Investigation and Research on Tourist Satisfaction of Beijing Botanical Garden

Qun Zhao, Yanchun Wan and Yanyan Pei

ABSTRACT

As an important place to protect biological diversity, botanical garden is also an indispensable and important facility in the city. However, faced with the rapid development of green space construction in today's society, the following problems also appear one by one. Therefore, it is crucial to do a good job in the construction of botanical garden. This paper analyzes the satisfaction and evaluation factors of tourists in Beijing botanical garden by using questionnaire and fuzzy evaluation method, and draws corresponding conclusions.

1. INTRODUCTION

With the rapid expansion of tourism, people gradually change their consumption concept. Under such a general trend, tourist satisfaction determines a stable source of tourists. Tourist satisfaction refers to the measurement of tourists' satisfaction with tourist attractions and products, which means that tourists' satisfaction directly affects the re-visit rate, image and future development of scenic spots. This article put aside past the park from the designer's subjective perspective of professional planning concept, using the Internet the science open platform, the paper summarizes the real experience of tourists to the destination and quantitative processing, attach importance to public demand, the Beijing botanical garden system analysis, understand the existing problems, and analysis the reason, based on the actual put forward a set of overall planning of the scenic spot. This paper is of great help to attract tourists, improve scenic area planning and tourists' better experience.
2. TOURIST SATISFACTION ANALYSIS

2.1 Overall Reliability Analysis of The Questionnaire

The results of reliability analysis determine whether the questionnaire is valid or not. The higher the reliability coefficient, the more reliable the detection effect. Cronbach alpha coefficient is commonly used to calculate, and the formula is: \( \text{alpha} = \frac{k}{k-1} \times \left(1 - \frac{\sum r_{ij}^2}{\sum (1 - r_{ij}^2)}\right) \), where \( k \) represents the total number of questions in the questionnaire, the variance of the survey results of the its question, and the variance of all survey results. Generally speaking, the calculated coefficient should be between 0 and 1. If the Cronbach alpha coefficient is higher than 0.9, it is considered to be highly reliable. If the Cronbach alpha coefficient is 0.7≤alpha< 0.9, we will consider it to be reliable or acceptable. If Cronbach's alpha coefficient is 0.6≤alpha<0.7, the questionnaire design is considered to be problematic, but there are still some reference values. If Cronbach's alpha coefficient is less than 0.6, the questionnaire is considered to have a big problem, and it is necessary to rewrite the questionnaire. In this paper, reliability analysis in IBM SPSS Statistics 22.0 software was used to test the reliability of 369 valid questionnaires, to determine the internal consistency of each evaluation factor in the questionnaire. According to table I, the Alpha coefficient of Cronbach obtained through the test is 0.804, which indicates that the questionnaire is highly reliable and can be further analyzed and counted.

2.2 Questionnaire Structure Validity Analysis

KMO and Bartlett test were used to analyze the validity of the questionnaire structure, and the formula was:

\[
KMO = \frac{\sum_i \sum_{i \neq j} r_{ij}^2}{\sum_i \sum_{i \neq j} r_{ij}^2 + \sum_i \sum_{i \neq j} \Sigma p_{ij}}
\]

(1)

It should be between 0 and 1. When KMO≥0.9 is, it is considered very appropriate; 0.8 or more is appropriate; 0.7 or greater is fair; 0.6 or more is not appropriate; Less than 0.5 is extremely inappropriate. When the P value detected by Bartlett test is less than 0.05, it indicates that there is correlation in the middle of the variable, and the subsequent factor analysis is effective. According to table II, the coefficient of KMO is 0.901 and the P value is 0.000, which indicates that the structure design of this questionnaire is good.
TABLE II. KMO AND BARTLETT STRUCTURAL VALIDITY ANALYSIS.

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin measures sampling appropriateness</th>
<th>0.901</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett's spherical test</td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>4279.009</td>
</tr>
<tr>
<td>Df</td>
<td>595</td>
</tr>
<tr>
<td>Significant</td>
<td>0.000</td>
</tr>
</tbody>
</table>

2.3 Descriptive Statistical Analysis

According to the statistics, female tourists and male tourists accounted for 54.47 percent and 45.53 percent respectively. Tourists are mainly aged between 15 and 29, followed by those aged between 30 and 44 and those aged between 45 and 60, accounting for 44.45%, 29.81% and 20.05% of the total. From the perspective of education level, tourists with bachelor's or junior college degree account for 51.76% of the total, followed by those with higher than senior high school, junior high school and graduate school, and those with lower than primary school, accounting for 20.06%, 10.84%, 9.21% and 8.13% respectively. From the perspective of occupation, employees of enterprises and public institutions account for a relatively large proportion, accounting for 63.96% of the total. In terms of the frequency of tourists going out to play, 29.54% of them seldom come to the Beijing botanical garden, and 49.05% of them come to the botanical garden every year, while 21.41% of them come to the botanical garden every week or once a month. Tourists spend from 30 minutes to more than 2 hours on the way to Beijing botanical garden, and the way to travel is evenly distributed. Recreation and getting close to nature are the main travel purposes of Beijing botanical garden tourists, accounting for 35.78% and 30.62% respectively, followed by dating and accompanying children, accounting for 19.24% and 13.82% respectively. Family is the main way to enjoy the Beijing botanical garden, accounting for 39.29 percent, followed by friends and individuals, accounting for 23.31 percent and 19.24 percent respectively.
3. TOURIST SATISFACTION ASSESSMENT

3.1 Determination Of Weights

<table>
<thead>
<tr>
<th>target layer</th>
<th>criterion layer</th>
<th>Weight value</th>
<th>Level 3 indicators</th>
<th>Weight value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape resources</td>
<td>0.279</td>
<td>Ornamental flora</td>
<td>0.180</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>arboretum</td>
<td>0.135</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Greenhouse area</td>
<td>0.180</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overall greening</td>
<td>0.108</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>natural scenery</td>
<td>0.126</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flower species</td>
<td>0.144</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of trees</td>
<td>0.126</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General environment</td>
<td>0.212</td>
<td></td>
</tr>
<tr>
<td>Environmental quality</td>
<td>0.232</td>
<td>Air quality</td>
<td>0.197</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sanitary conditions</td>
<td>0.152</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scenic spot scale</td>
<td>0.258</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content Richness</td>
<td>0.182</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>leisure facilities</td>
<td>0.152</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Entertainment facilities</td>
<td>0.152</td>
<td></td>
</tr>
<tr>
<td>Supporting facilities</td>
<td>0.193</td>
<td>Parking facilities</td>
<td>0.121</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tag system</td>
<td>0.182</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>toilet</td>
<td>0.212</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Convenience of transportation</td>
<td>0.182</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Online Ticket Purchase Service</td>
<td>0.190</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manual Ticket Purchase Service</td>
<td>0.167</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cost performance</td>
<td>0.238</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>scenic area management</td>
<td>0.214</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>security</td>
<td>0.190</td>
<td></td>
</tr>
</tbody>
</table>
3.2 The Establishment of Fuzzy Comprehensive Evaluation Model

(1) determine the set of evaluation indicators. This group of tourist satisfaction evaluation index will be represented by the symbol U, which includes four criteria layers in the secondary index, namely \( U = U_i \) \((i = 1, 2, 3, 4)\). Each of the secondary indicators and corresponding set of three indicators, namely \( U = U_{ij} \) \((i = 1, 2, 3, 4 \ldots 23)\); (2) establish comment set. In this survey, we divide the evaluation results of the respondents for each factor into: very dissatisfied, dissatisfied, average, satisfied, very satisfied. Then, the comment set of the respondents is: \( V = \{\text{very dissatisfied, dissatisfied, average, satisfied, very satisfied}\} \); (3) evaluation vector. In this step, the selection percentage of each question on each option is taken as the evaluation vector in the fuzzy evaluation system, \( R = \begin{bmatrix} r_{11} & \cdots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{n1} & \cdots & r_{nn} \end{bmatrix} \).

\( R = R_i \) \((i = 1, 2, 3, 4)\); (4) determine the membership matrix. Then the fuzzy evaluation set is: \( B = W \times R = \left[\begin{array}{ccc} 1 & 1 & \cdots \\ \frac{1}{n} & \frac{1}{n} & \cdots \\ \frac{1}{n} & \cdots & \frac{1}{n} \end{array}\right] \times \begin{bmatrix} r_{11} & \cdots & r_{1n} \\ \vdots & \ddots & \vdots \\ r_{n1} & \cdots & r_{nn} \end{bmatrix} \).

\[ B = B_i \) \((i = 1, 2, 3, 4)\]; (5) calculation of evaluation scores. According to the scoring value of the questionnaire, the set \( S \) (S = very dissatisfied, dissatisfied, general, satisfied, very satisfied = 1, 2, 3, 4, 5) is set as the quantitative set of fuzzy evaluation. Then, the calculation formula of evaluation score is: \( N = B \times S^T \).

3.3 Fuzzy Comprehensive Evaluation of Tourists' Satisfaction with Beijing Botanical Garden

In this paper, the selection percentage of each three-level index on each option is used as the evaluation vector in the fuzzy evaluation system. The evaluation vectors of tourists' satisfaction with "landscape resources", "environmental quality", "supporting facilities" and "service management" of Beijing botanical garden are:

\[
R_1 = \begin{bmatrix}
0.027 & 0.035 & 0.220 & 0.425 & 0.293 \\
0.030 & 0.065 & 0.241 & 0.377 & 0.287 \\
0.027 & 0.119 & 0.271 & 0.309 & 0.274 \\
0.049 & 0.119 & 0.228 & 0.374 & 0.230 \\
0.043 & 0.089 & 0.260 & 0.341 & 0.266 \\
0.003 & 0.136 & 0.290 & 0.393 & 0.179 \\
0.000 & 0.144 & 0.247 & 0.420 & 0.190
\end{bmatrix}.
\]

\[
R_2 = \begin{bmatrix}
0.014 & 0.154 & 0.268 & 0.377 & 0.187 \\
0.022 & 0.133 & 0.266 & 0.382 & 0.198 \\
0.019 & 0.125 & 0.312 & 0.360 & 0.184 \\
0.000 & 0.079 & 0.306 & 0.390 & 0.225 \\
0.011 & 0.122 & 0.333 & 0.312 & 0.222
\end{bmatrix}.
\]
According to the importance of tourists to each three-level index of Beijing botanical garden mentioned above, the weight is:

\[ W_1 = [0.180, 0.135, 0.180, 0.108, 0.126, 0.144, 0.126] \]
\[ W_2 = [0.212, 0.197, 0.152, 0.258, 0.182] \]
\[ W_3 = [0.152, 0.152, 0.121, 0.182, 0.212, 0.182] \]
\[ W_4 = [0.190, 0.167, 0.238, 0.214, 0.190] \]

The fuzzy evaluation set is:

\[ B_1 = W_1 \times R_1 = [0.025, 0.098, 0.251, 0.376, 0.249] \]
\[ B_2 = W_2 \times R_2 = [0.012, 0.120, 0.296, 0.367, 0.205] \]
\[ B_3 = W_3 \times R_3 = [0.047, 0.126, 0.312, 0.311, 0.205] \]
\[ B_4 = W_4 \times R_4 = [0.010, 0.072, 0.264, 0.369, 0.283] \]

Fuzzy quantization set of evaluation language has been set up \( S = [1, 2, 3, 4, 5] \). Therefore, the satisfaction evaluation scores of the surveyed tourists on "landscape resources", "environmental quality", "supporting facilities" and "service management" of Beijing botanical garden are:

\[ N_1 = B_1 \times S^T = 3.722 \]
\[ N_2 = B_2 \times S^T = 3.636 \]
\[ N_3 = B_3 \times S^T = 3.504 \]
\[ N_4 = B_4 \times S^T = 3.841 \]

Among them
\[ N_{11} = 3.921, N_{12} = 3.827, N_{13} = 3.683, N_{14} = 3.618, N_{15} = 3.696, \]
\[ N_{16} = 3.610, N_{17} = 3.656 \];
\[ N_{21} = 3.569, N_{22} = 3.602, N_{23} = 3.566, N_{24} = 3.762, N_{25} = 3.612 \]
\[ N_{31} = 3.222, N_{32} = 3.436, N_{33} = 3.043, N_{34} = 3.737, N_{35} = 3.724, \]
\[ N_{36} = 3.596, \]
\[ N_{41} = 3.789, N_{42} = 3.764, N_{43} = 3.862, N_{44} = 3.829, N_{15} = 3.967 \]

Based on the above steps, the overall satisfaction of tourists to the Beijing botanical garden can be obtained, that is, the overall satisfaction score = index score of the criterion layer × index weight of the criterion layer =3.695), the satisfaction of the four criterion layers are: landscape resources 3.722, environmental quality 3.636, supporting facilities 3.504, service management 3.841.
4. CONCLUSIONS

According to the results, the overall satisfaction of the surveyed tourists with the Beijing botanical garden is 3.695 points, which indicates that the overall satisfaction of tourists with the Beijing botanical garden is at a "high satisfaction" level, but there is still a lot of room for improvement, including 1.305 points. From the four indicators, tourists' satisfaction with "service management" is at the highest point of 3.841. The satisfaction of tourists on "supporting facilities" is at the lowest point of 3.504. Then, the surveyed tourists' satisfaction on each index of Beijing botanical garden is ranked from high to low: service management > landscape resources > environmental quality > supporting facilities.

REFERENCES