and promote the integrated development of culture and tourism [81]. In this context, destination promotion may further reshape visitor-flow patterns and intensify pressure on public space and facilities if not accompanied by management measures. Therefore, in Anhai, facility improvement should be coordinated with visitor-flow management and commercial control so that tourism growth does not further weaken the environmental quality of shared public space.

For Hukeng, the key task is to combine functional facility improvement with sustainable heritage tourism management. Both residents and tourists placed public toilet settings in the first-level improvement zone, while differing in their priorities for paving material, map guidance, folk activities, and night lighting. As a heritage-driven tourism destination with the strongest World-Heritage-oriented tourism identity, Hukeng requires a sustainable tourism strategy that integrates spatial planning, tourism infrastructure, and community engagement [77–79]. Previous research has shown that World Heritage designation in developing countries can increase tourism demand while making conservation and tourism management more complex [82]. Accordingly, public toilet provision, paving quality, and map guidance should be treated as priority intervention items because they directly affect both visitor use and everyday functionality. At the same time, folk activities and night lighting should be managed in ways that strengthen cultural expression without weakening the traditional atmosphere of the ancient town.

For Huotong, public space optimization should place greater emphasis on residents’ daily-use infrastructure and environmental maintenance. Residents assigned stronger priority to trash bin settings, sun and rain shelter facilities, and the maintenance of environment and facilities, whereas tourists assigned these indicators lower improvement priority. This pattern indicates that in a relatively less-commercialized ancient town, public-space quality is judged more strongly through residents’ long-term living experience. Accordingly, the most urgent strategies for Huotong are to improve maintenance, cleanliness, waste management, weather-protection facilities, and the everyday usability of public space, rather than to expand tourism-oriented functions. In this sense, a more moderate development path is preferable in Huotong, one that strengthens residents’ daily-use environment while avoiding excessive commercialization.

Taken together, these strategies indicate that public space optimization in ancient towns should be grounded in local tourism conditions, heritage context, and residents' everyday needs, rather than applied through a uniform model. More broadly, this suggests that public-space improvement in ancient towns is also a matter of destination governance, because it requires coordination among multiple stakeholders and the balancing of tourism development, heritage conservation, and everyday community life. In this sense, the practical contribution of the study lies not only in identifying perceptual differences between residents and tourists but also in showing how the IPA–KANO framework can translate those differences into graded and context-sensitive intervention priorities for more sustainable public-space planning and management.

4.4. Limitations

This study has several limitations. First, only three ancient towns in Fujian Province were included as case studies, which may limit the generalizability of the findings to ancient towns in other regional and developmental contexts. Second, the IPA–KANO model has inherent limitations. Indicators closer to the axes yield lower accuracy, which could be improved by integrating fuzzy algorithms [83]. Third, although reliability and validity tests showed strong overall measurement quality, some indicators may still have been interpreted differently by respondents despite on-site clarification during questionnaire administration. Finally, although supplementary independent-samples *t*-tests were conducted for the shared indicators identified in each case town, the overall analytical framework of this study remains primarily descriptive and exploratory. The statistical validation was limited to selected shared indicators and did not extend to broader multivariate modeling or full-scale inferential comparison across all variables. Future research could strengthen robustness by integrating IPA–KANO analysis with ANOVA, multivariate analysis, or other advanced statistical techniques.

5. Conclusions

This study examined public building spaces in three representative ancient towns in Fujian Province—Anhai, Hukeng, and Huotong—from the perspectives of residents and tourists. By applying the IPA–KANO model, it developed a systematic evaluation framework and identified differentiated public-space priorities under different tourism development contexts. The findings show that resident–tourist differences in ancient-town public spaces are clear but not fixed; rather, they vary with local development conditions.

A key contribution of this study is the establishment of a multidimensional evaluation framework for ancient-town public spaces, consisting of 23 indicators under three dimensions: traditional style, sensory experience, and supporting facilities. The results confirm that residents and tourists differ in their priorities. Residents place greater emphasis on the maintenance of environment and facilities, whereas tourists are more sensitive to public toilet settings and sun and rain shelter facilities. At the same time, these differences are context dependent. Hukeng showed the greatest overlap between residents and tourists, Anhai displayed an intermediate pattern with shared indicators but different urgency levels, and Huotong revealed the strongest divergence, with residents' daily-use needs playing a more central role in public-space evaluation.

Methodologically, the study demonstrates that the IPA–KANO model can be effectively applied to ancient-town public-space evaluation by translating user perceptions into graded improvement priorities. Theoretically, it contributes to the literature by comparing residents' and tourists' perceptions within a unified analytical framework that integrates traditional features, sensory experience, and supporting facilities. In doing so, it extends public-space evaluation from a question of environmental quality and visitor satisfaction to a broader

issue of destination governance, stakeholder coordination, and sustainable management in historic and heritage settings.

From a practical perspective, the findings suggest that public-space optimization in ancient towns should be context sensitive rather than standardized. In commercially developed contexts such as Anhui, improvement should balance tourist convenience with residents' everyday environmental quality. In heritage-driven contexts such as Hukeng, priority should be given to interventions that support both practical functionality and heritage experience. In relatively less-commercialized contexts such as Huotong, greater emphasis should be placed on residents' daily-use infrastructure, cleanliness, maintenance, and weather-protection facilities. More broadly, the study indicates that public-space management in ancient towns should be treated not only as a design issue but also as a governance issue requiring coordination between tourism development, heritage conservation, and community life.

Future research could test the wider applicability of this framework in other regional and developmental contexts and further strengthen comparative robustness by combining questionnaire data with behavioral observation, seasonal analysis, and additional statistical testing.

Author Contributions: Conceptualization, X.Z. and H.F.; validation, J.C., B.Z. and P.L.; investigation, X.Z., J.C. and C.-K.M.; data curation, X.Z., B.Z. and P.L.; writing—original draft, X.Z. and H.C.; writing—review and editing, C.-L.C. and C.-K.M.; supervision, H.F. and H.C.; funding acquisition, X.Z. and C.-L.C. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the 2025 Fujian Provincial Education System Philosophy and Social Science Research Project, grant number JAS25251. The authors also acknowledge the funding support from Universiti Teknologi Malaysia, Potential Academic Staff [Q.J130000.2722.03K62].

Institutional Review Board Statement: Ethical review and approval were waived for this study as the study did not involve any medical procedures, clinical interventions, psychological manipulation, or inclusion of vulnerable populations. Therefore, it is classified as minimal-risk research, which generally does not require a formal ethical review under standard academic research guidelines. Second, the data collection process was conducted in a fully anonymous manner. The questionnaire did not collect any personally identifiable information, such as names, contact details, identification numbers, or any other data that could directly or indirectly identify participants. All responses were recorded and stored in an anonymized form and were used solely for academic research purposes. Third, participation in this study was entirely voluntary. All participants were informed of the research purpose, procedures, and their rights through an informed consent statement prior to participation. Participants had the right to withdraw at any time without any negative consequences. The study did not involve deception, coercion, or any form of physical, psychological, or social harm.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data is contained within the article.

Acknowledgments: During the preparation of this manuscript, the authors used an AI-based tool (ChatGPT-5.3) to assist in the generation of Figure 1 for visualization purposes. The authors have reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

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