

Study on Fuzzy Comprehensive Evaluation of Tourism Service Quality

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Abstract: *Tourism service quality means if the service provided by tourism destination for tourists can achieve the desired effect, or the degree of meeting travel demand of tourists. Through the analysis of the characteristics of tourism service quality, this paper chooses the fuzzy evaluation method to evaluate. Analyze by synthesis on the influences of affecting the quality of tourism services, and provide reference for the future development of the tourism destination.*

Keywords: *tourism service quality; influences; fuzzy comprehensive evaluation*

1. INTRODUCTION

Economic development led to the rapid development of the tourism industry, so that the competition between tourism destinations is becoming more and more intense. The competition makes lots of scenic spots work on marketing of tourism products and the project of characteristics construction, regardless of the control of service quality. López – Toro(2010)[1]believes that the quality of tourism services is an important means to distinguish different tourism services and promote tourism competitiveness and attractiveness in the target market. Especially in today's society, the demand of tourism is so great, and the service quality of tourism destination is more important. A low quality service of tourism destination is not only detrimental to the local tourism image, but also harmful to the travel interests of the tourists. There are many factors influencing the quality of tourism services and the evaluation about it also largely depends on the subjective perception of tourists, what's more the conclusion of evaluation is fuzzy. So the method of fuzzy comprehensive evaluation is appropriate to these problems.

2. THE PRINCIPLE OF FUZZY COMPREHENSIVE EVALUATION

The fuzzy comprehensive evaluation method is based on the fuzzy mathematics method. The fuzzy mathematics theory is firstly put forward by American professor Zadeh [2], who studies on cybernetics, since then the method is used in various fields widely. Fuzzy comprehensive evaluation is a method which makes some factors quantitative, which the boundary is not clear and not quantified easily[3]. Then it makes a comprehensive evaluation on the membership grade status. To judge evaluation objects one by one, not affected by their collection of objects, is the biggest characteristic of fuzzy comprehensive evaluation.

3. THE EVALUATION INDEX OF TOURISM SERVICE QUALITY

Relative to the tourism enterprises, the evaluation index of service quality of tourism destination is more complex. The Factors considered are the service facilities of basic tourism facilities, public service including transportation, safety and environment and so on. In addition the local residents' attitude towards tourists and a variety of other problems also need to be considered. Residents' support is an important precondition and foundation for good running of travel operation system. Residents and visitors should be friendly and live in harmony [4].

This paper chooses the evaluation index of service quality mainly according to the content of tourism service, which is service, environment, facilities, characteristic, and shopping. The evaluation index system is established from above five aspects. Show them in the following table.

Table1. Evaluation index of tourism service quality

Tourism service quality evaluation U	Service U ₁	Service attitude U ₁₁
		Service capability U ₁₂
		Friendly degree of residents U ₁₃
	Environment U ₂	Air quality U ₂₁
		Accommodation sanitation U ₂₂
		Safety U ₂₃
		Accommodation safety design U ₂₄
	Facilities U ₃	Accommodation facilities quality U ₃₁
		The convenience of inter-city traffic U ₃₂
		The convenience of public toilets U ₃₃
		Guide sign of city U ₃₄
	Characteristic U ₄	landscape characteristic U ₄₁
		Cuisine characteristic U ₄₂
		Cultural characteristics U ₄₃
	Shopping U ₅	Commodity prices U ₅₁
		The quality of commodity U ₅₂
		Commodity characteristics U ₅₃
		Commodity classification U ₅₄
		Shop location U ₅₅

4. THE CONSTRUCTION OF FUZZY COMPREHENSIVE EVALUATION MODEL

4.1. Determine Evaluation Index Set

In this paper, it selects 19 evaluation indexes from five aspects including service, environment, facilities, characteristic and shopping on the basis of existing research, to form the tertiary comprehensive evaluation index system. The first is target layer: tourism service quality; The second is element layer, including service, environment, facilities, features and shopping; The Third is indexes layer, including 19 indexes such as service attitude, service ability and so on.

4.2. Determine Evaluation Set

The number of evaluation set is commonly the integer between 4 and 9, evaluation set is a kind of description of evaluation index in each level. The evaluation set of this model : V = (V1, V2, V3, V4) = (very good, good, general, bad).

4.3. Determine Weight

Catch a fuzzy subset from U, A = (a1, a2 ... an), the ai > 0, and a1 + a2 + ... + an = 1, ai means the weight of factor i. There are two kinds of methods to determine weights, one is relying on subjective experience represented by experts' estimation; the other is using mathematical method to determine, such as analytic hierarchy process. The evaluation system of this model is relatively simple, so it uses the method of experts' estimation to determine the weights, the results are as following:

A = (0.4, 0.2, 0.15, 0.15, 0.1)

A₁ = (0.4, 0.3, 0.3)

A₂ = (0.3, 0.3, 0.2, 0.2)

A₃ = (0.3, 0.25, 0.25, 0.2)

A₄ = (0.40, 0.30, 0.30)

A₅ = (0.25, 0.25, 0.20, 0.15, 0.15)

4.4. Determine Fuzzy Relationship Matrix

Some relevant experts make single factor evaluation to each element in the evaluation index system. By sorting and counting the results of the survey, we can get the matrix of single factor fuzzy evaluation.

$$R = (r_{ij})_{n \times m} = \begin{bmatrix} r_{11} & r_{12} & \dots & r_{1m} \\ r_{21} & r_{22} & \dots & r_{2m} \\ \dots & \dots & \dots & \dots \\ r_{n1} & r_{n2} & \dots & r_{nm} \end{bmatrix}$$

To determine the R, the chosen judge group should give an evaluation level to the evaluation elements of tourism service quality firstly, that is the single factor evaluation; then integrate all the evaluation results, and obtained the membership degree of each level of factor U_i . Specific steps are as following:

1. Service

According to table 1, there are three factors influencing the "service", the domain of factors for $U_1 =$ (service attitude, service ability, the friendly level of residents), the evaluation set $V =$ (very good, good, general, bad).

After experts' discussion conclude:

The membership degree of "service attitude" $R_1=(0.360.390.250)$

The membership degree of "service ability" $R_2=(0.27 0.35 0.35 0.03)$

The membership degree of "the friendly level of residents" $R_3=(0.32 0.30 0.32 0.06)$

The evaluation matrix of "service" composed by three factors is

$$R_1 = \begin{bmatrix} 0.36 & 0.39 & 0.25 & 0 \\ 0.27 & 0.35 & 0.35 & 0.03 \\ 0.32 & 0.30 & 0.32 & 0.06 \end{bmatrix}$$

2. Environment

According to the above methods, the evaluation matrix of "environment" consisting of four factors is

$$R_2 = \begin{bmatrix} 0.75 & 0.15 & 0.15 & 0 \\ 0.50 & 0.25 & 0.25 & 0 \\ 0.50 & 0.30 & 0.20 & 0 \\ 0.45 & 0.30 & 0.15 & 0.10 \end{bmatrix}$$

3. Facilities

Similarly, the evaluation matrix of "equipment" is

$$R_3 = \begin{bmatrix} 0.40 & 0.24 & 0.25 & 0.11 \\ 0.35 & 0.42 & 0.20 & 0.03 \\ 0.33 & 0.34 & 0.26 & 0.07 \\ 0.30 & 0.36 & 0.25 & 0.09 \end{bmatrix}$$

4. Characteristic

Similarly, the evaluation matrix of "Characteristic" is

$$R_4 = \begin{bmatrix} 0.30 & 0.25 & 0.25 & 0.2 \\ 0.50 & 0.40 & 0.10 & 0 \\ 0.30 & 0.30 & 0.30 & 0.10 \end{bmatrix}$$

5. Shopping

Similarly, the evaluation matrix of "Shopping" is

$$R_5 = \begin{bmatrix} 0.25 & 0.32 & 0.25 & 0.18 \\ 0.30 & 0.25 & 0.23 & 0.22 \\ 0.30 & 0.30 & 0.26 & 0.14 \\ 0.30 & 0.47 & 0.20 & 0.03 \\ 0.32 & 0.37 & 0.22 & 0.09 \end{bmatrix}$$

4.5. Choose Composition Operator, Carry on the Comprehensive Evaluation

From the above A and R, we can calculate according to the formula:

$B = A \circ R = (b_1, b_2, \dots, b_m)$, this is the fuzzy comprehensive evaluation model. The notation " \circ " means general synthetic operation.

$$B_1 = A_1 \circ R_1 = (0.4, 0.3, 0.3) \begin{bmatrix} 0.36 & 0.39 & 0.25 & 0 \\ 0.27 & 0.35 & 0.35 & 0.03 \\ 0.32 & 0.30 & 0.32 & 0.06 \end{bmatrix} = (0.341, 0.370, 0.276, 0.013)$$

Similarly, we can get the results of B_2, B_3, B_4 and B_5 . Then we can obtain the comprehensive evaluation matrix:

$$R = \begin{bmatrix} 0.341 & 0.370 & 0.276 & 0.013 \\ 0.565 & 0.240 & 0.175 & 0.020 \\ 0.350 & 0.334 & 0.240 & 0.076 \\ 0.360 & 0.310 & 0.220 & 0.110 \\ 0.290 & 0.329 & 0.235 & 0.146 \end{bmatrix}$$

$$B = A \circ R = (0.4, 0.2, 0.15, 0.15, 0.1) \begin{bmatrix} 0.341 & 0.370 & 0.276 & 0.013 \\ 0.565 & 0.240 & 0.175 & 0.020 \\ 0.350 & 0.334 & 0.240 & 0.076 \\ 0.360 & 0.310 & 0.220 & 0.110 \\ 0.290 & 0.329 & 0.235 & 0.146 \end{bmatrix}$$

$$= (0.3894, 0.3255, 0.2379, 0.0517)$$

The calculation results show that 38.49% of people believe that the service quality of the tourism destination is "very good", 32.55% of people think that is "good", 23.79% think that is "general", 5.17% think that is "bad". According to the maximum membership degree principle, the service quality evaluation of the tourism destination is "very good".

On the basis of the above, make the comment "very good" has 5 points, "good" has four points, "general" has three points, "bad" has 2 points, then the assessment score vector of the evaluation set is as following:

$$C = (5 \ 4 \ 3 \ 2)^T$$

The final score of the service quality of the tourism destination is:

$$Q = B \cdot C = (0.3849 \ 0.3255 \ 0.2379 \ 0.0517) (5 \ 4 \ 3 \ 2)^T = 4.0436 \text{ (points)}$$

6. CONCLUSION

Tourism service quality is a vital condition to measure whether a tourist destination is good or not, and is also a direct basis for visitors to evaluate a tourism destination. In other words, the tourism service quality is the subjective judgment and perception of tourists. At the same time, it is difficult to analyze the tourism service quality because it involves many different factors. Fuzzy comprehensive evaluation method is more comprehensive compared with other methods, and it can evaluate both subjective and objective indicators, besides we can increase or reduce impact factors in the process of using. So in this paper, we select fuzzy comprehensive evaluation method to solve the related problems well.

Nowadays, with the rapid development of tourism, tourism destination managers should carry out other competitive tourism projects on the basis of the quality of tourist service, rather than pursuit innovation or novelty blindly but be indifferent to the service and experience accepted by visitors. Only guarantee tourists' experience and improve the service quality, can the development of the tourism destination be sustainable and advanced.

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