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Trends in the Chinese Ancient Architecture Tourism Market and Research on Ancient Architecture Preservation

Xinyuan Feng *, Senyu Yang, Haoying Wang, Mengyuan Chen, Ziyao Li

Miami College of Henan University, Henan University, Zhengzhou, China, 450046

* Corresponding Author Email: sxtyfxy@qq.com

Abstract. Ancient architecture, as an important symbol of Chinese culture, carries rich historical and cultural value and is crucial for the inheritance of culture. In the present, how to balance tradition with modernity, inheritance with development, and exploitation with preservation is an issue that cultural heritage protection must confront. This article combines stratified sampling and simple random sampling methods with questionnaire research, and conducts in-depth interviews with staff at ancient architectural sites to understand the status of ancient building protection. The study first uses statistical charts to describe the baseline characteristics of respondents and their current interest in ancient architectural tourism. Subsequently, structural equation modeling is used to assess the importance of indicators, and analytic hierarchy process is applied to determine the priority of key needs, in order to precisely meet the needs of the public. Finally, Logistic regression models are used to analyze the sensitivity of different gender, occupation, and family background groups to the ancient architectural tourism market. The research indicates that the external tourism environment and atmosphere have a significant impact on the experience and attractiveness of ancient architectural tourism. Therefore, in the process of promoting ancient architectural tourism, attention should be paid to the optimization of the tourism environment and the improvement of tourism service quality to enhance public interest and willingness to participate.

Keywords: Ancient Building Tourism; Tourism Market; Ancient Building Conservation; Logistic Regression Model.

1. Introduction

Ancient buildings, as an important part of Chinese civilization, embody profound cultural values and are key to the inheritance and development of culture. In recent years, with the improvement of living standards and the increasing demand for cultural tourism, ancient building tourism has become a new IP hot-spot. In the field of education, ancient buildings, as a significant carrier of traditional culture, are also one of the core elements of educational content. Therefore, in the current context, how to properly handle the multiple relationships between tradition and modernity, inheritance and development, and development and protection has become an unavoidable major issue in the work of cultural heritage protection. To this end, this article conducts research and analysis on the ancient building tourism market, aiming to gain an in-depth understanding of market demand, tourist preferences, and the current state of ancient building preservation, and to explore the public's enthusiasm for the preservation of ancient buildings and the inheritance of traditional Chinese cultural.

With the rise of cultural tourism, ancient architecture tourism is attracting an increasing number of visitors with its profound historical and cultural depth and unique artistic charm, becoming a major highlight in the tourism market. However, as this market continues to expand, competition is also becoming increasingly fierce. In China, ancient buildings are widely distributed, especially in North China, Northwest China, and the Sichuan Basin [1], with Shanxi Province leading the country in the number of ancient buildings [2]. How to stand out among the many ancient architecture tourism destinations has become an important issue that the market urgently needs to address. In addition, as cultural heritage, there is an inherent contradiction between the protection and development of ancient buildings. Despite the strong demand for tourism, how to balance the relationship between protection and development in practice has become a major challenge. Given the non-renewable nature of

ancient buildings, their protection work is particularly critical. Therefore, how to ensure that ancient buildings are properly protected while fully tapping their tourism potential is the core issue faced by the ancient architecture tourism market.

This study aims to deeply explore the current situation, demand characteristics, and sensitivity of the ancient building tourism market through a systematic approach. Based on this, it further discusses issues related to the protection of ancient buildings. Combining questionnaire research, field research, and data analysis, this paper preliminary analyzes the characteristics of respondents, tourism interests, and user needs through statistical charts. Subsequently, using structural equation modeling and analytic hierarchy process, it filters out key demands and ranks them to achieve precise market positioning. After statistical analysis, the questionnaire data is visually presented in the form of charts to show data trends and to deeply explore the relationship between market demand, sensitivity, and conservation issues, aiming to provide decision support for cultural tourism departments and cultural preservation units. In addition, field research was conducted on the ancient building tourism and conservation situation in Yuncheng City, Shanxi Province, and in-depth interviews were conducted with staff at ancient building scenic areas to deeply understand the current state of conservation, providing a reference for precisely controlling the ancient building tourism market in China.

Through systematic research and analysis, this paper aims to form a comprehensive and in-depth understanding of the ancient building tourism market, thereby providing solid theoretical support and practical guidance for the protection and sustainable development of ancient buildings. This study has the following marginal contributions: (1) Precisely grasping market dynamics: This study comprehensively applied the methods of questionnaire + field research to understand tourists' needs and expectations for ancient building tourism, providing a basis for developing tourism products and service types that meet market demands. (2) Predicting market prospects: Based on preliminary data integration, this study utilized word cloud diagrams and structural equation models, analytic hierarchy process, and Logistic regression models to scientifically predict the future trend of the ancient building tourism market. (3) Balancing ancient building conservation and development: This study explored the balance point between ancient building conservation and tourism development, deeply analyzed the necessity of conserving ancient buildings and the economic value of tourism development, and proposed innovative solutions to achieve the sustainable use of ancient buildings and the proper protection of historical culture. (4) Assisting policy-making: This study focused on the growth potential of market size and potential risk factors, providing forward-looking market insights for relevant government departments.

2. Literature review

Through careful combing of a large amount of literature, it is not difficult to find that many scholars have conducted certain research on the ancient building tourism market. In these studies, some scholars focus on exploring the current issues of the ancient building tourism market, such as its scale, growth rate, and market demand [3]. They use various data and models to describe and analyze the current market situation in detail, attempting to reveal the market's development trends; others focus on studying the marketing strategies of the ancient building tourism market, such as how to attract more tourists by enhancing brand awareness and market competitiveness [4-6]. However, most studies have adopted an evasive attitude towards how to properly handle multiple relationships in the ancient building tourism market, such as tradition and modernity, inheritance and development, development and protection.

Furthermore, most existing studies are conducted from the perspective of government departments or tourist attractions, with few delving into the general public to understand their needs and expectations. Only by truly understanding the needs of the people can we develop tourism market strategies for ancient buildings that are more practical and feasible. Therefore, future research needs to pay more attention to the voices of the general public and explore the path towards sustainable development of the ancient building tourism market.

3. Research methods and subjects

3.1. Research methods

The study primarily adopts the following analytical methods, including respondent suggestion word cloud diagrams, structural equation models [7] (see Figure 1), analytic hierarchy process models [8] (see Equation 1), and Logistic regression models [9] (see Equation 2), for in-depth analysis of needs assessment and data.

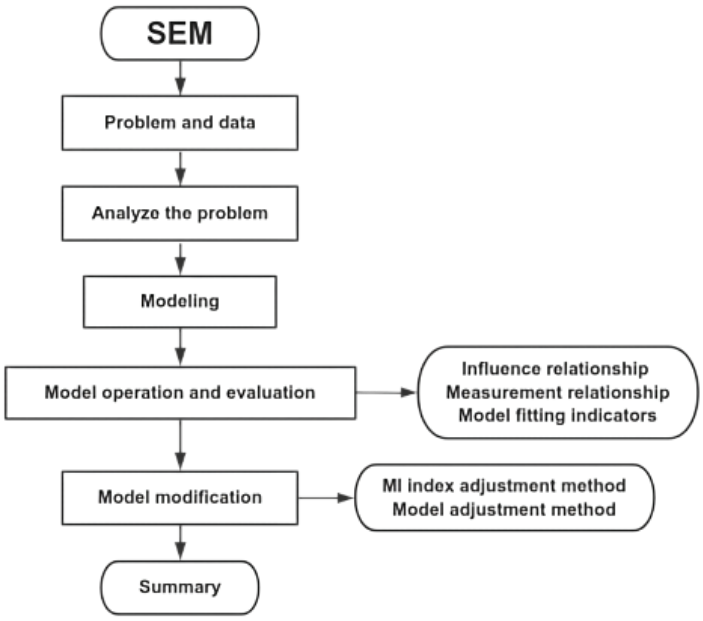

Figure 1. Structural Equation Model

$$CI = \frac{\lambda_{\max} - n}{n-1}, \quad CR = \frac{CI}{IR} \tag{1}$$

In the formula, CI represents the Consistency Index; λ_{max} is the maximum eigenvalue of the judgment matrix; n is the order of the matrix; CR is the Consistency Ratio; and R is the average random consistency index.

$$\log it[P(y \le j)] = \ln \frac{P(y \le j)}{1 - P(y \le j)} = \alpha_j + \beta_j x_i (j = 1, 2, \cdots J - 1) \tag{2}$$

In the formula, $P(y \le j)$ represents the probability that y falls at or below a specific j, that is, the cumulative probability of y passing; $x_i (i = 1,2,\cdots n)$ is the set of independent variables; $\beta_i (i = 1,2,\cdots n)$ denotes the effect of x_i on the log-odds of the dependent variable y falling into or being less than the category.

3.2. Research subjects and data sources

This article conducts a questionnaire study on various age groups and occupations nationwide, using a multi-stage sampling method that combines stratified sampling with simple random sampling. The survey aims to investigate tourists' awareness, points of interest, and satisfaction regarding Chinese ancient building tourism through the use of questionnaires. The questionnaire mainly involves young people in the age range of 18-25 years old. Furthermore, this article particularly focuses on representative Chinese ancient architectural tourist destinations, such as Yuncheng City in Shanxi Province, to obtain more accurate data.

4. Stability test

In this study, we mainly collect data in the form of online questionnaires. A quality control mechanism is embedded in the questionnaire design to ensure that if there are omissions or format errors in the filling process, the system will immediately point out the errors to the respondents until they are corrected before continuing to answer the questions and finally submitting the questionnaire. In addition, if the respondent is found to fill out the questionnaire unusually quickly or fails to pass the lie detection question in the questionnaire, we will consider the questionnaire invalid and select the next sample according to the preset rules to ensure the authenticity and validity of the survey results.

4.1. Reliability analysis

Questionnaire reliability analysis is an indicator to measure the stability and reliability of questionnaire survey results [10], which aims to ensure that the collected data can truly reflect the characteristics of the studied subjects. In this paper, we used Cronbach's alpha coefficient for this analysis, and the higher the coefficient, the stronger the reliability of the measurement [11]. A well-designed questionnaire should ideally have a total scale reliability coefficient of more than 0.8, and a range of 0.7 to 0.8 can also be considered acceptable. For the subscale, the reliability coefficient is better than 0.7, and the reliability coefficient between 0.6 and 0.7 is acceptable. If the Cronbach's alpha coefficient is less than 0.6, consideration should be given to redesigning the questionnaire. For the Q17 and q23 scales in the questionnaire, we used Cronbach's alpha coefficient for analysis, and the Cronbach's alpha coefficient was 0.717, indicating that the reliability of the questionnaire was acceptable. See Table 1 for details.

Table 1. Cronbach's Alpha Coefficient

Cronbach's Alpha Coefficient	Standardized Cronbach's Alpha Coefficient	Number of Items	Number of Samples
0.717	0.717	9	149

4.2. Validity analysis

The purpose of validity analysis is to evaluate the appropriateness of the design of the research questionnaire questions [11] and to test the effectiveness of the various items in the scale, that is, whether they contribute significantly to the scale as a whole. The analysis is based on principal component factor analysis, which judges whether it performs best in the corresponding principal components by comparing the factor load coefficient of the item. After the validity analysis of Q17 and q23, the following results are obtained from table 2: the results of KMO test show that the value of KMO is 0.837, while the results of Bartlett sphere test show that the significance p value is 0.000, indicating that the validity of the questionnaire is good and the results of the questionnaire are valid.

Table 2. KMO test and Bartlett test

KMO Test and Bartlett Test			
KMO Value	Bartlett Spherical Test		
0.837	Approximate Chi-square	df	P
	589.376	45.000	0.000

5. Empirical research results

Based on the preliminary questionnaire data, this article employs a series of statistical methods for inductive analysis. By plotting statistical charts, it visually demonstrates the distribution and trends of the data. Furthermore, using structural equation modeling and Logistic regression models, the complex relationships among the demand, sensitivity, and influencing factors of conservation issues in the Chinese ancient architecture tourism market were further explored.

5.1. Descriptive analysis

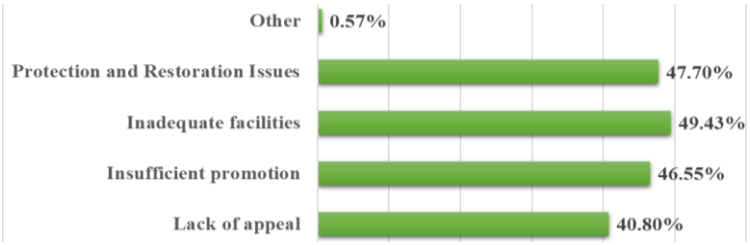

Figure 2. Analysis of Difficulties in the Chinese Ancient Architecture Tourism Market

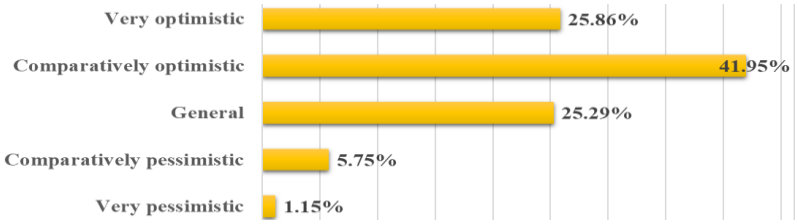

Figure 3. Analysis of the Prospects for the Chinese Ancient Architecture Tourism Market

Among all respondents, the prevailing view is that the main factor limiting tourism in Chinese ancient buildings is the tourism atmosphere, while the inadequacy of supporting facilities is the key factor preventing the development of the Chinese ancient architecture tourism market, as shown in Figure 2. However, within the surveyed group, 25.86% of respondents hold a very optimistic attitude towards the future development of the Chinese ancient structure tourism market, while 41.95% are optimistic. This indicates that despite the challenges faced by the Chinese ancient building market, respondents generally have a positive outlook on the development prospects of the Chinese ancient architecture tourism market, as shown in Figure 3.

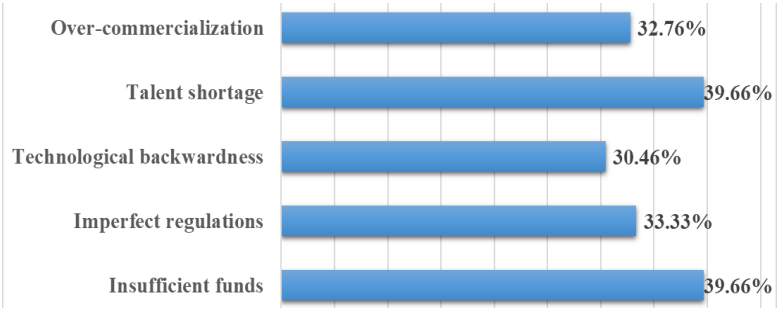

Figure 4. Analysis of Work Protection Issues

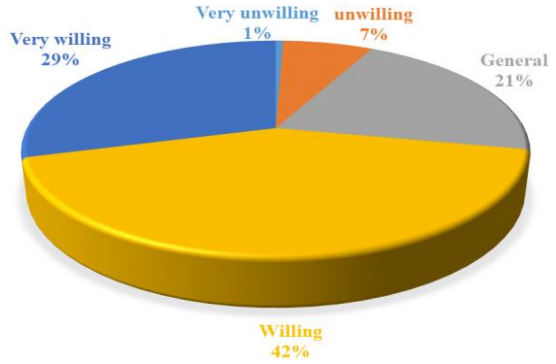

Figure 5. Analysis of Public Participation in Chinese ancient building Preservation

As shown in Figure 4, the field of Chinese ancient structure preservation faces many challenges. Relevant functional departments need to take measures from multiple aspects such as law, funding, and technology, implementing a series of practical and feasible actions to strengthen the protection of ancient buildings and ensure that cultural heritage is properly maintained. Figure 5 shows that 71.84% of respondents expressed a willingness to participate in ancient building protection activities.

Relevant departments can stimulate public participation enthusiasm by increasing publicity efforts and educational guidance, thereby promoting the progress of Chinese ancient building protection endeavors and facilitating the inheritance and sustainable development of cultural heritage.

5.2. Requirement evaluation

After in-depth analysis, numerous respondents pointed out that the most significant issues in the current field of Chinese ancient building tourism and conservation include excessive commercialization, inadequate infrastructure, and challenges in conservation and restoration. Additionally, as shown in word cloud analysis Figure 6, the most frequently mentioned terms by respondents were conservation, promotion, culture, tourists, and publicity.

Figure 6. Word Cloud Map of Respondents' Suggestions

5.3. Analysis of the influencing factors of ancient building tourism based on the structural equation model

Structural equation model is a research method based on statistical analysis technique to explore causal relationships among variables. It combines the ideas of factor analysis and multiple regression analysis to analyze the direct and indirect effects between variables by constructing a causal model containing both dominant and latent variables. The influence relationship of the structural equation model on the variables is shown in Figure 7.

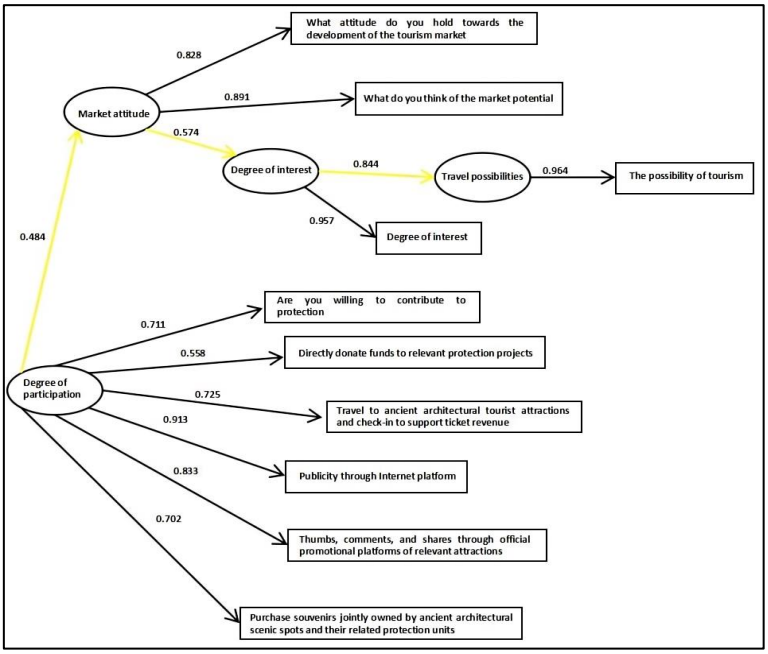

Figure 7. Path Diagram of Structural Equation Modeling

Subsequently, the measured variables within the factor were screened by the factor loading coefficient. Usually, if the measured variable passes the significance test (P<0.05) and the standardized load system value exceeds 0.4, the measured variable can be considered to meet the criteria of factor dimension reduction. After analysis, the P-value of the measured variable is 0.000, and the standardized load system value is greater than 0.4, indicating that the measurement relationship is appropriate.Then, based on the simulated regression coefficient table, the size of the P-value is used to determine whether the variables in the model have mutual influence. If the P-value is less than 0.05, it indicates a significant influence relationship between the variables. As shown in Table 3, all P-values were 0.000, showing statistically significant, with the corresponding influence coefficients of 0.844, 0.574 and 0.484, respectively. Subsequently, the fitting effect of the model was analyzed according to the model fitting index, as shown in Table 4, indicating that the model fits well.

Table 3. Model Regression Coefficient

Factor	→ Analysis Items	Non-standardized Coefficient	Standardized Coefficient	Standard Error	Z	P
Level of Interest	→ Tourism Possibilities	0.877	0.844	0.104	8.395	0.000
Market Attitude	→Level of Interest	0.731	0.574	0.11	6.633	0.000
Level of Participation	→Market Attitude	0.542	0.484	0.11	4.945	0.000

Table 4. Model Fitting Indicators

χ^2	df	P	Chi-square Degrees of Freedom Ratio	GFI	RMSEA	RMR	CFI	NFI	NNFI
-	-	>0.05	<3	>0.9	<0.10	<0.05	>0.9	>0.9	>0.9
46.734	32	0.045	1.46	0.943	0.056	0.063	0.981	0.943	0.973

Based on the above analysis, the respondents efforts in the protection of ancient buildings will strengthen their confidence in the ancient building tourism market, thus stimulate their interest in ancient buildings, and ultimately encourage them to visit ancient buildings. This shows that relevant departments should attach importance to the impact of ancient building protection on the confidence and interest of respondents. By encouraging participation, enhancing market confidence, increasing attractiveness, and promoting sustainable development, measures can be taken to promote the common prosperity of ancient building protection and tourism markets, thereby attracting more people to visit ancient buildings and inherit and promote historical culture.

5.4. Screening of user needs based on the analytical hierarchy process

Table 5. Results of the AHP

Results of the AHP				
Item	Feature Vector	Weighted Value (%)	The Biggest Characteristic Root	CI
Convenient Transportation	1.067	26.666		
Ticket Prices for Scenic Spots	0.933	23.334		
Family Conditions	0.667	16.665	4	0
The Atmosphere around the Tourist Attractions	1.333	33.335		

Analytical Hierarchy Process is used to calculate the weight of each indicator. The descriptive statistical analysis of the tourism limitation factors of ancient buildings is conducted, and each index is authorized according to the average value, and then the judgment matrix is constructed. By applying

the square root method, the feature vector is obtained, and the weight of transportation convenience is 26.666%, the weight of scenic spot ticket price is 23.334%, the weight of family conditions is 16.665%, and the weight of the atmosphere around tourist attractions is 33.335%. Detailed data are shown in Table 5.

Meanwhile, the calculation results of the Analytical Hierarchy Process show that the maximum feature root is 4.0, and according to the RI table, the corresponding RI value is 0.882. Accordingly, the CR=CI / RI=0.0 <0.1 is calculated, indicating that the one-time test is passed and the assignment process is correct and logical.

According to the above analysis, the respondents generally believe that the limiting factors of ancient building tourism are mainly due to the influence of tourism atmosphere, followed by the convenience of transportation and the ticket price of scenic spots, while the influence of family factors is relatively small. This shows that the external tourism environment and atmosphere play a vital role in terms of the experience and attraction of ancient architectural tourism. Therefore, when promoting ancient architecture tourism, we should focus on optimizing the tourism environment and improving the quality of tourism service, so as to enhance the public interest and participation in ancient architecture tourism.

5.5. User Positioning Based on Logistic Regression

In view of the characteristics of dependent variables, this study adopts an ordered logical regression model. The significance level of likelihood ratio chi square was analyzed by performing likelihood ratio chi square test on the model. If the p value is less than 0.05, the model is statistically effective. As shown in Table 6, the significance p value is 0.000, which is significant at the level, so the model can be determined to be effective.

Table 6. Model Evaluation Table

Likelihood Ratio	P	AIC	BIC
40.087	0.000	389.241	434.3

Subsequently, according to the model parameter table, the significance of the independent variable is analyzed, that is, to test whether the p value is less than 0.05, which is used to study the impact of the independent variable on the dependent variable. Regression coefficient and odds ratio (or value) were analyzed and compared to assess the impact of independent variables on dependent variables. The specific analysis results can be seen in the ordered logical regression results table shown in Table 7.

Table 7. Results of Ordered Logistic Regression

Items	Regression Coefficient	Standard Error	Z	P	OR	OR=95% Confidence Interval	
						Upper Limit	Lower Limit
Under 18 Years Old	-0.092	0.555	-0.165	0.869	0.912	0.308	2.707
26-35 Years Old	-1.427	0.511	-2.795	0.005	0.240	0.088	0.653
36-55 Years Old	-0.247	0.734	-0.336	0..736	0.781	0.185	3.292
Over 55 Years Old	-0.688	1.460	-0.471	0.637	0.503	0.029	8.781
Civil Servant, Public Institution Staff, Government Staff	1.928	0.923	2.088	0.037	6.875	1.125	42.007
Company Employee	0.673	1.012	0.665	0.506	1.960	0.270	14.248
Student	0.202	0.689	0.293	0.770	1.224	0.317	4.723
Ordinary Worker	-3.107	1.470	-2.113	0.035	0.045	0.003	0.799
Service Staff	-1.612	0.833	-1.935	0.053	0.200	0.039	1.021
Freelancer	-1.181	0.840	-1.406	0.160	0.307	0.059	1.592

Based on the age variable between 26 and 35 years old, the significance P value is 0.005, which is significant at the level, and the or value is 0.24, so the interest of respondents between 26 and 35 years old in the ancient architectural tourism market will have a significant impact, and for each additional unit, the probability of increasing their interest in the ancient architectural tourism market by one or more levels will be reduced by 76%.

For career variables, the significant P values of civil servants, public institution employees, government workers and ordinary workers were 0.037 and 0.035, respectively, which also showed statistical significance. This shows that the interest of civil servants, employees of public institutions, government workers or ordinary workers in ancient building tourism has a significant impact. The corresponding or values are 6.875 and 0.045, respectively, showing a strong impact.

6. Conclusions and recommendations

6.1. Conclusion

At present, the ancient building tourism market is facing two major issues. Firstly, there are defects in the market's hardware facilities. Survey data indicates that the supporting facilities of the ancient architecture tourism market are inadequate, the transportation is inconvenient, and the phenomenon of overcharging around scenic areas, which are common problems in the scenic areas and are consistent with findings from offline research. In addition, there are also deficiencies in the market's software aspects. This paper studies four aspects: (1) Inaccurate market positioning. Many ancient building tourism projects lack precision in their positioning, making it difficult to attract the target group; (2) The homogenization of tourism products is severe, lacking uniqueness and innovation, such as Kaifeng Iron Pagoda, Yellow River Iron Ox, etc. The single-building scenic area structure is hard to meet the diverse needs of tourists [12]; (3) The visitor experience is monotonous. Currently, ancient building tourism is mostly limited to superficial visits, making it difficult for tourists to deeply experience the cultural connotations of ancient buildings. (4) Insufficient management and maintenance. Due to the large number and wide distribution of ancient buildings in China, the management and maintenance system is not sound, leading to some precious cultural heritage being damaged.

In addition, the questionnaire data reveals the balance and connection between ancient architecture tourism and protection: respondents generally express their support for the scenic spot information on official promotion platforms through clicks and shares, and use internet platforms for promotion. They prefer to raise funds for the protection of ancient buildings by purchasing cultural and creative products from the scenic areas. However, the willingness to donate directly is relatively weak. Moreover, respondents indicate that they hope to be able to participate in simple cleaning work during their visit to ancient building scenic areas, to carry out tourism activities under the principle of prioritizing protection. This shows that ancient building tourism and ancient building protection are not opposing relationships, and the market has the full capability to promote the main conditions required for the development of protection.

6.2. Recommendations

In order to achieve the harmonious coexistence of ancient architecture tourism and cultural heritage protection, it is necessary to increase the investment and technical support and encourage the social capital participation. At the same time, strengthening the coordination and management between ancient building conservation and tourism development, enhancing the professional quality of cultural relics protection personnel and scenic area staff, and rationally developing tourism resources. In addition, tourism routes rich in cultural connotations should be planned, convenient transportation networks should be built, infrastructure of scenic spots should be improved and upgraded, and tourism products should be innovated to meet the needs of different tourists, and modern scientific should be used to enrich tourist experience. At the same time, we should strengthen the publicity efforts for ancient building tourism, strengthen regional cooperation and linkage, and take consumer needs as

the starting point to realize the sharing and optimal allocation of tourism resources. In addition, we should also strengthen the educational guidance for tourists, and strengthen the formulation and enforcement of policies and regulations to convey the core concept of cultural relics protection.

References

[1] Chen Junzi, Zhou Yong, Liu Dajun. Chinese ancient architecture heritage in time and space distribution characteristics and genetic analysis [J]. Journal of Arid Zone Resources and Environment, 2018, 32 (02): 194-200.

[2] Zhang Xin. Exploration of the relationship between ancient architecture protection and cultural tourism development [J]. China Nationalities Expo, 2022, (04): 111-113.

[3] Hao Runqiang. Ancient tourism present situation and the development strategy [D]. Guangxi Normal University, 2021.

[4] Wang Enchuan, Xue Lijie, Li Ke, et al. Problems and countermeasures of ancient architecture tourism development in Daming County [J]. Cooperative Economy and Science and Technology, 2011, (22): 22-23.

[5] Wei Yongqing. Research on Design of Tourism Cultural and Creative Products based on ancient architecture carving in Northern Fujian [J]. Sculpture, 2022, (01): 70-71.

[6] Yao Zhibing. Analysis on new tourism industry model of ancient architecture tourism region in Southern Jiangsu [J]. Tourism and Photography, 2020, (01): 61-62.

[7] Zhao Yuxin, Zhao Shengli. An analysis of factors influencing employment of college students based on structural equation modeling - A case study of Qufu Normal University [J]. Journal of Qufu Normal University (Natural Science Edition), 2023, 49 (03): 25-30.

[8] Wu Benlin, Chen Hao, Yang Longgao, et al. Prevention and control technologies based on analytic hierarchy process and fuzzy evaluation method [J]. Journal of Shanxi Coal, 2024, 43 (10): 153-157+184.

[9] Li Xiaoxue, Shi Xiaoru. An analysis of influencing factors on the effectiveness of blended learning based on multinational Logistic regression [J]. Journal of Higher Education, 2023, 9 (31): 19-22.

[10] Tenko R, George M, James A, et al. Evaluating Cronbach's Coefficient Alpha and Testing Its Identity to Scale Reliability: A Direct Bayesian Confirmatory Factor Analysis Procedure [J]. Measurement: Interdisciplinary Research and Perspectives, 2024, 22 (1): 78-89.

[11] Wu Yuqian, Zhang Yumei, Zang Dawei, et al. Study on the reliability, validity, and sensitivity of the upper limb action research test scale for assessing the function of the hemiplegic upper limb and hand in subacute ischemic stroke patients [J]. Chinese Journal of Stroke, 2024, 19 (08): 915-923.

[12] Xing Huibin, Wang Yucheng. Analysis of the current development and countermeasures of ancient architectural tourism economy in China [J]. Chinese Businessmen (Economic Theory Studies), 2005, (09): 63-65.