Eurasia Journal of Science and Technology	ISSN: 2663-1024	Volume 4, Issue 1, pp 1-10	APR 2022

Research on strategies to enhance the attractiveness of tourist attractions to college students -- Based on F-AHP

Yuting Wang*, Xinyu Li, Guanglin Wu, Qun Chen, Yulin Chen, Shixin Wei
School of Business, Guangdong University of Foreign Studies, Guangzhou, China

Abstract
With the continuous development of the economic level, tourism has become an important choice of modern people for leisure and entertainment. And with the continuous improvement of people's education level, the group of college students has become a very important tourism consumer group, so this paper is necessary to study the attraction enhancement strategy of this group. By analyzing the influencing factors of attracting college students' travel behavior, this paper finds out the aspects that are more valuable to them to propose the improvement suggestions for tourist attractions to attract this consumption quality group.
Keywords: tourist attractions; Fuzzy Analytic Hierarchy Process; attractiveness enhancement strategy

1 INTRODUCTION

With the transformation of China's economic structure and the improvement of residents' living standards in recent years, travel has now become a common form of leisure and entertainment. The "2019 Tourism Market Basic Information" released by the China Tourism Research Institute shows that in 2019, 6.006 billion domestic trips were made, an increase of 8.4% over the same period of the previous year; the total number of inbound and outbound trips was 300 million, an increase of 3.1%; and the total annual tourism revenue was 6.63 trillion yuan, an increase of 11%. The comprehensive contribution of tourism to GDP was 10.94 trillion yuan, accounting for 11.05% of the total GDP. Except for 2020, which was affected by the new crown epidemic with more special data, the number of domestic tourism and income have been maintaining a stable growth trend. It can be seen that tourism as a tertiary industry now occupies a more important position in China's economic structure, and the development of this industry also has a more important role in the good running of the national economy.

Meanwhile, according to Talking Data survey data, the age group of 19-25 years old accounted for 23.1% of the domestic travel group in 2017 and 23.2% in 2018. in 2018, the age group under 25 years old accounted for 36%, an increase of 0.5 percentage points from 2017. National travel is trending younger. In addition, youth (15-24 years old) account for a not-insignificant share of travelers, about a quarter, second only to the 26-35 years old age group. And most of the 15-24-year-olds overlap with the student group. Among the student group, college students who have sufficient vacation time and certain financial ability are the main consumers. Therefore, it is also meant to explore how to grasp the consumer psychology of college students, position them precisely, and expand the proportion of college student tourists for the development of each tourist attraction.

To this end, this study takes college students group as the research object and uses hierarchical analysis and fuzzy comprehensive evaluation method to construct a fuzzy comprehensive evaluation matrix to explore how attractive tourist attractions are to college students and the difference of each factor to college students' attractiveness, to dig out the influencing factors that are more attractive to

college students and help tourist attractions make more targeted improvements to attract this part of the target group.

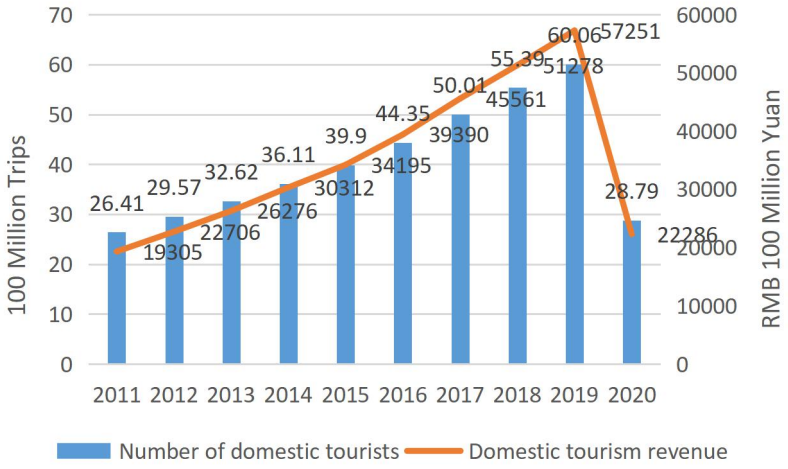

Figure 1 2011-2020 domestic tourism scale change trend

2 LITERATURE REVIEW

In recent years, with the rapid economic development, the residents' consumption level gradually improved, although affected by the epidemic, the overall residents' consumption psychology and consumption habits gradually changed, from simple material consumption to the era of service consumption as the main focus. The group of college students, as the trendsetters of the new era, standing at the tip of the trend of the development of the times, are also gradually opening up their consumption concepts and their thinking is more advanced. Influenced by many social practice activities and volunteer services in universities, college students' willingness and enthusiasm to participate in society and enjoy nature and life are gradually increasing, and the growth of their consumption demand also reflects their demand for a platform that is suitable and attractive to college students. Of course, this is also an important measure to boost economic growth and stimulate the vitality of young people. From the above, it is clear that the research on college students' tourism is very important and of great practical significance.

Domestic research results on the college student tourism market are relatively abundant. But most of the research perspectives are exploring tourism attractiveness research with specific cases. Chen Xiao et al. conducted a study on tourist perception of tourism attractiveness of theme parks in Shenzhen, taking Window of the World as an example; Deng Weiwei et al. analyzed and explored the influence of tourist visual perception on destination selection intention based on visual attractiveness and aesthetic emotion perspective; Zhang Nan et al. conducted a study on tourism attractiveness enhancement of Shanxi Wangjiayuan scenic spot based on tourist perception perspective. In summary, most scholars are specific examples of specific analysis, which are studies and suggestions based on the current situation of the featured scenic spots. In this paper, with a new perspective, aiming at college students, a group with strong willingness to consume and sufficient motivation in tourism, we use fuzzy comprehensive evaluation method to determine the strength of attractiveness of tourist attractions to college students, and analyze the inner logic of attractiveness of tourist attractions to them, and use AHP hierarchical analysis method to analyze the influencing

factors, and explore the good strategies to attract college students for tourist attractions.

3 AHP FUZZY COMPREHENSIVE EVALUATION METHOD

Hierarchical analysis refers to a complex multi-objective decision problem as a system, A systematic method for optimal decision making. The fuzzy comprehensive evaluation method is a comprehensive evaluation method based on fuzzy mathematics. This comprehensive evaluation method converts qualitative evaluation into quantitative evaluation based on the affiliation theory of fuzzy mathematics, i.e., it uses fuzzy mathematics to make an overall evaluation of things or objects that are subject to multiple factors. In this paper, the hierarchical analysis method is combined with the fuzzy comprehensive evaluation method to form the complementary advantages of the two methods, and then the AHP fuzzy comprehensive evaluation mathematical model is constructed.

3.1 Construction of indicator sets

Indicator set is the set of all factors that affect the evaluation object. It is expressed as:

$$U = (U1, U2, U3, \cdots, Un) \quad (1)$$

3.2 Construction of rubric set

The set of rubrics is the set of evaluation levels for each indicator, denoted as:

$$V = (v1, v2, v3, \cdots, vn) \quad (2)$$

3.3 AHP method to construct weight sets

To construct the weight set using the AHP method, a hierarchical analysis structure model with recursive relationship is needed to decompose the levels of complex problems, and the decomposed target level and multiple indicator levels play the role of upper level dominating lower level and lower level subordinating to the upper level. Subsequently, based on the establishment of a judgment matrix based on the importance degree among the hierarchical indicators, the indicator weights of each level can be solved. The details are as follows.

3.3.1 Construct hierarchical analysis judgment matrix

Based on Table 1, the n×n order judgment matrix D=d(ij)n×n can be established by comparing the importance degree between indicators of the same level between the two.

Table 1 Proportional scale scale

Scale	Results
1	Comparison of two factors with equal importance
3	Comparing the two factors, the former is slightly more important than the latter
5	Comparing the two factors, the former is significantly more important than the latter
7	Comparing the two factors, the former is strongly more important than the latter
9	Comparing the two factors, the former is extremely more important than the latter
2, 4, 6, 8	Intermediate value of the above adjacent judgments

Countdown	If the ratio of the importance of factor i to factor j is d(ij), then the ratio of the importance of factor j to factor i is d(ji) = 1/d(ij)

3.3.2 Judgment matrix weights

The weights Wi=(w1, w2, w3, ⋯ , wn) of each index were obtained by square root method for the constructed judgment matrix D.

3.3.3 Check the consistency of the judgment matrix D

The reasonableness test of whether the set of weights sought based on the AHP method satisfies the consistency ratio CR required for the actual operation is as follows: based on the judgment matrix D=d(ij)n×n to find its maximum characteristic root λmax, use the maximum characteristic root λmax and the average random consistency index RI (checked by Table 2) to find the test value of CR. Generally, if CR < 0.1, the judgment matrix is considered to pass the consistency test; otherwise, it does not have satisfactory consistency, and the matrix needs to be readjusted.

Table 2 Average random consistency index RI order

Matrix Order	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

3.4 Construction of index evaluation matrix

Based on the set (1) established by the indicator U and the set (2) established by the rubric Vn, the indicator evaluation matrix H can be formed, and the expression is

H=(h(1s), h(2s), h(3s), ..., h(ms))^T (3)

3.5 Fuzzy comprehensive evaluation

The fuzzy comprehensive evaluation P is the result of the product of the evaluation matrix H of indicators at each level and the corresponding set of weights W at each level, and the equation is further normalized to make the evaluation results more objective. The specific expression is:

P=H·W (4)

4 THE USE OF AHP FUZZY COMPREHENSIVE EVALUATION METHOD

In order to reasonably investigate the attractiveness of various factors of tourist attractions to college students, the author selected a college in Guangzhou, Guangdong Province as a sampling point and used the AHP fuzzy comprehensive evaluation method to find out the influencing factors that are more attractive to college students. The details are as follows.

4.1 Construction of indicator sets

4.1.1 Establishment of tourism scenic attractiveness evaluation index system

The establishment of the attractiveness evaluation index system of tourist attractions plays a guiding role in attracting college students' tourists and sustainable development for major tourist attractions in China. According to the basic situation and the current situation of the management of tourist attractions in China, following the principle of scientific and systematic, the author has organized the relevant index system found, and finally built the evaluation index system in line with the attractiveness of tourist attractions to college students. Specifically, the attractiveness of tourist attractions to college students is the target layer (A). The external traffic (A1),

landscape features (A2), infrastructure (A3), tour price (A4) and scenic spot management (A5) under the target layer are the first-level indicators. The first-level indicators include external transportation convenience (A11), external transportation cost (A12), external transportation comfort (A13), landscape characteristics (A21), landscape attractiveness (A22), landscape viewability (A23), infrastructure comprehensiveness (A31), infrastructure convenience (A32), infrastructure intelligence (A33), tour cost (A41), rest cost (A42), transportation cost (A43), service management (A51), health management (A52), and safety management (A53) as secondary indicators. The evaluation index system of attractiveness of tourist attractions to college students is constructed by 1 target layer, 5 primary indicators and 15 secondary indicators, as shown in Table 3.

Table 3 Attractiveness index evaluation system

Attractiveness of tourist attractions to college students A				
External Transportation (A1)	**Scenic features (A2)**	**Infrastructure (A3)**	**Tour price (A4)**	**Landscape Management (A5)**
Convenience (A11)	Landscape features (A21)	Comprehensiveness (A31)	Tour cost (A41)	Service Management (A51)
Cost (A12)	Landscape Attractiveness (A22)	Convenience (A32)	Cost of rest (A42)	Health Management (A52)
Comfort (A13)	Landscape viewability (A23)	Intelligibility (A33)	Transportation costs (A43)	Security Management (A53)

4.1.2 Data sources

In order to make this research data real and effective, the author distributed 200 questionnaires in a university in Guangzhou, Guangdong Province in December 2021, and 134 valid questionnaires were collected, with an effective rate of 67%. The respondents were all college students, aged between 18 and 25 years old.

4.1.3 Credibility analysis

Reliability is an indicator to test the reliability and consistency of questionnaire results. In this paper, the reliability of the questionnaire was analyzed by SPSS AU software, and the Cronbach's alpha coefficient was selected as the reliability test.

Table 4 Results of confidence analysis

Variable Name	Number of items	Cronbach Alpha Value
External Transportation	4	0.719
Scenic features	4	0.791
Infrastructure	4	0.702
Price Cost	4	0.711
Scenic Area Management	4	0.740

The validity of the scale is usually referred to as the validity of the scale. In this paper, exploratory factor analysis was used to test the structural validity of the questionnaire, and the scale validity was analyzed by KMO and Bartlett's spherical test in SPSS AU software. the common judgment criterion for KMO value is greater than 0.6. after analysis by SPSS AU software, the questionnaire data showed a KMO value of 0.786 (>0.6), and the significance of Bartlett's spherical test was 0.000, with a strong correlation between the variables and suitable for factor analysis. Therefore the scale has validity and good structural validity.

Table 5 Results of validity analysis

Numeric Type	Specific values
KMO value	0.786
Barth Spherical Value	997.827
df	190.000
Sig.	0.000

4.2 Collection of comments

Referring to the example of evaluation set selection in other fields, the evaluation method used in this fuzzy comprehensive evaluation is a five-level Likert scale, and the fuzzy calculated evaluation set is V=(V1,V2,V3,V4,V5)=(very low, low, average, high, very high). The evaluation results are shown in Table 6.

Table 6 Mutual factor weights of the criterion layer for the target layer

A	A1 External Transportation	A2 scenic features	A3 Infrastructure	A4 tour price	A5 Scenic Area Management
A1	1	5/7	5/7	1	5/9
A2	7/5	1	1	7/5	7/9
A3	7/5	1	1	7/5	7/9
A4	1	5/7	5/7	1	5/9
A5	9/5	9/7	9/7	9/5	1

Table 7 Degree of attractiveness of college students to the characteristics of tourist attractions

Evaluation content		**Very low**	**Low**	**General**	**High**	**Very high**
Tier 1 Indicators	Secondary indicators	V1	V2	V3	V4	V5
External	Convenience A11	0.007	0.000	0.090	0.358	0.545
Transportation	Cost A12	0.007	0.022	0.142	0.403	0.425
A1	Comfort A13	0.000	0.007	0.172	0.410	0.410
Scenic features	Landscape	0.000	0.015	0.201	0.381	0.403
A2	Features A21					
	Landscape Appeal A22	0.000	0.000	0.112	0.351	0.537
	Landscape admirability A23	0.000	0.007	0.104	0.366	0.522
Infrastructure	Comprehensivenes	0.000	0.007	0.149	0.448	0.396

A3	s A31					
	Convenience A32	0.000	0.000	0.090	0.358	0.552
	Intelligent Degree A33	0.015	0.052	0.254	0.425	0.254
Tour price A4	Browse Cost A41	0.000	0.000	0.134	0.388	0.478
	Rest cost A42	0.007	0.037	0.209	0.403	0.343
	Transportation cost A43	0.000	0.015	0.149	0.470	0.366
Scenic Area Management A5	Service Management A51	0.000	0.007	0.149	0.463	0.381
	Health Management A52	0.000	0.007	0.045	0.388	0.560
	Security Management A53	0.000	0.007	0.067	0.276	0.649

From Table 6 and Table 7, the affiliation matrix R1 of the external traffic A1 is:

$$R1 = \begin{bmatrix} 0.007 & 0.000 & 0.090 & 0.358 & 0.545 \\ 0.007 & 0.022 & 0.142 & 0.403 & 0.425 \\ 0.000 & 0.015 & 0.201 & 0.381 & 0.403 \end{bmatrix}$$

The affiliation matrix R2 of the landscape feature A2 is:

$$R2 = \begin{bmatrix} 0.000 & 0.015 & 0.201 & 0.381 & 0.403 \\ 0.000 & 0.000 & 0.112 & 0.351 & 0.537 \\ 0.000 & 0.007 & 0.104 & 0.366 & 0.522 \end{bmatrix}$$

The affiliation matrix R3 of infrastructure A3 is:

$$R3 = \begin{bmatrix} 0.000 & 0.007 & 0.149 & 0.448 & 0.396 \\ 0.000 & 0.000 & 0.090 & 0.358 & 0.552 \\ 0.015 & 0.052 & 0.254 & 0.425 & 0.254 \end{bmatrix}$$

The affiliation matrix R4 for browsing price A4 is:

$$R4 = \begin{bmatrix} 0.000 & 0.000 & 0.134 & 0.388 & 0.478 \\ 0.007 & 0.037 & 0.209 & 0.403 & 0.343 \\ 0.000 & 0.015 & 0.149 & 0.470 & 0.366 \end{bmatrix}$$

The affiliation matrix R5 of scenic management A5 is:

$$R5 = \begin{bmatrix} 0.000 & 0.007 & 0.149 & 0.463 & 0.381 \\ 0.000 & 0.007 & 0.045 & 0.388 & 0.560 \\ 0.000 & 0.007 & 0.067 & 0.276 & 0.649 \end{bmatrix}$$

4.3 Hierarchical analysis

In this paper, we directly use the R program to calculate the mutual factor weights and consistency test CR values in the judgment matrix of the criterion layer "Ai" for the target layer "A". The specific steps are:

1) Bringing the analysis data into the R program matrix (matrix)
2) Calculate matrix eigenvalues and eigenvector values
3) The first eigenvalue is taken out to calculate the CI value with the consistency test (CR) value
4) The first column feature vector value is taken as the judgment matrix weight value

The data in Table 6 were substituted into the R program, and the results of the program run showed that the judgment matrix consistency test (CR) value was 0, which was less than 0.1, representing acceptable consistency, and the four criterion layer weights were 0.1515152, 0.2121212, 0.2121212, 0.1515152, and 0.2727273.

The analysis results show that the weight value of scenic area management is 0.2727273, and the level of scenic area management is the most attractive to college students compared with other indicators.

Table 8 Mutual factor weights of sub-criterion layers for the criterion layer

A1	A11	A12	A13	A2	A21	A22	A23
A11	1	9/7	9/7	A21	1	7/9	7/9
A12	7/9	1	1	A22	9/7	1	1
A13	7/9	1	1	A23	9/7	1	1
A3	A31	A32	A33	A4	A41	A42	A43
A31	1	7/9	7/5	A41	1	9/5	9/7
A32	9/7	1	9/5	A42	5/9	1	5/7
A33	5/7	5/9	1	A43	7/9	7/5	1
A5	A51	A52	A53				
A51	1	7/9	7/9				
A52	9/7	1	1				
A53	9/7	1	1				

Similarly, the data in Table 8 are substituted into the R program, and the R program can be used to directly calculate the mutual factor weights and the consistency test (CR) values within the judgment matrix of the scheme layer Aij for the criterion layer Ai. The approach is the same as that of the above R program, and the results of the R program run found that the CR values of the judgment matrix, criterion layer cr1 and sub-criterion layers cr21, cr22, cr23, cr24 and cr25 are 0, -3.828355e-16, 3.828355e-16+0i , 0+0i , -3.828355e-16 respectively, all less than 0.1 therefore represent the consistency is acceptable. And the values of the criterion layer and sub-criterion layer weights are listed below.

Table 9 Weight values of the second indicator layer to the first indicator layer

w21	0.3913043	0.3043478	0.3043478
w22	0.28	0.36	0.36
w23	0.3333333+0i	0.4285714+0i	0.2380952+0i
w24	0.4285714+0i	0.2380952+0i	0.3333333+0
w25	0.28	0.36	0.36

4.4 Fuzzy comprehensive evaluation

Firstly, the questionnaire data are substituted into the affiliation matrix R to find the first level fuzzy evaluation, and the formula is:

Ki=Wi*Ri=(wi1,wi2,...,win)(ri1,ri2,...,rim)T

Using the formula to multiply the weight factors of the above derived scheme layer Aij for the criterion layer Ai with the weight values of the judgment matrix calculated in the previous section, the first level fuzzy evaluation matrix of the attractiveness factor of tourist attractions for college students is derived as:

$$K=\begin{bmatrix}K1\\K2\\K3\\K4\\K5\end{bmatrix}=\begin{bmatrix}0.004869565 & 0.008826087 & 0.1307826 & 0.3875217 & 0.4673913\\0.000000000 & 0.006720000 & 0.1340400 & 0.3648000 & 0.4940800\\0.003571429 & 0.014714286 & 0.1487143 & 0.4039524 & 0.4290476\\0.001666667 & 0.013809524 & 0.1568571 & 0.4189048 & 0.4085238\\0.000000000 & 0.007000000 & 0.0820400 & 0.3686800 & 0.5419200\end{bmatrix}$$

Finally, the second-level fuzzy comprehensive assessment is then performed, and the matrix multiplication operation is

performed using the K matrix and the judgment matrix weight w1 obtained earlier, with the formula:P=W*K.

The results of the R program run show that the comprehensive secondary evaluation of the attractiveness factors of tourist attractions is:

P=W*K=(0.001747914+0i 0.009885396+0i 0.1259345+0i 0.3858036+0i 0.4763257+0i)

These 5 values represent the affiliation degree of "very low", "low", "average", "high" and "very high" in the fuzzy evaluation. "very high", i.e. 47.63% of them are "very high", 38.58% of them are "high", 12.59% of them are "average", 0.99% "low", and 0.17% "very low", according to the principle of maximum affiliation in the above five levels of comprehensive affiliation, we have:

0.4763>0.3858>0.1259>0.0099>0.0017

Therefore, the tourist attractions are very high for college students.

5 CONCLUSION

In China, many regions that rely on tourism in economic development has achieved a stage of reform and development achievements, and the formation of a series of new integrated tourism, culture, health, tourism, and other tourism economic development model, social and cultural, ecological environment, and "tourism economy" between the development of the linkage, to achieve effective coordination so that China Tourism industry for economic development and social progress to provide great dynamic energy. In this paper, through the reasonable construction of attractiveness evaluation index system, using AHP fuzzy comprehensive evaluation method for research data calculation. The results show that tourism scenic spots currently have very high attractiveness to college students. In the specific measurement of the attractiveness of tourist attractions to college students, the management of scenic spots is the most important aspect for college students, among which, the service, safety, and health management of scenic spots are the most important. In this regard, based on the attractiveness of tourist attractions to college students, the author puts forward the following suggestions on the methods to enhance the attractiveness of domestic tourist attractions.

5.1 Strengthen the management of tourist attractions services

The core of tourism is tourism service, which means that tourists are satisfied with their tourism experience. A holistic and systematic service process will not only bring tourists a satisfactory experience, but also provide a good medium for the overall management of the scenic spot, and the overall management perspective is more convenient for the managers. Specifically, the establishment of an intelligent tourism system is a good choice to provide high-quality, high satisfaction services based on information technology to meet the individual needs of tourists. For university students, this fresh travel experience will not only increase their experience of the travel process but also directly improve customer perception in the form of tangible services.

5.2 Strengthen the safety management of tourist attractions

Tourism safety supervision has always been a top priority in the work of tourism operators. However, in recent years, tourism safety accidents have occurred frequently, and the youth group including college students is one of the victim groups. This is also one of the reasons why most college students choose to travel in groups. To stimulate the intrinsic motivation of the college student group to travel, it is essential to do a good job in the safety management of tourist attractions. Keep

the lifeline of tourism safety, to fundamentally guarantee the stable, healthy, and sustainable development of tourist attractions.

A similar scenic safety office is necessary, and the employment of professional safety managers is a must. Not only that, daily inspections, regular verification of the safety level of important facilities, and the establishment of risk prevention and control mechanisms are also essential. Security management is not tough or patterned, it is a guarantee and the visitor's choice to rely on. This work is a solid wall of protection for college students who are less capable of taking safety precautions.

5.3 Strengthen the health management of tourist attractions

Scenic sanitation problems will arise with the growth of tourists, for this incremental problem, timely and continuous scientific governance measures are very important. Not only governance, the establishment and strict implementation of a sound scenic sanitation management system is an important step to ensure long-term management.

At the same time, the awareness of scenic sanitation is also the core of achieving the standardization of scenic sanitation management. Awareness of caring for the environment is not only a requirement of the ideological norms of scenic governance, but also the obligation and responsibility of each resident. Therefore, the guidance of the standardized consciousness of tourists is also a place that needs to be achieved. For example: reasonable setting of restrooms, reasonable layout of parking lots, reasonable setting of warm reminder content and signs, reasonable setting of scenic sanitation management-related facilities, etc.

These are not only good strategies to enhance the attractiveness of tourist attractions to college students, but also important measures to promote the sustainable development of the attractions themselves, which hopefully will provide valuable help to the construction of the attractions.

REFERENCES

[1] Zhao Y. H. Satisfaction evaluation of ecological tourism management in Lhasa based on AHP fuzzy comprehensive evaluation method [J] Tibet Science and Technology.2020.05

[2] Li Yanyan. Investigation of tourism consumption behavior and marketing countermeasures of female college students in higher education [J] Tourism Management

[3] Zhang Chunhua. Analysis of the differences in tourism market characteristics and influencing factors of college students [J] Journal of Harbin College.2021.02

[4] Kong ZJ, Guo YF, Hu DP, Rao BY. Operational safety risk evaluation of ecological cultural tourism scenic area based on AHP and fuzzy comprehensive evaluation method.2021.09

[5]Su Aoyu, Wang Xiaodi, Zhang Gengxin. Research on night tourism experience degree of scenic spots based on AHP-simulation comprehensive evaluation method [J] Journal of Harbin College.2020.07

[6] Li Zhuo Yang et al. AHP-based evaluation of tourist satisfaction in Rizhao Fulai Mountain Scenic Area, Shandong Province [J] Hubei Agricultural Science.2019.12

[7] Xia Yangyang, Research on the innovation model of tourism scenic spot based on service design. [N] Tourism Service.2021.10

[8] Wang Mingzhu. Leading with ideological and political work to ensure the safety of scenic tourism [N] Safety Management.2021.12

[9] Song Jiayan, Zou Xue. Research on the health problems of experience-oriented tourism scenic spots [J] Tourism Planning

[10] China Tourism Research Institute. China Domestic Tourism Development Annual Report 2021.