Research on the Promotion of Rural Mountain Local Tourism Landscape in Yangtze River Delta based on IPA analysis: A case Study of Nanshankan Village

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Abstract. Tourism has evolved into a critical metric for assessing national well-being and quality of life, with rural mountain tourism emerging as a burgeoning trend in the Yangtze River Delta region. However, insufficient attention to the significance of rural mountain tourism landscape content and tourists' needs has led to generally substandard landscapes, impacting the long-term development of local tourism economies. This study focuses on Nanshankan Village in Nanjing, Yangtze River Delta, employing factor analysis and Importance-Performance Analysis (IPA) to evaluate the importance and satisfaction levels of various material and non-material landscape elements of rural mountain tourism. The conclusion is as follows: (1) The landscape evaluation system and index can fully reflect the current situation of rural mountain tourism landscape; (2) Each index is in different positions in the four quadrants, and the content is classified with different degrees of maintenance and improvement; (3) In view of the difference between the real needs of tourists and the current situation of the landscape, specific measures are proposed to promote this type of landscape, and theoretical references are provided for relevant research.

Keywords: Landscape promotion, Rural mountain local tourism, IPA analysis method, Yangtze River Delta region

1   INTRODUCTION

The Yangtze River Delta is one of the regions with the most active economic development and the highest degree of openness in China, with a long history and culture and a developed water system. With the rapid economic development and the rapid increase of urban population in the Yangtze River Delta [1], the outdoor activity space in the city is getting smaller and smaller. Therefore, more and more people want to get close to nature, walk in the mountains, and experience the leisure life with the characteristics of rural mountains [2]. Rural mountain tourism, which relies on local resources such as mountain, forestry, countryside and natural landscape, has gradually become a preferred way for locals to travel, allowing tourists to escape the crowded and fast-paced

urban life. At the same time, the tourism activities such as sightseeing and leisure, activity experience, publicity and learning with the theme of forest scenery, rural village life and characteristic folk customs can effectively drive the economy of the rural area [3], improve the ecological environment of the rural village, enhance the basic service construction of the rural village, and improve the spatial planning of the rural village. Locality refers to the characteristics and phased results presented in the coupling and coordination process of material landscape elements such as natural environment and artificial environment with intangible landscape elements such as history, culture and local customs within a certain region. Nowadays, an excellent rural local tourism landscape planning should fully integrate local characteristics, geographical conditions, agriculture, ecological resources, local traditional culture, folk customs, etc. [4]. Create a comprehensive experience place that meets the needs of modern people and has a high degree of tourist satisfaction [5]. Actually, rural tourism landscape is not only the direct carrier to show the life style of rural villages, but also the specific expression of the characteristic life of rural villages. Compared with the western region, on the one hand, the Yangtze River Delta region is flat with fewer mountain resources, on the other hand, the mountain height and mountain forest composition elements in the Yangtze River Delta region are different from those in other regions, and people are generally eager to experience mountain tourism with local characteristics. Therefore, the planning and design of rural mountain tourism landscape should respect the local excellent forest art, traditional rural culture and folk customs, and also pay attention to the combination of rural landscape and forestry. However, relevant studies rarely pay attention to the high-quality development of rural tourism. Which local landscape elements are crucial? What landscape factors do rural tourists pay attention to? What are the main local features of rural tourism to attract more tourists? These are the key issues that should be studied in the development of rural mountain tourism. Taking Nanshankan Village in Yangtze River Delta as an example, this paper introduces the importance-satisfaction analysis method into the research of rural mountain tourism landscape improvement. First, the importance of rural local landscape elements is evaluated to reflect the various needs of the tourist group. Then, the measures to improve the landscape are introduced by evaluating the satisfaction of tourists with the rural mountain tourism landscape.

2   RESEARCH REGIONS AND METHODS

2.1   Research Regions

Qingpu District is located in the southwest corner of Shanghai, between the lower reaches of Taihu Lake and the upper reaches of Huangpu River, between 120°53'~121°17' east longitude and 30°59'~31°16' north latitude, with a total area of 668.54 square kilometers, flat terrain, altitude of 2.8-3.5 meters, and the daily average temperature of about 17.6°C. The water network is densely covered and rivers run through the territory. Dianshan Lake in Qingpu District is 46.84 square kilometers, rich in species resources and high vegetation coverage, which is an important ecological barrier for Shanghai. In 2020, the GDP of Qingpu District is 119.401 billion yuan, calculated at comparable prices, an increase of 3.8% over the previous year, and the growth

rate is the third in the city. The added value of the primary industry is 797 million yuan; The added value of the secondary industry was 42.162 billion yuan; The tertiary industry added 76.442 billion yuan. Qingpu District has jurisdiction over 3 streets and 8 towns: Xia-yang Street, Yingpu Street, Xianghuaqiao Street, Zhaoxiang Town, Xujing Town, Huaxin Town, Chonggu Town, Baihe Town, Zhujiajiao Town, Liantang Town, and Jinze Town, with jurisdiction over 184 administrative villages and 157 communities (Figure 1).
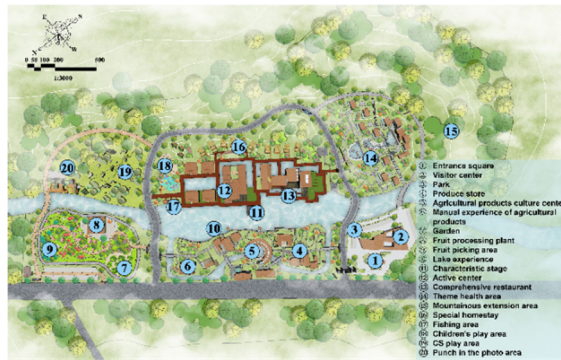

Fig. 1. Preliminary planning.

2.2   Research Methods

(1) Factor analysis can extract potential, essentially the same, representative factors that affect the overall data from many variables, classify them into a common factor, reduce the number of multiple variables, and at the same time make the factors have the interpretability of naming.

$$X_1=a_{11}f_1+a_{12}f_{2+}\ldots+a_{1k}f_{k+}\varepsilon_1$$
$$X_2=a_{21}f_1+a_{22}f_{2+}\ldots+a_{2k}f_{k+}\varepsilon_2$$
$$.$$
$$.$$
$$.$$
$$X_p=a_{p1}f_1+a_{p2}f_{2+}\ldots+a_{pk}f_{k+}\varepsilon_p$$

Factor analysis can select highly relevant factors as the principal component of the analysis from numerous internal and external factors and mechanisms affecting rural mountain and forest tourism landscape, and at the same time, it can test the reliability and validity of each factor, which has good effectiveness and implementability for such research. This research mainly adopts the following formula. Firstly, the prerequisite of factor analysis is determined, the initial variable data is processed, the coefficient matrix is calculated, and the correlation between indicators is judged by KMO (Kaiser Meyer Olkin) test statistics and Bartlett sphericity test [6]. Then the principal component analysis method is used to obtain the common factors of the data, the orthogonal rotation method is selected for factor rotation, and then the variables of the common factors are studied to obtain the explanatory factor names and build the index system.

The principal component analysis method is used to obtain the common factors of the data, and the orthogonal rotation method is selected for factor rotation[7]. Factor analysis is to use a small number of common factors to reflect the main information of multiple projects, mainly using the following models: Each original variable is divided into common factors (common factors) and special factors, among which common factors f1, f2,...,fk are extracted by factor analysis method and Special factor ε Reflect the contents of variables that cannot be summarized by common factors; Besides, it is assumed that there are P variables: x1, x2,..., xp, the number of the variables which are greater than common factors is k; Meanwhile, aij, as the factor load, affects the load of the original variable on the common factor (where i is 1,2,3,..., p; j is 1,2,3,..., K). Study the variables of public factors, get explanatory factor names, and build an index system [8].

(2) In the 1970s, Martilla and James proposed the Importance-Performance Analysis (i.e., the importance - performance analysis method, referred to as IPA), which built a model to reflect users' expectations of products and evaluation of product status. Importance reflects the user's perception of the product indicators, and satisfaction reflects the user's actual evaluation of the indicators after use. Because the method is relatively simple, intuitive, reliable and operable, it was gradually widely used in the service industry at the end of the 20th century, and now IPA analysis has been gradually applied in the design fields of landscape, planning, architecture and so on. Based on this model, this study built a new two-dimensional four-quadrant coordinate system (Figure 2), in which the horizontal axis represents the performance of rural mountain and forest tourism landscape construction with tourist satisfaction, the vertical axis reflects its importance, the mean or median of variables is set as the dividing line of coordinates, and the four quadrants are divided into different improvement levels. According to different evaluation dimensions and indicators, corresponding analysis results are obtained, and specific improvement measures are formed.
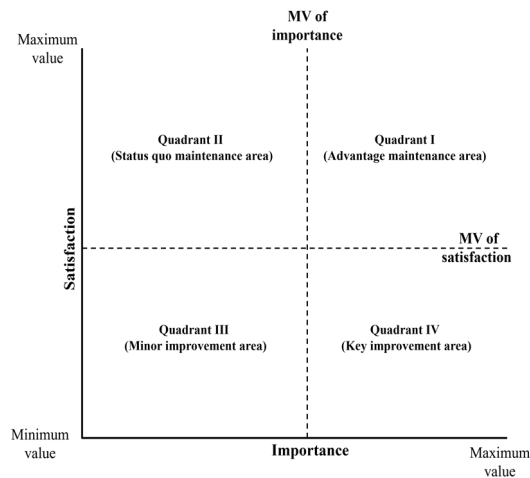
Fig. 2. Diagram of importance and satisfaction model.

2.3   Data Collection

After completing the index screening, the importance and satisfaction information of each index of landscape evaluation are to be obtained through questionnaires. The first part of the questionnaire is the age, sex, health status and other information of the respondents; The second part is about the importance of rural tourism landscape; The third part is about the satisfaction of rural tourism landscape. The importance and satisfaction evaluation of the questionnaires in parts 2 and 3 are based on the Likert scale[9], which sets the measurement of rural tourism landscape indexes. A total of 273 questionnaires were distributed in Ganquan Lake Community, and 257 effective questionnaires were recovered, with an effective rate of 94.1%.

3   RESEARCH DESIGN

3.1   Index Screening

Before the IPA analysis of rural local mountain tourism landscape, all indexes must be screened. The screening scope includes various elements of rural tourism landscape, as well as elements related to the psychological, physiological and behavioral needs of tourists and villagers in the tourism area. These indexes have a certain impact on the accuracy and objectivity of the final evaluation results. For Nanshankan Village in Jiangning, Nanjing, the main characteristics of tourist behavior and their relationship with various landscape elements are summarized by using the methods of current situation investigation, questionnaire survey, field interview and literature review, so as to extract 26 main evaluation indexes related to rural tourism landscape. See Table 1 for details.

Table 1. Summary of evaluation indexes.

Index	Index meaning
Functionality of the site	Including leisure, viewing, activities, communication, sports, learning, popular science and other functions.
Landscape suitability	The landscape conforms to ergonomics and is suiTable for the needs of individuals, groups and large-scale group activities.
Barrier-free design	Flatness and skid resistance of entrance, road and site, and whether ramps and handrails are provided.
Accessibility of scenic spots	The convenience of getting to each scenic spot, including the distance of walking and driving and the condition of the site.
Organization of rural activities	Material, spiritual and cultural activities held by various institutions, groups and organizations.
Number of sites	Whether the number of venues in the venue for tourists and residents' activities meets the needs of various activities.
Accessibility of roads	The roads are set smoothly and the road network is complete to meet the traffic demand.

Types and levels of greening	The number and richness of greening types.
Waterscape	Whether the natural and artificial waterscape is functional, beautiful, safe and good water quality.
Seasonal change of greening	With the change of seasons, greening presents different scenes.
Greening effect	It has certain effects on people's physical and mental health, beautifying the environment and purifying the air.
Greening rate	Ratio of greening land area to total land area.
Recreational and sport facilities	Provide landscape facilities for people's leisure, sports and entertainment.
Sheltered facilities	The site is open and has the functions of sheltering the wind, shading and rain.
Recreational facilities	Provide kiosks, corridors, seats and other facilities for rest, waiting and communication.
Landscape sketch	Systematic and artistic landscape installations, service sketches, sculptures, garbage cans, etc.
Signage System	Completeness, rationality and aesthetics of the traffic, service and emergency indication system.
Lighting system	Systematic, scientific and artistic lighting facilities.
Continuation of context	The preservation, translation and transmission of the historical tradition, spiritual culture and material culture of the place.。
Space humanity	The closeness of people's communication and emotional involvement.
Identification	Identification, attachment and satisfaction with the rural environment.
Self-value realization	Positive evaluation of self-experience and emotion from multiple perspectives.
Experience and participation	People's participation and experience in tourism activities, rural construction and tourism area management.
Site safety	The site is open and has the functions of sheltering the wind, shading and rain.
Facility comfort	Comfort and practicability of various service facilities.
Sound light and thermal environment	The comfort brought by sound, light and thermal environment, such as noise, light pollution, temperature and humidity.

3.2   Factor Extraction and Rotation

In this study, the importance of tourists' evaluation of rural local mountain tourism landscape index is taken as the source of factor analysis data, and SPSS26.0 is used to analyse the data. Finally, KMO and Bartlett's spherical test are used to judge the correlation between variables. Among them, when the value of KMO statistic is equal to 0.913, the significance probability value (P) of the sig. Statistic value of Bartlett's

spherical test is equal to 0.000. Then if the value of this index is less than 0.01 at this time, it indicates that there is a very significant difference in the data, which is suitable for factor analysis (0.05 is the given significance level α, if P is greater than 0.05, the difference is not significant; P < 0.01 indicates that the difference is very significant; P between 0.01 and 0.05, indicating significant difference).

3.3   The Determination of the Preconditions for Factor Analysis

All the indexes of factor analysis correspond to the actual data. Hence The principal component analysis method is used to extract the indexes whose eigenvalue is greater than 1 according to the original variable correlation coefficient matrix. As shown in Table 3, for the variable data under the principal component analysis method, all the initial values of the indexes are 1, indicating that 26 characteristic values of the 26 index variables are extracted by the principal component analysis method, that is, all variances of the index variables are explained with the commonality to be 1. Besides, most of the 26 indexes in Table 2 have a high degree of commonality. For example, although the index of 'greening types and levels' in Article 19 is the lowest, it still exceeds 0.5, which indicates that the factor extraction method can reduce the loss of information of the original data, and the result of factor extraction is reasonable. In terms of the acquisition of the total variance of the analysis variables the principal component analysis, there are 5 factors with eigenvalues greater than 1, and the cumulative contribution variance is 60.133%. In fact, the 5 common factors can better represent the content of 26 index variables [10].

Table 2. Variance of public factors of the landscape indexes.

Indexes	Initiation	Extraction
1 Functionality of the site	1	0.540
2 Landscape suitability	1	0.631
3 Greening rate	1	0.592
4 Seasonal change of greening	1	0.572
5 Greening effect	1	0.591
6 Site safety	1	0.747
7 Barrier-free design	1	0.571
8 Recreational facilities	1	0.606
9 Signage system	1	0.529
10 Lighting system	1	0.612
11 Facility comfort	1	0.653
12 Waterscape	1	0.587
13 Continuation of context	1	0.618
14 Experience and participation	1	0.554
15 Accessibility of scenic spots	1	0.583
16 Organization of rural activities	1	0.663
17 Landscape sketch	1	0.602
18 Number of sites	1	0.563

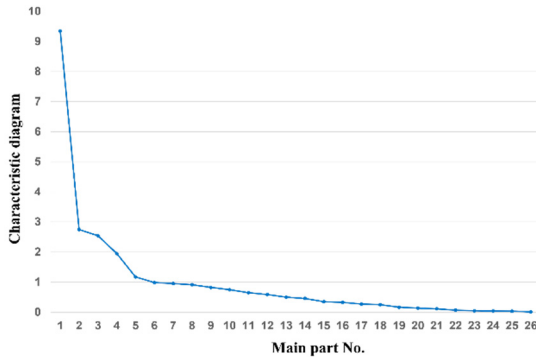|		
19 Types and levels of greening	1	0.502
20 Accessibility of roads	1	0.662
21 Recreational and sport facilities	1	0.599
22 Space humanity	1	0.579
23 Identification	1	0.558
24 Self-value realization	1	0.573
25 Sound, light and thermal environment	1	0.713
26 Sheltered facilities	1	0.638

Fig. 3. Gravel map of composition characteristic value.

Extraction of common factors from index variables can be found in Figure 3 Gravel map of composition characteristic value. Among them, the characteristic value of the first factor is greater than 7, which is the highest, indicating that the contribution of explanatory variables of this factor is also the highest. Besides, the eigenvalues of the factors starting from the sixth factor are basically within 1, which indicates that the contribution of the explanatory variables of these factors is low and those five common factors extracted are more suitable. In order to clearly explain the relationship between variables, the converging load factor is obtained through the factor axis rotation operation to explain and classify the index variables. Table 3 shows the convergence of the load factor after the orthogonal rotation operation. The values of 26 original variables are multiplied by 5 common factors and load factors and then summed. At the same time, if the load factor value of one original variable on the first common factor is the highest, it means that the first common factor has the strongest explanatory power to the variable, which can be classified into the first category. By analogy, the five common factors divide the 26 original variables into five categories, and the expression of the load factor is shown in Table 3.

Table 3. Factor load matrix after rotation.

Index	Element				
	1	2	3	4	5
Functionality of the	0.651	-0.013	0.137	0.252	0.191

site					
Landscape suitability	0.701	0.152	0.287	0.107	0.151
Greening rate	0.053	0.172	0.058	0.742	0.073
Seasonal change of greening	0.223	0.132	0.116	0.702	0.043
Greening effect	0.087	0.116	0.078	0.752	0.023
Site safety	0.142	0.151	0.172	0.191	0.801
Barrier-free design	0.737	0.068	0.044	0.136	0.051
Recreational facilities	0.021	0.735	0.174	0.156	0.107
Signage system	0.226	0.677	0.065	0.027	0.112
Lighting system	0.207	0.708	0.128	0.147	0.172
Facility comfort	0.203	0.112	0.154	0.105	0.754
Waterscape	0.157	0.166	0.088	0.717	0.105
Continuation of context	0.133	0.187	0.748	0.058	0.022
Experience and participation	0.084	0.197	0.701	0.088	0.076
Accessibility of scenic spots	0.736	0.143	0.061	0.031	0.117
Organization of rural activities	0.751	0.237	0.180	0.087	0.015
Landscape sketch	0.248	0.687	0.141	0.166	0.134
Number of sites	0.718	0.056	0.041	0.065	0.193
Types and levels of greening	0.121	0.087	0.083	0.663	0.176
Accessibility of roads	0.741	0.234	0.144	0.183	0.048
Recreational and sport facilities	0.048	0.744	0.055	0.192	0.039
Space humanity	0.197	0.018	0.701	0.142	0.167
Identification	0.111	0.084	0.718	0.097	0.107
Self-value realization	0.099	0.111	0.728	0.048	0.122
Sound, light and thermal environment	0.211	0.198	0.148	0.106	0.772
Sheltered facilities	0.062	0.778	0.138	0.104	0.016

3.4   Factor Naming and Index System Construction

After the relevant common factors are extracted, these factors are processed by orthogonal rotation transformation, so as to analyse the internal correlation between the factor variables and classify them. As shown in Table 4, among the evaluation indexes of public factor axis 1, there are 7 groups of "site landscape" contents related to the function, content and form of the activity site: the organization of rural village activities, the accessibility of roads, the accessibility of scenic spots, barrier free design, the number of sites, the suitability of landscape and the functionality of the site. In the public factor

axis 2, there are 6 indexes related to "landscape facilities" for load factors above 0.677: shelter facilities, recreation and sports facilities, recreation facilities, lighting system, landscape sketches, and signage system. These indexes are all about providing users with functional facilities such as entertainment, identification, recreation, and aesthetic appreciation. In the public factor axis 3, there are 5 high indexes of the "place atmosphere" load factor related to the non-material content in the public environment: the continuation of the context, the realization of self-worth, the sense of identity, the experience and participation, and the space humanity. Among the public factor axis 4 evaluation indexes, there are 5 indexes related to "soft landscape" with a load of more than 0.664: greening efficiency, greening rate, waterscape, greening type and level, and greening season phase change. Among the high indexes of load factor value in the common factor axis 5, three are related to the "comfort and safety" index: the safety of the site, the sound, light and thermal environment, and the comfort of the facilities, which are all related to the comfort and safety of the users.

Table 4. Summary of factor naming.

Factor Naming	Variables of the index	Load factor	Characteristic value	Cumulative variance contribution rate (%)
Site landscape	Organization of rural activities	0.753	7.866	15.7088
	Accessibility of roads	0.743		
	Accessibility of scenic spots	0.7378		
	Barrier free design	0.737		
	Number of sites	0.718		
	Landscape suitability	0.701		
	Functionality of the site	0.651		
Landscape facilities	Shelter facilities	0.776	2.384	29.408
	Recreational and sports facilities	0.744		
	Recreational facilities	0.733		
	Lighting system	0.708		
	Landscape sketch	0.689		
	Signage System	0.679		
Place atmosphere	Continuation of context	0.748	2.061	40.804
	Self-value realization	0.728		

	Identification	0.718		
	Experience and participation	0.701		
	Space humanity	0.703		
Soft landscape	Greening effect	0.752	1.902	52.044
	Greening rate	0.742		
	Waterscape	0.717		
	Seasonal change of greening	0.702		
	Types and levels of greening	0.665		
Comfort and safety	Site safety	0.801	1.417	60.132
	Sound, light and thermal environment	0.772		
	Facility comfort	0.752		

According to the results of factor analysis, the landscape index system of rural tourism is built, which is mainly divided into Class B dimension layer and Class C index layer. Among them, the dimension layer defines many important attributes of the target as multiple dimensions, and divides those 26 evaluation indexes into five Class B dimensions: site landscape dimension, landscape facility dimension, place atmosphere dimension, soft landscape dimension, and comfort and safety dimension. Finally, according to the established Class C index system, the evaluation results of importance and satisfaction are sorted into detailed data for IPA analysis.

4   IPA DATA PROCESSING AND ANALYSIS

4.1   Data Reliability Test

The accuracy of the data is to be tested by inputting the evaluation data of importance and satisfaction survey into spss26.0 software.The Cronbach's alpha of importance is equal to 0.906, and the Cronbach's alpha of satisfaction is equal to 0.918, both of which are greater than 0.6, indicating that the reliability of the questionnaire is high (Generally, when Cronbach's alpha is greater than 0.6, it indicates that the reliability is high).

4.2   Difference Analysis of Importance and Satisfaction

In order to test whether there are significant differences in the importance and satisfaction results of rural local mountain tourism landscape indexes, SPSS26.0 is adopted to evaluate the importance and satisfaction data, and T-test of samples is carried out. When sig. Value $p > 0.05$, the difference between the two samples is not significant; P value < 0.01 indicates that the difference between the two samples is very significant. There are significant differences in the importance and satisfaction evaluation of the 26 rural tourism landscape indexes, which indicates that there is a large gap between the

expectations of tourists and the current situation of the rural tourism environment, and there is a large room for improvement in all indexes.

4.3   IPA Analysis of Rural Mountain Tourism Local Landscape

According to the above-mentioned model and 257 valid data from the rural tourism landscape survey of Nanshankan Village, the IPA model data of 5 dimensions of Nanshankan Village (Table 5) are calculated. The mean values of 4.05 and 2.57 are used as the dividing lines to determine the importance and satisfaction of the B1 site landscape dimension, the mean values of 4.03 and 2.49 are used as the dividing lines for the B2 landscape facilities dimension, the mean values of 4.20 and 2.19 are used as the dividing lines for the B3 place atmosphere dimension, the mean values of 4.20 and 2.95 are used as the dividing lines for the B4 soft landscape dimension, and the mean values of 4.34 and 2.70 are used as the dividing lines for the B5 comfort and safety dimension. Therefore, the above dimensions are divided into four Quadrants respectively to form the IPA model distribution map of five dimensions.

Table 5. Importance and satisfaction evaluation of rural tourism landscape.

Dimension	Index	Importance mean	Satisfaction mean	Mean difference
B1 Site landscape	C1 Organization of rural activities	4.02	2.17	1.85
	C2 Accessibility of roads	3.35	3.94	-0.60
	C3 Accessibility of scenic spots	4.19	3.67	0.53
	C4 Barrier free design	3.98	2.19	1.79
	C5 Number of sites	4.42	1.80	2.61
	C6 Landscape suitability	4.03	2.35	1.68
	C7 Functionality of the site	4.37	1.92	2.45
B2 Landscape facilities	C8 Shelter facilities	4.24	1.94	2.29
	C9 Recreational and sports facilities	4.34	3.05	1.29
	C10 Recreational facilities	4.42	1.77	2.65
	C11 Lighting system	4.24	3.79	0.45
	C12 Landscape sketch	3.63	2.06	1.57
	C13 Signage System	3.37	2.37	1.01
B3 Place	C14 Continuation of context	4.08	1.71	2.37

atmos-phere	C15 Self-value reali-zation	3.98	3.06	0.92
	C16 Identification	4.41	3.92	0.49
	C17 Experience and participation	4.20	2.50	1.71
	C18 Space humanity	4.35	3.39	0.97
B4 Soft land-scape	C19 Greening effect	4.18	3.04	1.14
	C20 Greening rate	4.57	3.84	0.73
	C21 Waterscape	4.10	2.02	2.08
	C22 Seasonal change of greening	4.02	3.06	0.96
	C23 Types and lev-els of greening	4.25	2.79	1.46
B5 Comfort and safety	C24 Site safety	4.43	3.63	0.80
	C25 Sound, light and thermal environ-ment	4.26	2.39	1.87
	C26 Facility comfort	4.32	2.07	2.25

B1 Site Landscape Dimension (Figure 4).

C3 accessibility of scenic spots in the advantage maintenance area in Quadrant I indicates that the tourist routes in the village tourist area of Nanshankan Village are relatively complete and people can reach each tourist point smoothly; C2 accessibility of road in the current maintenance area of Quadrant II indicates that people are highly satisfied with the road system in the tourist area. The existing hill roads, branch roads and forest roads are connected to each other, which is convenient for tourists to visit and various vehicles to drive; In the secondary improvement area of Quadrant III, there are C6 landscape suitability, C1 rural village activity organization and C4 barrier free design. The importance value of these indicators is high, around 4.00, but the satisfaction value is low, around 2.00. In addition, the activity sites of the rural landscape are scattered, mainly distributed in the open space on the top of the hill, the forest rest area, the roadside and other places, and the area is small. In the investigation and interview, it is found that villagers and tourists generally hope that the landscape site is larger and more concentrated, and can organize diversified characteristic activities in combination with the existing rural village resources. At the same time, there are some problems in the barrier free design of the site and equipment, such as: pay attention to the slope design of the site, the slope design of the disabled and the increase of handrails; C5 number of sites and C7 functionality of sites are in the important improvement area in Quadrant IV. the index in this dimension is at the highest importance and the satisfaction value is at the lowest position, indicating that the number of landscape sites is obviously insufficient and the functions of the sites in each tourist area are very imperfect. It is an important problem to be solved urgently. It is necessary to set up rich ornamental Leisure, participation and popular science landscapes and activity venues.
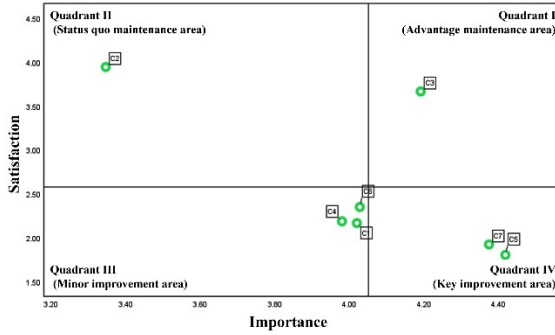
Fig. 4. Diagram of IPA model distribution of B1 Site landscape dimension.

B2 Landscape Facility Dimension (Figure 5).

C9 recreation and sports facilities and C11 lighting system in the advantage mainte-
nance area of Quadrant I show that the overall transformation of the lighting system
and recreation and sports facilities in Nanshankan Village has achieved good results.
The existing street lamps, courtyard lamps, adult activity facilities and children's game
equipment basically meet people's needs; C12 landscape sketch and C13 signage Sys-
tem in the secondary improvement area in Quadrant III have a small satisfaction value,
which means that the scenic spot should appropriately increase the viewing platform,
waterfront corridor bridge, characteristic garbage can, theme device, etc. related to the
tourist site. At the same time, add signs in some parts of the scenic spot and improve
the design of the sign system, so as to build a complete sketch and sign system with
rural characteristics; C8 shelter facilities and C10 rest facilities are located in the im-
portant improvement area of Quadrant IV, where the indexes are with the highest im-
portance but the lowest satisfaction. For example, some of the existing facilities along
the rural village sightseeing site and the road have been worn out, which are incompat-
ible with the environment of the rural village and the style is not uniform. Therefore, it
is necessary to increase systematic rain shelter, rest and stay kiosks, corridors, catering
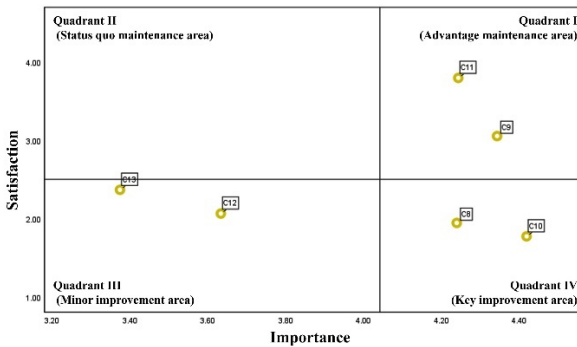facilities and benches.

Fig. 5. Diagram of IPA model distribution of B2 Landscape facilities dimension.

B3 Place Atmosphere Dimension (Figure 6).

C18 space humanity and C16 identification in the advantage maintenance area of quadrant I show that the majority of the villagers in Nanshankan Village have lived here for decades and have a strong sense of belonging and identification to the area. The villagers are familiar with each other and have close contacts. Such humane space and harmonious relationship should be maintained in the subsequent development and construction; C15 realization of self-worth in the status quo maintenance area of Quadrant II indicates that villagers and tourists have a positive evaluation on their cognition and emotional experience. The traditional leisure activities in the area have realized their self-worth to a certain extent, but it's far from enough. Therefore, some new theme activities can be added. C14 continuation of context and C17 satisfaction value of experience and participation in the secondary improvement area of quadrant III are the smallest. Usually, the ancient forests and villages have their own regional culture and place characteristics. Villagers and tourists hope to find their long-standing memories and emotional resonance of the ecological environment of the rural village here. However, the reality is that in addition to individual cultural graffiti walls, the stone mortar, ancient well, old house, old tree, stone road and old soil wall with historical and cultural characteristics have not been properly protected and repaired to become the cultural elements of the landscape. The cultural atmosphere of the forests and old villages has been created. At the same time, the whole area lacks overall activity planning, and does not make full use of local resources to create an experience system and participatory interactive activities that can meet the "five feelings and six senses" of tourists. Therefore, it is difficult for the scenic spots here to attract tourists' desire to revisit.
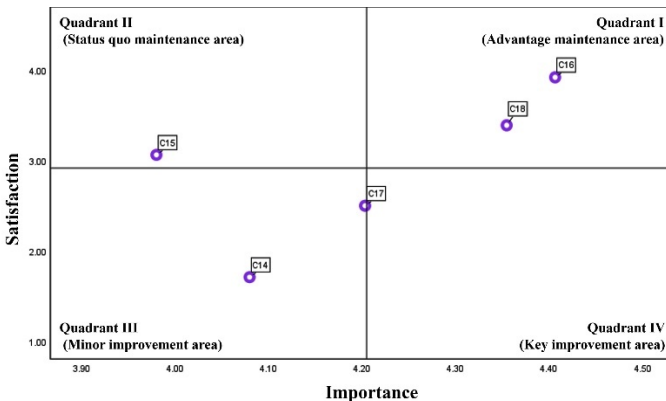
Fig. 6. Diagram of IPA model distribution of B3 Place atmosphere dimension

B4 soft Landscape Dimension (Figure 7).

C20 greening rate is in the advantage ma intenance area of Quadrant I. It can be seen that Hangshan Mountain and Yuntai Mountain, which are connected with Nanshankan Village and are covered with dense forest belts, and large areas of fruit trees, flowers, vegeTable fields and nurseries have created a good green ecological space; In the status quo maintenance area of quadrant II, there are C22 seasonal change of greening and

C19 greening effects, indicating that the existing greening types in the tourist area are relatively rich, and the combination of evergreen and deciduous plants is emphasized. There are different plant landscapes in four seasons, so the satisfaction value is high; C21 waterscape is located in the secondary improvement area of quadrant III. It can be seen from the position of this index that the importance value of waterscape is high, while the satisfaction value is small. Actually, in the important improvement area of Quadrant IV, there are C23 greening types and levels. It can be seen that there exist many plant types in the original pine forest, bamboo forest, osmanthus forest, orchard, vegeTable field and nursery, but the arrangement and level of arbor, shrub, flower and ground cover plants are not rich enough, and there are few ornamental plants with characteristics. In other words, the characteristics of the greening space are not obvious and the theme is not prominent, It is difficult to leave a deep memory for tourists and villagers.
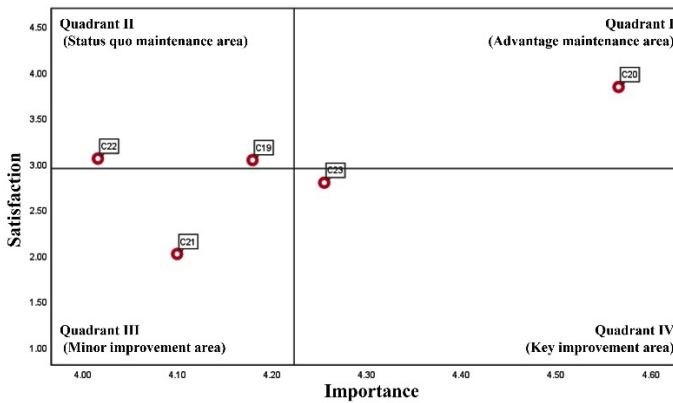
Fig. 7. Diagram of Distribution of IPA model of B4 soft landscape dimension.

B5 Comfort and Safety Dimensions (Figure 8).

C24 security of site in the advantage maintenance area of Quadrant I indicates that security facilities and personnel have been added in the recent reconstruction of Nanshankan Village, and the public order has been improved. At the same time, the simple folk customs of the rural village and the harmonious relations between the neighbors also give tourists a good sense of security; C26 facility comfort and C25 sound, light and thermal environment are located in the status quo maintenance area of quadrant II. In the scenic area, the pavement and facilities in the area have been damaged to some extent. Moreover, the material and use comfort of the facilities are not high. Some of the spaces adjacent to Tangtong Highway are noisy, and the sound, light and thermal environment comfort of the old houses and courtyards in the village is low. Therefore, the overall repair can be carried out in combination with the rural renewal and construction plan of the community.
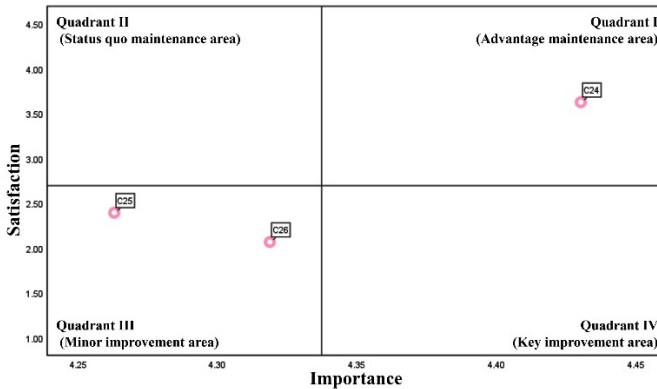
Fig. 8. Diagram of IPA model distribution of B5 comfort and safety dimension.

In short, through the analysis of the data and models of the above five dimensions, it can be seen that the key improvement area includes five landscape indexes: C5 number of sites, C7 functionality of sites, C8 shelter facilities, C10 recreation facilities, and C23 greening types and levels. The secondary improvement area includes 10 landscape indexes: C1 organization of rural activities, C4 barrier free design, C6 landscape suitability, C12 landscape sketches, C13 Signage System, C14 continuation of context, C17 experience and participation, C21 waterscape, C25 sound, light and thermal environment, and C26 facility comfort. All the above indexes reflect the common practical problems in the rural tourism landscape of Nanshankan Village. At the same time, these are also the projects that should be given priority in landscape reformation. The serious problems are mainly concentrated in the dimensions of site landscape, landscape facilities and soft landscape, while the problems in the dimensions of place atmosphere, comfort and safety are not too serious.

5   CONCLUSIONS AND SUGGESTIONS

5.1   Conclusions

Establish the Evaluation Index System of Rural Tourism Landscape.
    After collecting the importance and satisfaction evaluation of villages and tourists on the rural landscape environment through questionnaires and interviews, the factor analysis method of statistics is used to screen out 26 landscape evaluation indicators that are highly related to the local mountain tourism landscape from the perspective of tourists' needs. From the perspective of tourists' perception, the index is summarized into five dimensions: site landscape, landscape facilities, site atmosphere, soft landscape and comfort and safety, and an innovative landscape evaluation system is constructed for tourists' tourism needs, which can fully reflect the evaluation of the importance and satisfaction of villagers and tourists on rural tourism landscape. It provides some reference for the study of rural mountain tourism landscape evaluation system.

IPA Model Analysis of Rural Tourism Landscape.

In combination with the current situation, dimension, indicators and data of rural tourism landscape in Nanshankan Village, a targeted model was constructed for analysis. The key landscape improvement area had 6 indicators: the number of C5 sites, the functionality of C7 sites, C8 shelter facilities, C10 rest facilities, C25 sound, light and thermal environment, and C26 facility comfort, while the secondary improvement area had 8 indicators: C1 Village event organization, C4 barrier-free design, C6 landscape suitability, C12 landscape sketch, C13 signage system, C14 context continuation, C17 experience and participation, C21 waterscape. These indicators reflect the common problems in the current situation of rural tourism landscape in Nanshankan Village, and are also the contents that should be paid priority attention to in the promotion of tourism view in the later stage, indicating that the IPA evaluation and analysis model can indicate the direction for the improvement of rural tourism landscape and contribute to the formulation of landscape renewal strategies.

Effectiveness of IPA Model Analysis.

This study introduces the IPA analysis method used in business research, which breaks the traditional analysis method based on the one-way research mechanism of designers and managers, and closely links users with designers and managers. The importance evaluation index is taken as the measurement of tourists' demand, and the satisfaction evaluation is taken as the basis for updating the planning. The demand is fed back to the designer, and the design is made to serve the demand. The correlation between importance and satisfaction directly reflects the difference and degree of difference between the current situation of rural tourism landscape and the real needs of tourists, which is conducive to grasping the difference between the real needs of tourists and the current situation of landscape, determining the severity of transformation indicators, and carrying out targeted landscape improvement, so as to make the relevant transformation work more effective in the later stage. The design ideas and theoretical research methods of rural tourism landscape are expanded. Through literature research, field investigation and interviews, 26 landscape evaluation indexes were selected. Then, after collecting the importance and satisfaction evaluation of villagers and tourists on the rural landscape environment through the questionnaire, using the factor analysis method in the statistical method, the indexes are summarized into five dimensions: the site landscape, the landscape facilities, the place atmosphere, the soft landscape and the comfort and safety, so as to construct three-level evaluation index system of rural tourism landscape, that's (A) Target layer, (B)Dimension layer , (C) Index layer. On the basis of the above, this paper can comprehensively reflect the evaluation of the importance and the satisfaction of the rural tourism landscape of the villagers and tourists.

5.2   Suggestions

Multiple Featured Functions Embedded in the Site.

In the IPA investigation and analysis of the tourism landscape of Nanshankan Village, the indexes of the site landscape dimension are mostly in the key improvement

areas, of which the number and type of sites are relatively single, and the lack of functions has become the current problem of the key transformation in the tourism landscape of Nanshankan Village. Therefore, the distribution and improvement of the activity sites are the key links in the renewal of the rural tourism landscape. In the survey and interview, tourists in Nanshankan Village have diversified activity demands. The existing venues need to be supplemented by multi-functional characteristic activity contents, which can be divided into activity spaces such as communication type, culture type, leisure type, fitness and entertainment type, ceremony type, expansion type, popular science type, parent-child type and health care type, so as to provide diversified choices for different types of tourists and enhance the vitality and cohesion of the venues.

Optimize Plant Space and Increase the Experience of Plant.
Abundant soft landscape elements such as plants and water bodies can create a comforTable natural environment. Shrubs, flowers and waterscape can not only meet the psychological and physiological needs of tourists, but also help to improve the visual comfort of the landscape in the tourist area, so as to relieve the pressure of tourists. Although the greening rate of the tourist landscape in Nanshankan Village is high, the types and levels of plants are monotonous, and the setting of waterscape and related facilities cannot meet the needs of tourists. Therefore, in terms of the soft landscape dimension, it is necessary to focus on improving the types and levels of plants, enriching the diversity of the waterfront landscape, increasing the color change and color change of plants, and planting aromatic plants; At the same time, make full use of the forest, flowers, fruits, vegeTables, crops, bamboo, tea, Chinese herbal medicine and other plant resources in the village to create leisure experience activities such as walking through the forest, looking at bamboo, picking fruit, appreciating flowers, cultivating, harvesting, handicrafts, picking tea and tasting tea.

Inherit the Rural Context and Reshape the Place Memory.
The site context refers to respect for the original unique characteristics, history, culture, environment and other elements of the site, while the place memory refers to the environment related to the behavior and psychology of the people who live and live here for a long time, which causes people's emotional resonance and identification with the place[11]. Each region or site has its own unique context, and different places can produce a collective memory [12]. For a tourist area that has been built for a long time and has undergone a series of changes, place memory is the precious spiritual wealth produced by the interweaving of individual memory and site context. In order to inherit the context and memory of the site, the characteristic space can be used as the carrier of the memory of the rural village, and the landmark context landscape space can be designed to display the important historical events in the local social and historical changes [13]. In the selection of landscape structures, pavement materials and facilities materials, the materials with local characteristics shall be used as much as possible, such as blue bricks, tiles, bamboo, trees, willows and rocks.

Set up Diversified Participation Activities with Tourists as the Core.

The planning and construction process of Nanshankan Village tourist area is a process in which the government, enterprises, non-governmental organizations, tourists and villagers in the tourist area participate in the management and multi-body interest game. Nowadays, tourist groups have higher requirements in terms of service, safety, health and leisure. In order to meet the interests of different subjects, coordinate social resources of all parties, and improve the governance mechanism of the tourist area, tourists should be guided to participate in outdoor activities such as forest exploration, camping, field operations, expansion, fruit forest picking, farmland cultivation, river pond fishing, etc. Around the theme of the rural village, it can also adopt virtual technology to create an interactive tourist attraction with multiple participation and virtual and real integration with tourists as the core[14].

Improve Landscape Facilities and Enhance Landscape Comfort.

Whether the landscape facilities in the tourist area are reasonably set directly affects the quality of tourists' experience in using the space. It is possible to appropriately increase the outdoor sketch, rest, shelter and entertainment facilities along the pedestrian path, and improve the utilization rate of service facilities and the convenience of the space [15]. At the same time, planner should pay attention to the sound, light and thermal indexes of the site, facilities and environment, and design indoor and outdoor spaces and places that meet people's comfort, so as to greatly facilitate the outdoor activities of tourists, etc.

5.3   Discusstion

There are still some shortcomings in this study: (1) The development of rural mountain tourism landscape is affected by many local and external macro factors, and the action mechanism of various factors is very complex. The analysis and selection of 26 key driving factors with high correlation with the study area failed to cover all kinds of influencing factors, such as group customs, individual aesthetic differences, major events and other factors. In the later stage, other major association factors will be verified one by one in related studies to further improve the comprehensiveness of the index system. (2) This study mainly takes Nanshankan Village, Jiangning District, Nanjing as an example for analysis, but there are great differences in the geographical environment, economic, political, historical and cultural background of mountain forests in different provinces and cities. Subsequent studies will increase the study of rural mountain forest tourism landscape in other regions to improve the universality of research conclusions.

ACKNOWLEDGEMENT

Vocational Education teacher Teaching Innovation team research project [Z12021120202].

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